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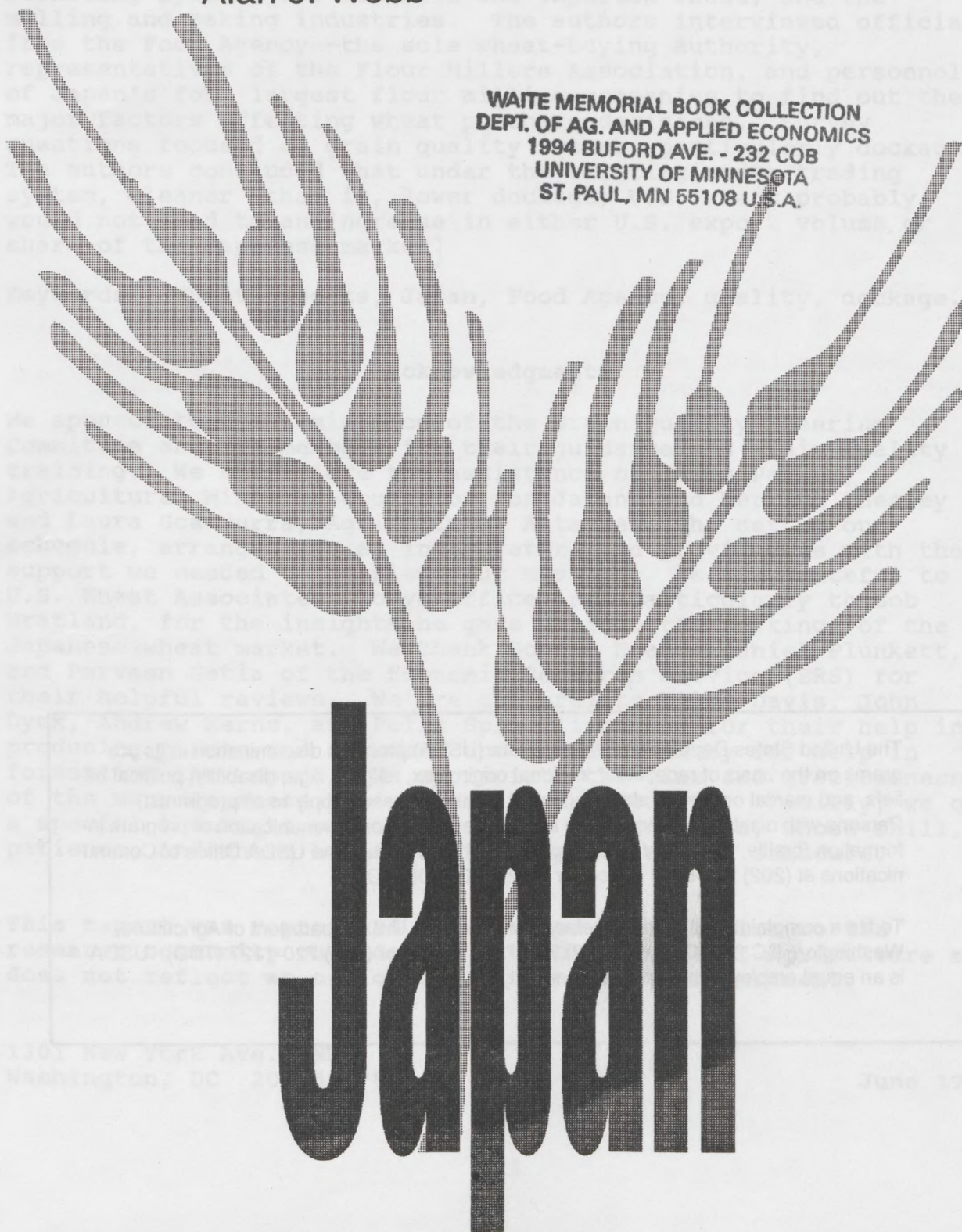
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Determinants of Wheat Import Demand

Lois A. Caplan
Alan J. Webb

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Abstract

This paper describes trends in Japanese wheat production, consumption, and trade. It also describes pricing policies, the marketing systems for domestic and imported wheat, and the milling and baking industries. The authors interviewed officials from the Food Agency--the sole wheat-buying authority, representatives of the Flour Millers Association, and personnel of Japan's four largest flour milling companies to find out the major factors affecting wheat purchase decisions. Survey questions focused on grain quality issues, particularly dockage. The authors concluded that under the existing state-trading system, cleaner (that is, lower dockage) U.S. wheat probably would not lead to an increase in either U.S. export volume or share of the Japanese market.

Keywords: Wheat imports, Japan, Food Agency, quality, dockage.

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We appreciate the assistance of the Grain Quality Steering Committee and its members for their guidance and grain quality training. We appreciate the assistance of James Parker, Agricultural Minister-Counselor for Japan, and Merritt Chesley and Laura Scandurra, Agricultural Attaches, who set up our schedule, arranged for an interpreter, and provided us with the support we needed to complete our mission. We are grateful to U.S. Wheat Associates' Tokyo office, and particularly to Bob Bratland, for the insights he gave us into the workings of the Japanese wheat market. We thank Sophia Huang, Daniel Plunkett, and Parveen Setia of the Economic Research Service (ERS) for their helpful reviews. We are grateful to Wilma Davis, John Dyck, Andrew Kerns, and Felix Spinelli of ERS for their help in producing charts and figures, and to Terri Raney for help in formatting the report. We appreciate the time and graciousness of the many Japanese businessmen we interviewed. Finally, we owe a special thanks to our interpreter, Takako Osuga, whose skill, patience, and charm helped us to complete a full schedule.

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June 1994

Preface

This report is 1 of 17 reports covering 18 wheat-importing countries prepared by the Economic Research Service (ERS) in support of a comprehensive study of cleaning U.S. wheat destined for export. Similar reports are forthcoming for corn and soybeans.

The Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA) required the Federal Grain Inspection Service (FGIS) to establish or amend grain grades and standards to include, "...economically and commercially practical levels of cleanliness." The legislation required FGIS to determine if the benefits of cleaning exceeded the costs. FGIS subsequently asked ERS to conduct the study. The comprehensive study on wheat included two major components: 1) economic-engineering studies of the cost of wheat cleaning in the United States and estimates of domestic benefits from cleaning and 2) a series of in-country interviews of buyers in major wheat-importing countries to determine the effects of cleaner U.S. wheat on sales in these markets.

The results of this work have been prepared in a three-volume set:

"Economic Implications of Cleaning Wheat in the United States" (AER-669), by B.T. Hyberg, M. Ash, W. Lin, C. Lin, L. Aldrich, and D. Pace;

"The Role of Quality in Wheat Import Decisionmaking" (AER-670), by Stephanie Mercier; and

"The Costs and Benefits of U.S. Cleaning Wheat: Overview and Implications" (AER-675), by William Lin and Mack Leath.

The 18-country case studies form the foundation for the results of the international component of the wheat-cleaning study. The 18 countries studied accounted for 58 percent of world wheat imports and 63 percent of U.S. wheat sales in 1991. Each report has two components: background on the wheat-marketing policies, institutions, and distribution system in the wheat-importing country and results of interviews of wheat traders, processors, and government officials. All the interviews were completed during April-September 1992, and all followed a similar format. Each interview team consisted of both a commodity specialist and a country specialist. They attended a series of seminars on grain quality issues, data collection, and interview procedures before doing their interviews.

All the interviews followed a specific set of guidelines. An advisory panel of government officials, private traders and trade association members helped develop the questions, which consisted of five topic areas:

- The most important factors in the choice of a supplier country;

- Quality factors most important to the importer's purchase decisions and the importer's perception of wheat purchased from their suppliers;
- Contract specifications the importer uses to communicate preferences;
- The level of dockage in the shipments the importer receives and the costs of removing it; and
- If U.S. wheat were cleaner, would the importer purchase more and/or be willing to pay more?

The background information on the wheat-importing country and the responses from the interviews provide a unique insight into the role of quality factors in the wheat purchase decisions of the major importers of U.S. wheat.

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Summary

Japan is the world's largest nonconcessional wheat importer, with purchases of 6 million tons in 1992. The United States, Canada, and Australia supply all of Japan's wheat imports. Japan has entered into annual wheat supply agreements with Canada and Australia for more than two decades. Although no supply agreement between Japan and the United States has been in place since the late 1970's, U.S. wheat has maintained a predominant and steady share of the Japanese market.

After falling during the 1960's, Japanese wheat production grew steadily from 1973 to 1988, when it reached just over 1 million tons. Production has declined since 1988 because of reduced producer prices and planted area. Domestic wheat accounted for approximately 12 percent of total consumption in the 1992/93 (July-June) marketing year.

The Japanese wheat market is now a mature one, with demand for food-use wheat driven primarily by population growth, which is under 0.4 percent per year. Future wheat import demand, expected to be about 6 million tons by the end of the decade, will be driven mainly by increased consumption, assuming domestic output stays at current levels.

The Japanese Food Agency controls the purchase, pricing, and distribution of almost all domestic and imported wheat. The Food Agency conducts about 45 tenders a year, specifying wheat types, grades, and terms and conditions of purchase. Eleven Japanese trading companies actively purchase wheat on behalf of the Food Agency, and deliver it to designated ports in Japan.

Japan's wheat milling and baking industries are dominated by large companies. Milling and baking technology is very sophisticated, so as to meet the high quality requirements demanded by Japanese consumers. The Flour Millers Association represents the major wheat milling companies in Japan.

The major quality issues for U.S. wheat centered on: undesirably high protein levels (above 9-10 percent) in western white (WW) wheat, used for confectionery; excessive dockage compared with Canadian and Australian wheat; low protein levels (below 14 percent) in dark northern spring (DNS) wheat, used primarily for bread; variability in certain intrinsic properties among cargoes in a given year and from year-to-year; and higher post-harvest chemical residue levels in certain U.S. wheat classes than were found in Canadian and Australian wheat.

Food Agency officials indicated they might offer a small premium for cleaner (that is, lower dockage) U.S. wheat. An estimated premium would be \$2-\$3 per ton. Under the existing state-trading system for wheat in Japan, cleaner grain probably would not lead to an increase in either U.S. export volume or share of the Japanese market. Past trading patterns underscore the importance to Japan of maintaining good trade relationships with and stable market shares for its three wheat suppliers.

Japan

Determinants of Wheat Import Demand

Lois A. Caplan
Alan J. Webb

Introduction

Japan's economy is the second largest in the world, after the United States. Per capita incomes in Japan on a nominal basis have exceeded those in the United States since 1988, and were over \$33,000 in 1992 (table 1). Japan's population of 124 million is growing slowly at around 0.35 percent per year, and is aging rapidly; by 2025, about one-fourth of Japan's population is expected to be 65 years or older. These demographic trends will have important consequences for Japan's future economy and could affect food consumption patterns as well.

Agriculture plays only a minor role in Japan's highly industrialized economy, contributing less than 3 percent of gross domestic product (GDP) in recent years; in contrast, the service sector has become increasingly more important. Rice remains the dominant crop in Japan, accounting for over one-fourth of total farm cash receipts in Japanese fiscal year 1992 (April 1992-March 1993). Vegetables are second in importance, and livestock products are ranked a close third, reflecting the rapid development of Japan's livestock industries since the 1960's.

Japan's real economic growth was on average slower during the 1980's than during the previous decade. In the 1980's, Japan emerged as a major exporter of capital as a result of a leveling off of domestic private investment and a continued high savings rate. The strengthening yen in the mid-1980's heightened competition for Japan's export and import-competing industries, highlighting the country's need to rely more on domestic demand for growth. Since 1986, Japan's economic growth has been driven primarily by domestic demand rather than by exports.

Japan's fast-paced "bubble economy" of the late 1980's, which was fueled by rises in stock and real estate values, halted by the early 1990's. Since peaking at the end of 1989, stock prices have fallen dramatically, and, over the past several years, land values have declined as well. The drop in the value of domestic assets caused demand in the economy to fall, contributing to the 1992-93 recession.

Table 1--Japan: Economic indicators

Item	Unit	1985-89 average	1990	1991	1992
Gross domestic product:					
In current prices	Tril.Yen	356	429	495	526
In current prices	Tril.USD	2.18	2.96	3.67	4.15
Per capita	USD	17,814	23,948	29,677	33,333
In 1985 prices	Tril.Yen	349	399	415	421
Change	Percent	4.6	4.2	4.0	1.4
Domestic prices:					
Wholesale price index	1990=100	99.6	100.0	101.0	100.1
Change	Percent	-1.6	1.5	1.0	-0.9
Consumer price index	1990=100	94.7	100.0	103.3	105.0
Change	Percent	0.9	3.1	3.3	1.6
Food price index	1990=100	94.4	100.0	104.8	105.4
Change	Percent	0.5	4.1	4.8	0.6
Balance of payments:					
Imports, c.i.f.	Bil.USD	160.7	234.8	236.7	233.0
Change	Percent	13.4	11.4	0.8	-1.6
Exports, f.o.b.	Bil.USD	230.8	286.9	314.5	339.7
Change	Percent	12.1	4.3	9.6	8.0
Trade balance	Bil.USD	70.1	52.1	77.8	106.7
Current acct. balance	Bil.USD	71.8	35.8	72.6	116.3
Exchange rate	Yen/USD	164	145	135	127
Population	Million	122.2	123.6	124.0	124.5
Change	Percent	0.5	0.3	0.3	0.3

Sources: Monthly Statistics of Japan, Management and Coordination Agency; The Summary Trade Report of Japan, Japan Tariff Association; DRI World Market Country Summaries; Monthly Statistics of Agriculture, Forestry, and Fisheries, MAFF.

Wheat Supply and Demand Trends

Production

Following a decline during the 1960's, Japanese wheat production grew almost steadily from 1973 to 1988, when it reached just over 1 million tons (fig. 1). Wheat area and output expanded as a result of subsidies provided to rice growers to divert paddyland to wheat and other target crops, such as barley, soybeans, vegetables, and forages, under the Government's various riceland diversion programs in place since the early 1970's. Wheat production had declined during the 1960's, in part because of Government price policies that encouraged rice production--the mainstay of Japanese agriculture. With the goal of raising farm household incomes, the Government-set producer rice price was doubled over the decade, and doubled again during the 1970's, which eventually created a surplus rice problem (Coyle, 1981).

Wheat production fell in 1989-91, mainly because of reduced planted area and, in 1991, a drop in yields. Declining wheat producer prices since 1986 discouraged wheat production, even with Government riceland diversion subsidies. In 1992, production remained at the 1991 level of 759,000 tons because of a continued decline in wheat area and poor yields in Hokkaido (Japan's northern island), where more than half of the nation's wheat crop is grown. Wheat area declined in 1992 primarily because the Government wanted to divert less riceland to other crops, including wheat, in an effort to make up for a shortage of Government rice stocks. Domestic output accounted for approximately 12 percent of total consumption in the 1992/93 (July-June) marketing year.

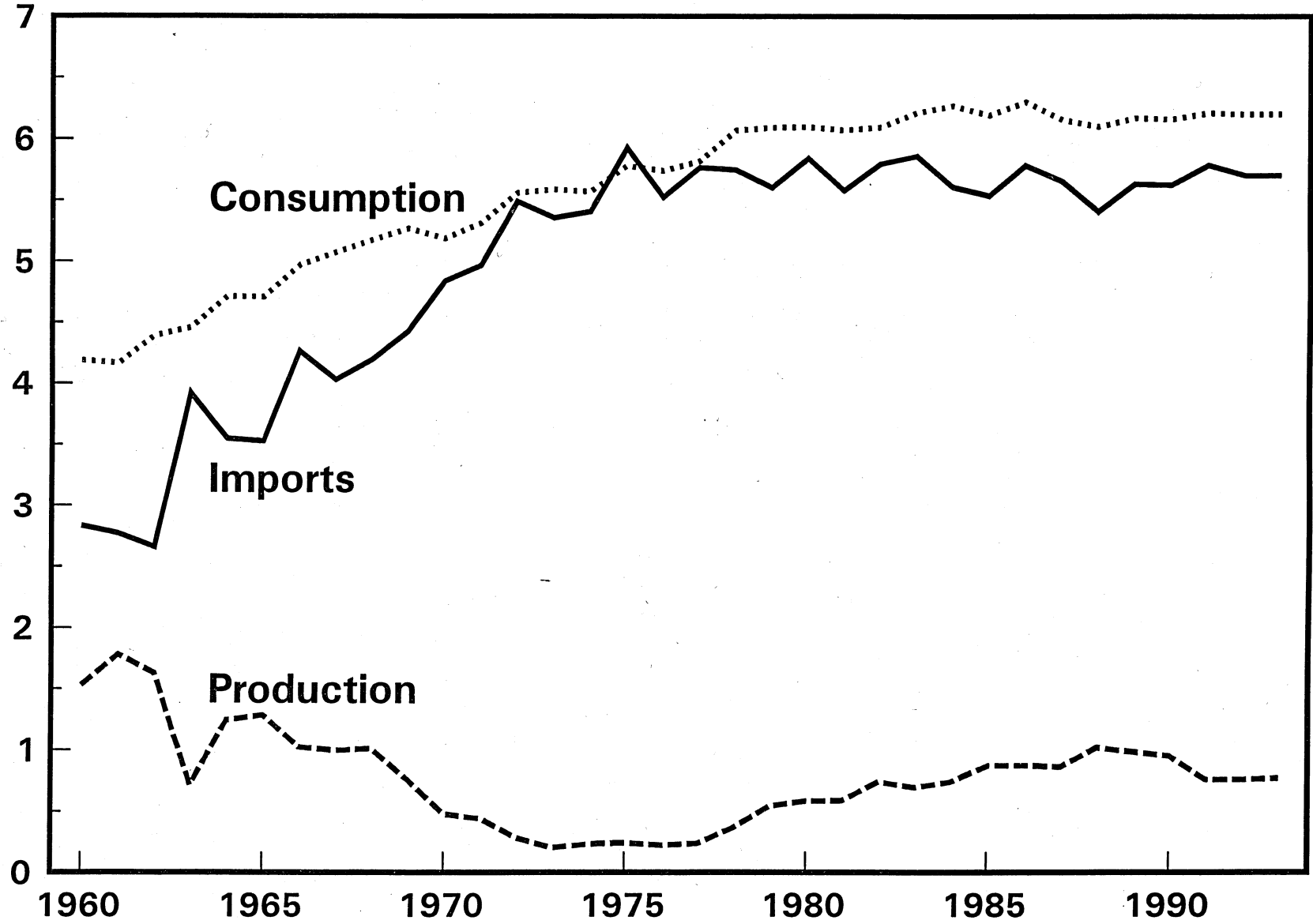
Consumption

Traditionally, the Japanese have consumed starchy foods, such as rice, wheat (mainly as noodles), barley (usually mixed with rice), and sweet potatoes, as their primary source of dietary calories. Over the last three and a half decades, the amount of starches in the Japanese diet has declined, while the amounts of proteins (especially animal proteins) and fats have increased. Per capita consumption of rice, a food staple and important source of starch in the Japanese diet, has been declining since the early 1960's, contributing to an overall decline in cereal consumption. While per capita wheat consumption has remained fairly steady over the last two decades, it is less than half that of rice: in 1989 (the latest year for which Japanese Government data are available), per capita wheat consumption was 31.7 kilograms, compared with 70 kilograms for rice (MAFF, 1991).

Total wheat consumption grew rapidly during the 1960's, expanding by one-third over the decade. Consumption was spurred by a rise in per capita consumption (attributed to income growth), population growth, and increased use of wheat for animal feed. During the 1970's, wheat consumption grew more slowly, rising

Figure 1. Japan: Wheat supply and use trends

Million tons



about 15 percent over the decade, partly reflecting consumers' desire to include more animal protein in their diets--and less starch--and to eat a greater variety of foods. During the 1980's, total wheat consumption remained almost flat, averaging 6.2 million tons per year (FAS, PS&D data). The Japanese wheat market is now mature, with demand for food-use wheat driven primarily by population growth, which is under 0.4 percent per year.

The United States was instrumental in promoting wheat consumption in Japan after the Second World War. In the postwar period, the United States shipped wheat to Japan on a concessional basis under various U.S. Government programs (Title I, Title II, Sec. 416), or on a barter basis. Because of rice shortages during that time, the Japanese Government, with U.S. support (including donations of wheat flour for a short period of time), instituted a school lunch program. The program initially provided bread, milk, and other foods for use in school meals. However, when a rice surplus emerged by 1970, rice was introduced into the school lunch program because of pressure from rice producer groups and Government policy to promote rice as a traditional food (Wailes, et al., 1991). In a turnaround, Japan's disastrous 1993 rice harvest--the lowest since 1945--is likely to result in increased bread and noodle consumption in 1994, especially in school cafeterias: they reportedly have already shifted menus from rice-based lunches to meals centered on bread and noodles (Journal of Commerce, Nov. 1993).

Feed Wheat

Wheat used directly in mixed feed for livestock averaged less than 250,000 tons in 1990/91 (July-June) and 1991/92 (FAS, Jan. 1993). The feed market absorbs about 40,000 tons of whole kernel wheat annually, mostly supplied by Canada and Australia (U.S. Wheat Associates, Nov. 1992). However, wheat bran, a byproduct of wheat milling, is more widely used in livestock feed, chiefly for dairy cattle. Under Japan's more-wheat-bran system, wheat is milled at a rate to yield 50 percent flour and a 50 percent bran-and-starch product.¹ The normal wheat milling rate in Japan is 78 percent, yielding 78 percent flour and 12 percent bran; this compares with a wheat flour extraction rate in the United States of around 74 percent (Harwood, et al., 1989).

Flour millers sell the bran at a Government-set price, which was 606 yen per 30 kilograms (\$0.15 per kg at 137 yen per dollar) during 1989-92 (U.S. Wheat Associates, Nov. 1992). The flour produced under this system, which is mainly used for noodle manufacture, is sold to end-users, to other millers for blending, or is used by the mill itself for blending (Japan Flour Millers Association, 1978).

¹ The flour milling yield under the more-wheat-bran system was 40 percent during 1972 to 1975, increased to 45 percent in 1976, and was subsequently increased to 50 percent.

Table 2--Japanese wheat imports by type

Item	Volume				Unit value			
	1989	1990	1991	1992	1989	1990	1991	1992
	<u>1,000 metric tons</u>				<u>Dollars per MT</u>			
Durum:								
United States	0	2	10	7	415	153	166	210
Canada	128	132	146	139	224	182	154	176
Total	128	134	157	146	224	182	155	178
Feed:								
United States	539	516	583	688	202	171	152	187
Australia	566	532	540	504	204	183	159	200
Canada	27	8	27	52	212	211	139	177
Total	1132	1056	1150	1245	203	178	155	192
Nonfeed:								
United States	2540	2537	2687	2734	204	178	155	191
Australia	489	476	504	498	203	180	155	192
Canada	1291	1272	1195	1357	240	207	184	215
Total	4319	4284	4386	4589	215	187	163	198
All wheat:								
United States	3079	3055	3280	3429	204	177	154	190
Australia	1054	1077	1044	1002	203	182	157	196
Canada	1446	1412	1369	1548	238	204	180	210
Total	5578	5474	5693	5979	212	185	161	196

Source: Ministry of Finance, Japanese Imports and Exports, Commodity by Country.

After the mid-1950's, Japanese imports of feed wheat--milled primarily for bran--increased markedly in just a short time, boosted by rapid growth in Japan's livestock industry. At first, Australian wheat was imported only as feed wheat, while Canadian and U.S. hard winter wheats were eligible both as food and feed imports. U.S. western white wheat was imported exclusively as a food wheat until 1963, when the Food Agency made it eligible as a feed wheat also (FAS, 1966).

In recent years, Australia and the United States have been the main suppliers of feed category wheat, as classified by Japanese import data (table 2). In 1989-1992, out of total Japanese wheat imports from each country, the share classified as feed imports averaged 51 percent for Australian wheat, 18 percent for U.S. wheat, and 2 percent for Canadian wheat.

Wheat Flour Usage

The primary uses for wheat flour in Japan are breads, noodles (Japanese and Chinese types), confectionery (crackers, biscuits, cookies, cakes, Japanese-type confectionery), household uses (home-use flour, tempura batter), industrial uses (sodium

glutamate, miso, soy sauce, wheat starch), and other (breeding, pet and fish food). Out of total wheat flour usage in 1991 (the latest data available), the respective shares for each of these categories were 36.2 percent, 35.9, 12.8, 4.1, 1.8, and 9.2. Their relative shares have stayed fairly steady since the mid-1970's: the only notable changes in flour consumption were a slight decline for industrial uses and a slight increase for "other" uses (fig. 2).

Japanese millers require many types of wheat to produce a variety of flours, which are used in many diverse end-products. The primary wheat classes and their principal end-uses are shown in figure 3. For bread, the primary wheats used are No. 1 Canadian western red spring (1CWRS), U.S. dark northern spring (DNS), U.S. hard red winter (HRW), and Australian prime hard (PH); for Chinese noodles, U.S. HRW (11.5 percent and 13 percent protein), U.S. DNS, and Australian PH; for Japanese noodles, Australian standard white (ASW) and domestic wheat; for pasta, Canadian durum and U.S. durum; and for cookies and cakes, U.S. western white wheat (WW).

The wheat grown in Japan is a low-protein soft wheat, which is mainly blended with Australian wheat to manufacture Japanese noodles. Domestic wheat is considered inferior to imported wheats for milling purposes because of its lower density, higher ash content, and thicker husks, which reduce milling yield. It also has a poor flour color. Japanese millers and bakers do not add vital wheat gluten to offset low protein in domestic wheat.

In contrast to strict Food Agency control over the pricing and distribution of domestic and imported wheat, the Government does not interfere with the production, pricing, quality, or marketing of flour. By custom, Japanese millers classify flour as hard, semi-hard, ordinary, and soft, depending on protein content (Japan Flour Millers Association, 1978). Although there are no official classifications, flour is generally sorted, on the basis of ash content, into four grades--Nos. 1, 2, 3, and a fourth grade for nonfood use (Sosland, 1987).

Wheat Imports

Japan imported 6.0 million tons of wheat in 1992, worth \$1.2 billion. The United States, Canada, and Australia supply all of Japan's wheat imports. Since 1974, Japan has purchased all of its wheat from these three countries, except for a small amount from Austria in 1981 and from South Africa in 1991 (1,000 tons of durum wheat).

Japan was the largest cash (that is, non-concessional, non-EEP (export enhancement program)) customer for U.S. wheat in 1992, taking 10.5 percent by volume and 13.1 percent by value of U.S. wheat exports worldwide. In 1992, only U.S. wheat shipments to the former Soviet Union and Egypt, 7.457 and 4.044 million tons, respectively, exceeded those to Japan of 3.545 million tons (FATUS, June 1993). However, those sales were largely dependent

Figure 2. Japan: Wheat flour uses

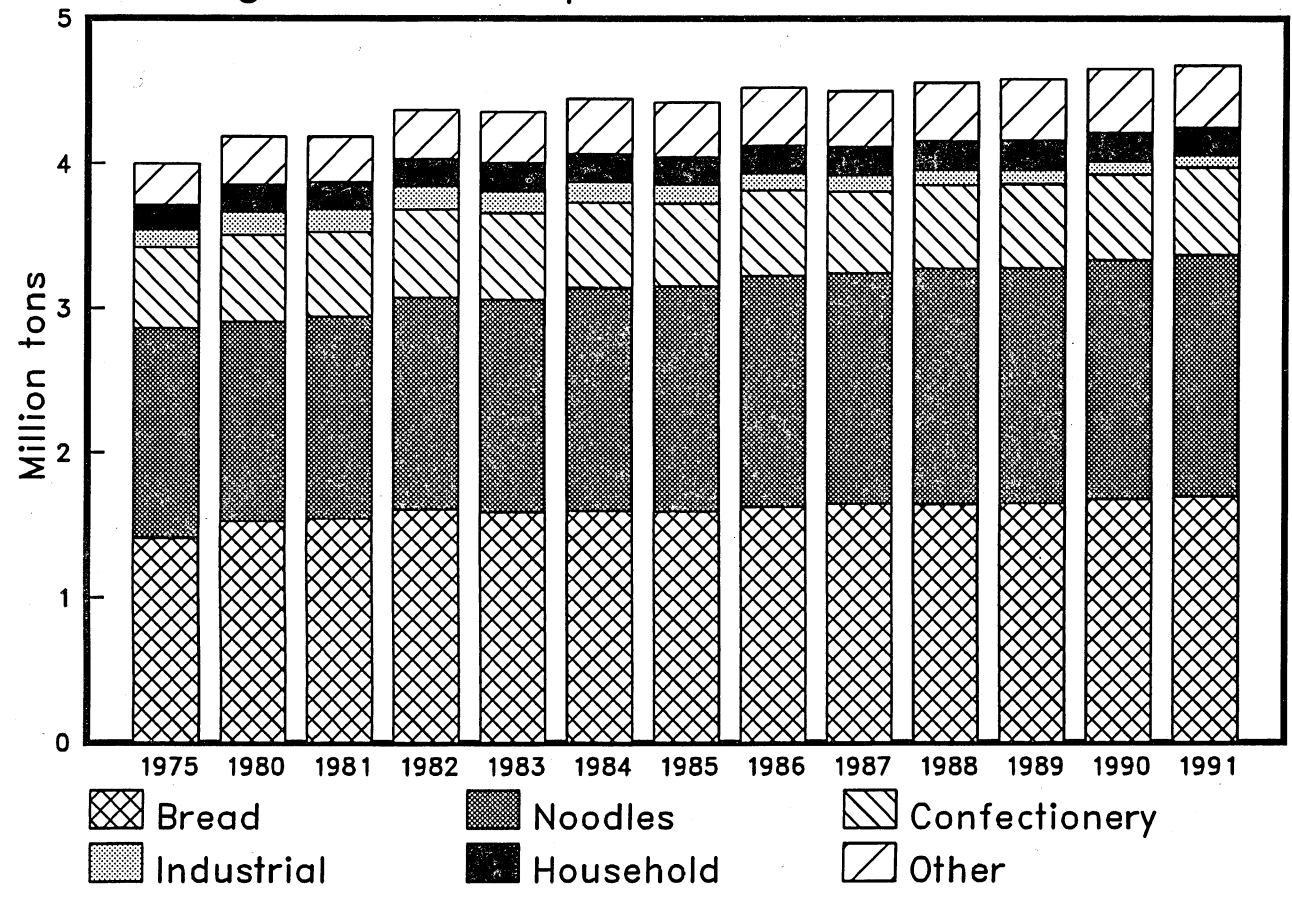
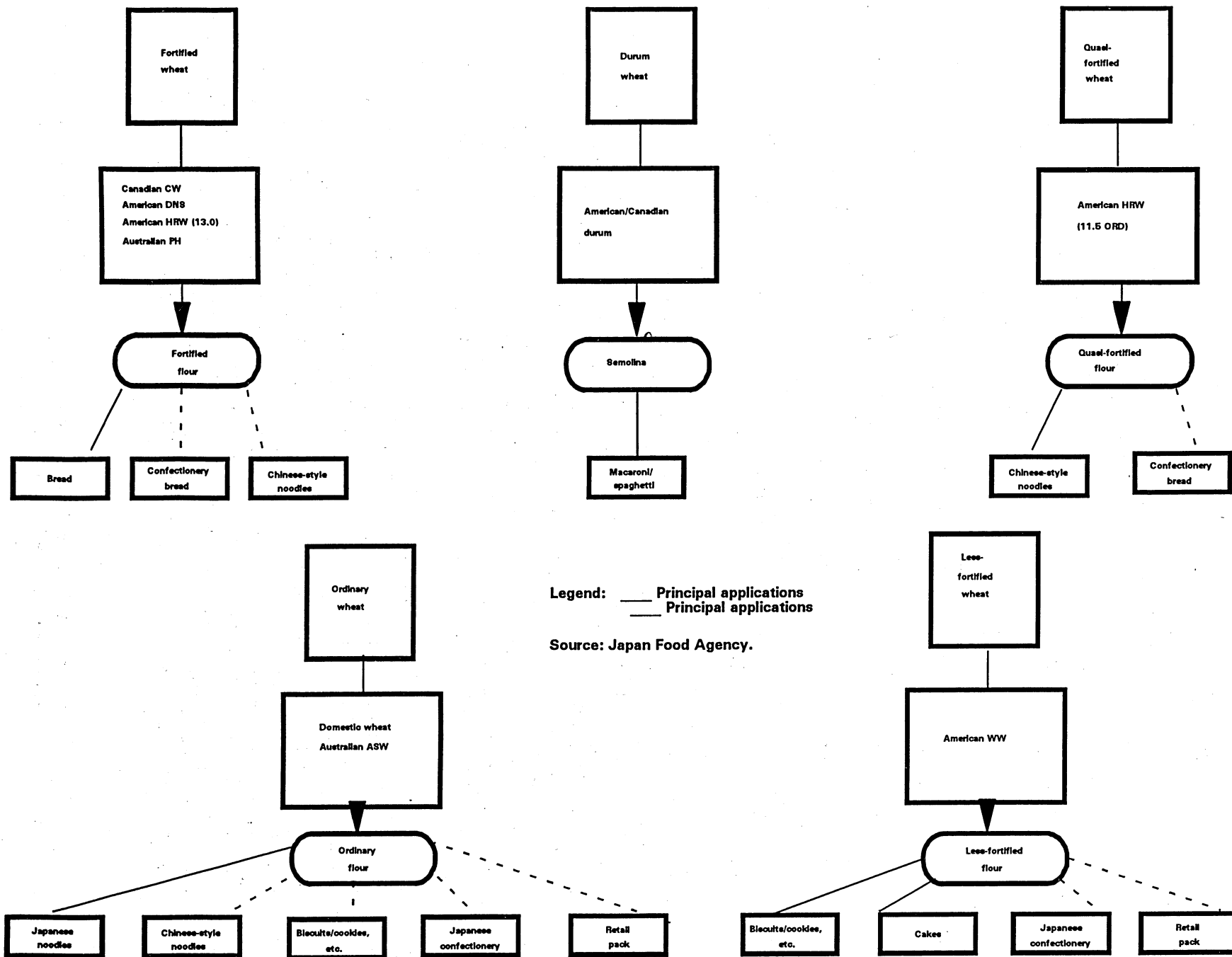


Figure 3. Japan: Wheat and wheat flour end uses



on U.S. credit programs and export subsidies under the export enhancement program.

Japan is also an important outlet for Australian and Canadian wheat. Australia's shipments to Japan were an estimated 10 percent of its total wheat exports in 1992/93, and Canada's exports to Japan comprised an estimated 6 percent of its 1992/93 global shipments (U.S. Dept. of Agr., Nov. 1993).

Japan has entered into annual wheat supply arrangements with Canada and Australia for more than 20 years. A wheat-supply agreement with the United States--the so-called Butz-Abe Agreement--was in force from 1975 to 1978. Under this pact, Japan agreed to purchase 3 million tons of U.S. wheat during the first year, and 3.1 million tons per year during the second and third years. Turmoil in the world wheat market in 1972 and fear of grain shortages prompted Japan to seek these agreements.

From 1980 to 1991, Japan's imports of Canadian wheat averaged 1.38 million tons, with Canada's share of total Japanese wheat imports staying between 23 and 26 percent (table 3 and fig. 4). In 1992, Canada agreed to supply Japan with 1.2 million tons (plus or minus 10 percent) under their bilateral supply arrangement, but Japan's actual imports rose to 1.55 million tons. In 1993, the Canadian Wheat Board agreed to supply 1.2 million tons.

Japan's imports of Australian wheat averaged just over 1 million tons from 1980 to 1991, with Australia's share of total Japanese wheat imports remaining between 16 and 19 percent (table 3 and fig. 4). Because of a drought in Australia's main wheat production area and a shortfall of prime hard wheat, Japan amended its 1992 wheat purchase agreement with Australia to import only 680,000 tons, down from a more normal 900,000 tons. However, actual Japanese imports from Australia that year amounted to slightly over 1 million tons. In 1993, Japan was expected to purchase 830,000 tons (Agra Europe, Feb. 1993).

Although no formal supply agreement between Japan and the United States has existed since the late 1970's (see above), the U.S. share of Japan's wheat imports has remained very steady, staying between 55 and 60 percent during the 1980's (table 3 and fig. 4). Some reasons why U.S. wheat has enjoyed such a dominant and stable share of the Japanese market include the longtime presence and market development efforts of U.S. Wheat Associates,² reliability in terms of supply, and the availability of many wheat classes. In addition, two key Japanese trade policy aims--to secure stable sources of supply and to maintain good customer relationships--have led to relatively constant market shares for its three suppliers: the United States, Canada, and Australia.

² U.S. Wheat Associates is a U.S. Department of Agriculture cooperator group that represents wheat producers.

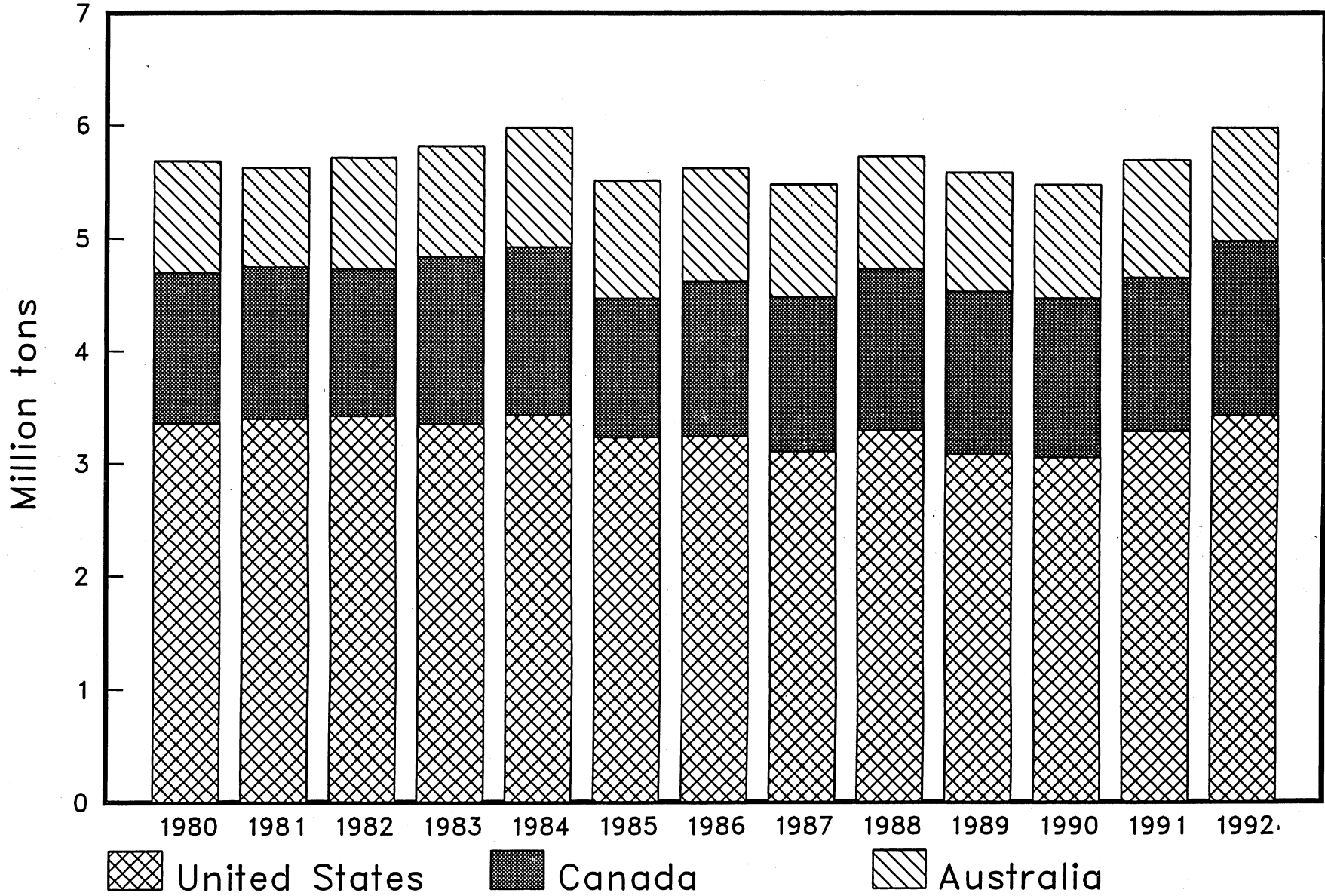
Table 3--Japanese wheat imports by supplier

Country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
	1,000 tons												
United States	3,352	3,394	3,417	3,348	3,433	3,232	3,241	3,103	3,294	3,079	3,055	3,280	3,429
Canada	1,340	1,351	1,309	1,486	1,485	1,234	1,377	1,373	1,430	1,446	1,412	1,369	1,548
Australia	990	882	987	983	1,061	1,044	1,002	1,000	999	1,054	1,007	1,044	1,002
Others	0	6	0	-1	-1	0	0	0	1	-1	0	1	0
Total	5,682	5,633	5,713	5,816	5,978	5,510	5,620	5,476	5,724	5,578	5,474	5,694	5,979
U.S. share (pct)	59	60	60	58	57	59	58	57	58	55	56	58	57

Note: Negative numbers are the result of rounding.

Source: Ministry of Finance, Japan Exports and Imports, Commodity by Country, December issues.

Figure 4. Japanese wheat imports



U.S. Wheat Classes

The relative shares of the major U.S. wheat classes shipped to Japan changed significantly during 1975-89, probably reflecting, to some extent, shifts in consumer preferences and flour usage (fig. 5). The share of hard red spring wheat rose from about one-fifth to almost one-third, while that of hard red winter declined from 45 percent to about 39 percent. Western white's share fell from almost 37 percent in 1980 to 29 percent in 1989, with a significant dip to 27 percent in 1988. Durum wheat represented only a small portion (less than 2 percent) of total U.S. wheat exports to Japan over the period.

Durum Wheat

Although Japan's consumption of durum wheat has grown with an increase in the popularity of pasta products, durum imports comprise only a very small portion (2.4 percent in calendar 1992) of total wheat imports. Japan imports durum wheat chiefly from Canada, and its purchases of U.S. durum are variable and relatively small: out of total Japanese durum imports of 146,000 tons in 1992, Canada's share was 95 percent and the U.S. share was 5 percent. U.S. Wheat Associates, with funds from the U.S. Department of Agriculture's Market Promotion Program (MPP),³ reportedly has been working with a major Japanese flour mill to promote a new brand of pasta, which was expected to result in a 20,000-ton increase in imports of U.S. durum over three marketing years (1990/91 to 1992/93) (FAS, 1992).

Wheat-Based Products

While Japanese wheat imports stayed relatively constant during the 1980's, imports of wheat-based products have risen substantially since the mid-1980's. The rise in the yen's value since 1985, along with high wheat prices in Japan (compared with world wheat prices), encouraged increased imports of processed wheat products, such as pasta, biscuits and crackers, and cakes and pastry.

Outlook for Wheat Imports

Table 4 shows projections for Japanese wheat supply and demand in 1995 and 2000. Wheat imports are forecast to rise only slightly over the decade, from 5.7 million tons in 1992 (marketing year) to 5.9 million tons in 2000. Import growth will be driven by a gradual increase in consumption, with domestic production rising only slightly from 1992 output of 760,000 tons. The projections assume that annual income growth will be in the range of 3.2 to 3.5 percent, and population growth will be 0.37 percent per year. Producer and consumer prices are held constant, as current policies are expected to remain unchanged.

³ MPP's predecessor was the Targeted Export Assistance (TEA) program. MPP's goals are to encourage the development, maintenance, and expansion of foreign markets for U.S. farm products (GAO, 1993).

Figure 5. U.S. wheat exports to Japan, by class, 1975/76 to 1989/90

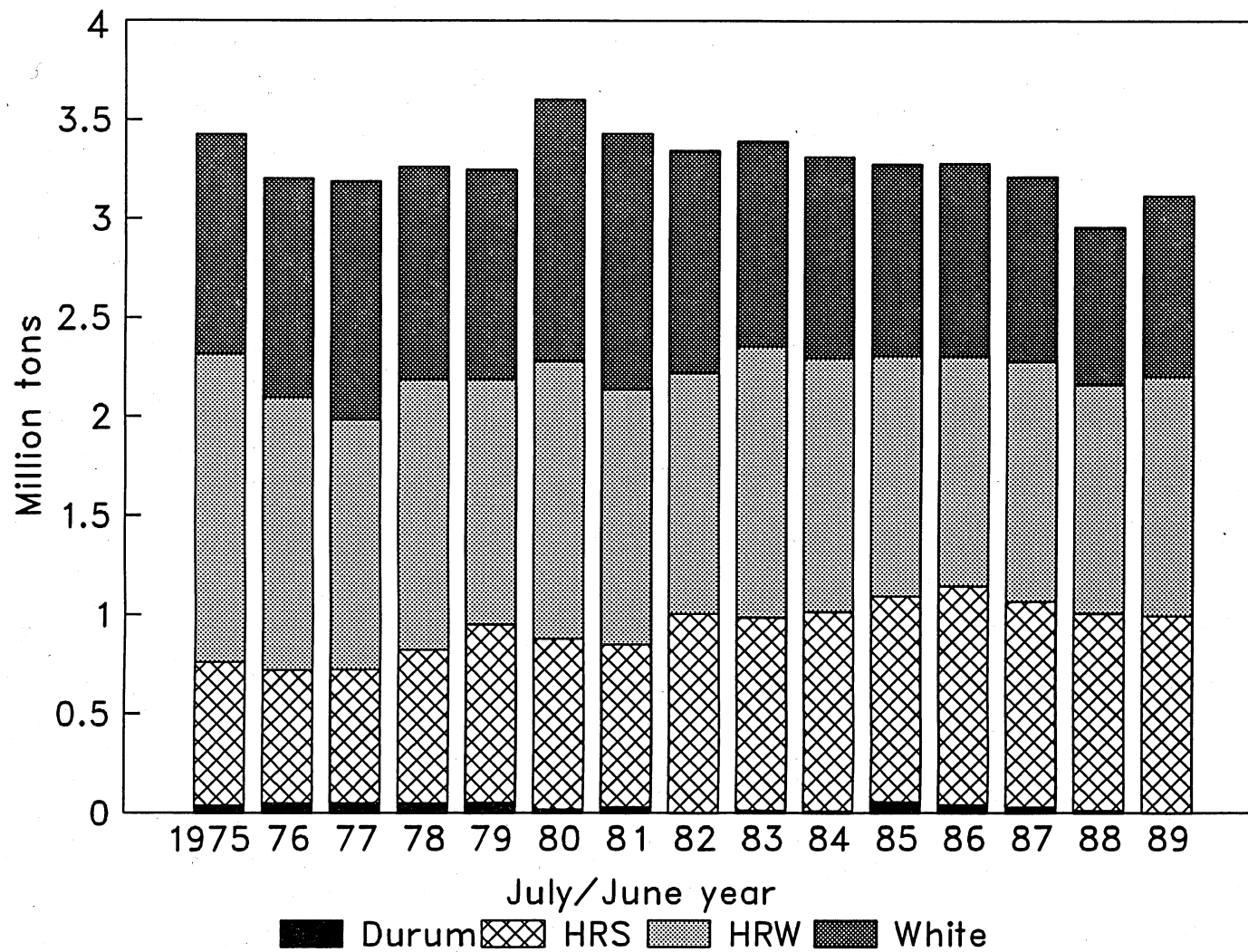


Table 4--Japan: Projected wheat supply, use, and trade

Item		Actual			Projected	
		1990	1991	1992	1995	2000
Area	1,000 ha	260	239	215	218	227
Yield	Tons/ha	3.66	3.18	3.53	3.46	3.55
Production	1,000 mt	952	759	759	757	806
Consumption	1,000 mt	6160	6210	6200	6212	6324
Ending stocks	1,000 mt	1619	1568	1467	1360	1384
Imports	1,000 mt	5622	5786	5700	5821	5883
Exports 1/	1,000 mt	359	386	360	360	360
Key assumptions:						
Real GDP growth	Percent	5.70	4.40	2.50	3.50	3.20
Population growth	Percent	0.29	0.25	0.34	0.37	0.37
Real exchange rate	Yen/USD	157	148	141	121	122

1/ Flour exports in wheat equivalent.

ERS projections.

If domestic production declines because of reduced Government support to wheat growers, more rapid import growth could occur, but no large increase in Japanese wheat imports is expected. On the demand side, wheat consumption is projected to increase by only 2 percent, or less than 150,000 tons, by the end of the decade. Even if higher GDP growth rates occur or prices for wheat products are lower, wheat consumption and imports are not likely to change much from projected levels because Japanese consumers can already purchase all the wheat products they desire as a result of high per capita incomes.

Wheat Sector Policies

Japan has a two-tiered pricing system in place for domestic wheat, under which the producer price (Government purchase price) is much higher than the consumer price (Government resale price). Figure 6 shows the price relationships, over the past 30 years, among the purchase price of domestic wheat, the resale price of U.S. western white wheat,⁴ and an average wheat import price. The average resale price of imported wheat in most years since 1960 has been above the average landed (c.i.f.) price, which has helped to offset the high cost to the Food Agency of procuring domestic wheat.

Along with all domestic wheat, the Japanese Food Agency controls the purchase, distribution, and pricing of almost all wheat imports. The Food Agency establishes annual resale prices for the various classes of imported wheat. Because of better quality, resale prices for imported wheats are usually set higher

⁴ Resale prices for U.S. western white wheat were used because they were most consistently reported in FAS reports.

Figure 6. Japan: Key wheat prices

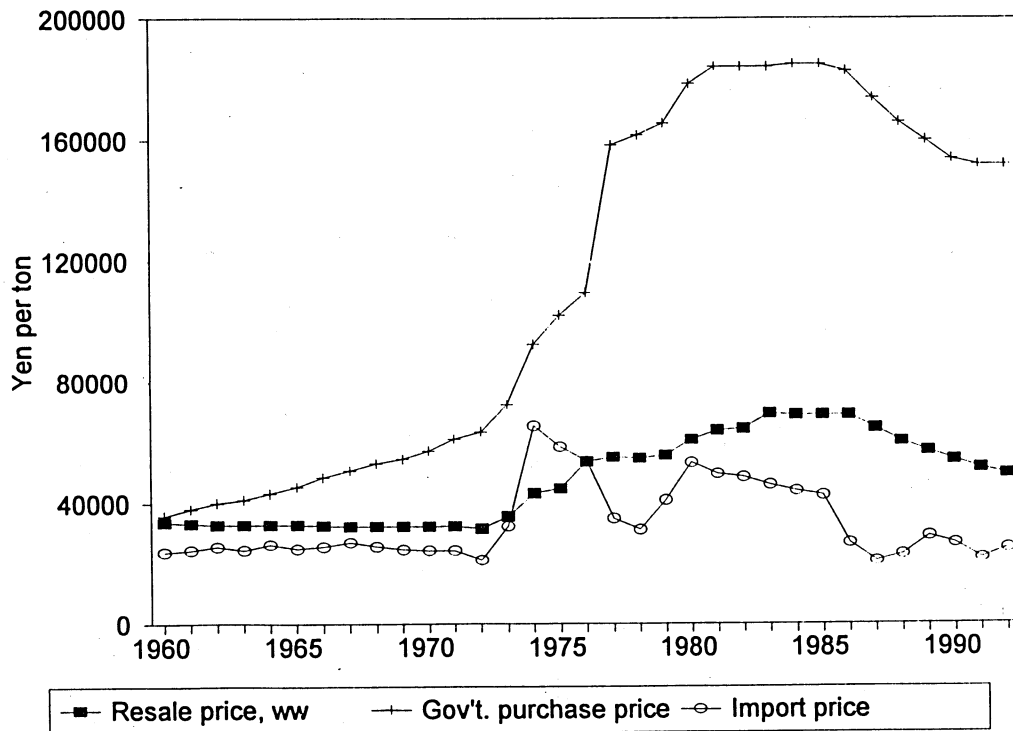
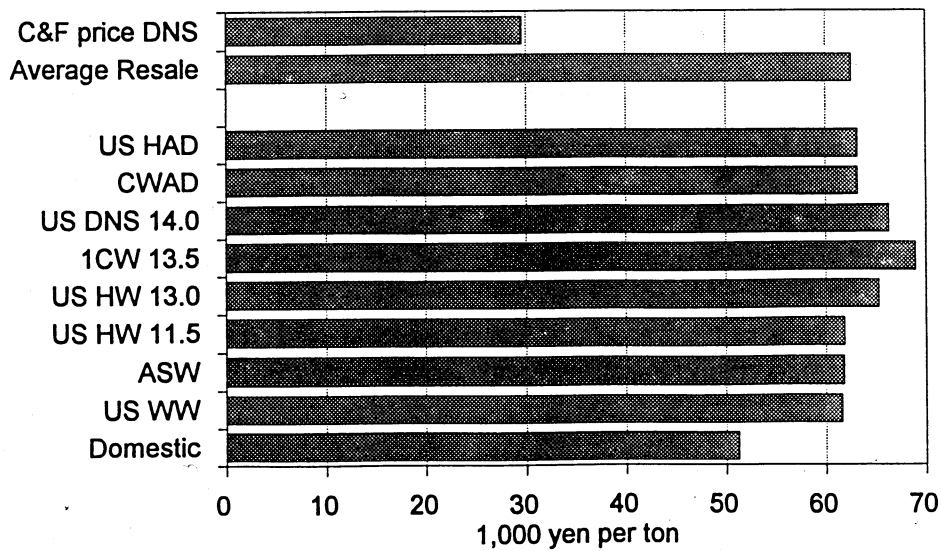


Figure 7. Wheat resale prices by class 1992



than the resale price for domestic wheat. The relative resale prices among the various classes of imported wheat tend to reflect quality and world market price differences; these relative prices changed very little over the past decade. Japan's 1992 wheat resale prices for domestic and imported wheats are shown in figure 7.

Various governmental and advisory bodies are involved in setting wheat (and rice) prices in Japan, including the Food Agency, the Ministry of Finance, the Economic Planning Agency, the Rice Price Deliberation Council, and several Diet (parliament) committees.

Producer Price

Under the provisions of the Food Control Law, enacted in 1942, wheat producer prices were based on a parity index until 1973.⁵ For the 1974 through 1976 crop years, incentive payments above the parity price were given to farmers to encourage wheat production, which had declined substantially during the 1960's. Beginning in 1977, these incentive payments were combined with the parity-based producer price to create a new basic price, which thereafter was to be adjusted by movements in the parity index (BAE, 1981).

Beginning with the 1988 harvest, the Government ended parity pricing for wheat. The current pricing system is based on the production costs of "core" farmers, who tend to own larger, more efficient farming units.⁶ The Government's goals in changing the pricing system were to lower producer prices, and thus, reduce its financial burden, increase farmer productivity, and reduce prices to consumers (ABARE, 1988).

From 1986 to 1991, the Government lowered wheat producer prices every year, resulting in an 18-percent reduction over the period. Even so, Japanese wheat producers received an average of \$1,300 per ton in Government support (as measured by the producer subsidy equivalent or PSE)⁷ in 1988-90 (table 5). Almost three-fourths of the support came from high producer prices, and the rest came from income transfers (including riceland diversion payments) and infrastructure support.

After considering another reduction in the wheat purchase price in 1992, the Food Agency ultimately decided to keep it unchanged from 1991; the average wheat purchase price in 1991 was 140,167

⁵ Parity pricing relates the costs of production inputs and living expenses in the relevant year to those costs in a base period--in this case, 1950 and 1951.

⁶ "Core" farmers are defined as those who are under 60 years old and who work on farms more than 150 days each year.

⁷ The producer and consumer subsidy equivalents (PSE and CSE) show the effect of government programs and policies, usually expressed as a share of production or consumption.

yen per ton, or \$1,038 at an exchange rate of 135 yen/dollar-- over six times the 1991 average landed wheat import price.

Consumer Price

From 1952 to 1972, the Government kept wheat resale prices (to millers) steady or lowered them because of rather stable wheat import prices during the period. However, in response to steep increases in world wheat prices, the Government raised wheat resale prices in 1973. Although world wheat prices subsequently declined, the Government did not lower resale prices, resulting in gains for the Food Agency from buying and selling imported wheat. Resale prices rose almost steadily through 1984, remained unchanged to 1986, and then declined for the next 6 years through 1992. The additional costs to consumers as a result of the Government's state trading of wheat (as measured by the consumer subsidy equivalent or CSE) averaged \$254 per ton during 1988-90 (table 5).

Under Japan's Food Control Law, the average resale price for domestic wheat cannot exceed a ceiling price, calculated according to a specific formula.⁸ The actual resale price is typically set considerably below the calculated ceiling price, however. The ceiling price formula takes into account the retail flour price, family disposable income levels, flour processing and distribution costs, and proceeds from the sale of milling byproducts, such as bran.

The Food Agency considers many factors in determining consumer wheat (resale) prices, including wheat import prices and the costs connected with the purchase, storage, and sale of imported wheat; the relationship between wheat flour and milled rice prices; and other economic factors, such as the cost of living (Japan Flour Millers Association, 1978). Since both wheat and rice are important staple foods, their relative prices can affect consumption. In recent years, the Government-set consumer (resale) rice price has been roughly six times the consumer (resale) wheat price.

Marketing and Distribution

Since 1952, domestic growers have been able to choose whether to retain their wheat, market it privately, or deliver it to the Food Agency, which uses the storage and handling facilities of the farmers' cooperatives (fig. 8) (BAE, 1981). However, because the Government purchase price is much higher than the market price, Japanese wheat producers sell nearly all of their wheat to the Food Agency. The Food Agency sells domestic and imported wheat to flour millers and processors, such as soy sauce manufacturers, at the established resale prices.

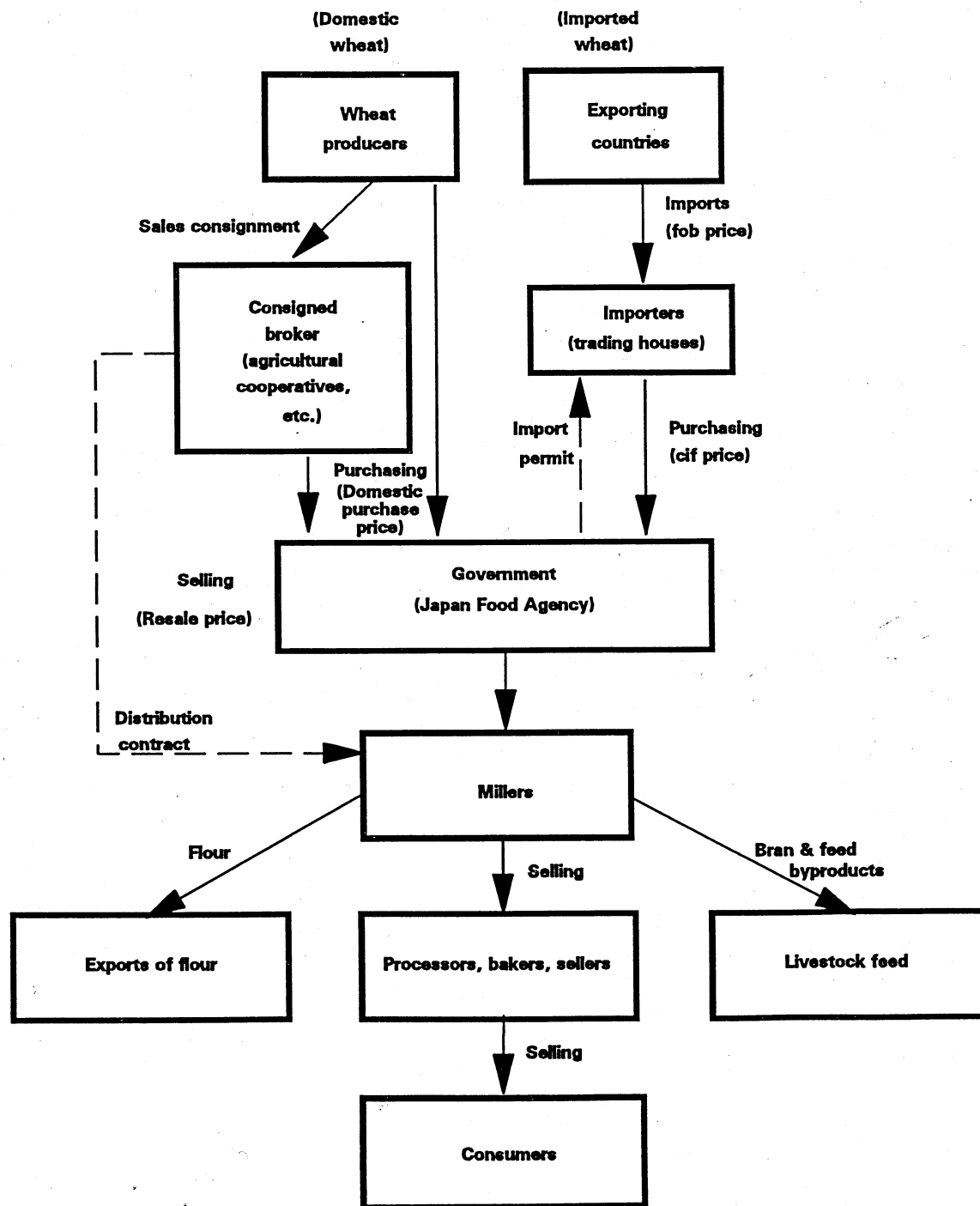
⁸ Wheat resale prices are usually decided in December of each year, and go into effect on February 1 of the following year.

Table 5--Japan: Summary of wheat producer and consumer subsidy equivalents

Item		1982	1988	1989	1990	1988-90
Producer subsidy equiv.:						
Production	1000 tons	742	1021	985	952	986
Producer price	Yen/ton	184100	165000	149000	142000	152000
Producer value	Bil. Yen	137	168	146	135	150
Direct payments	Bil. Yen	42	21	20	17	19
Value to producers	Bil. Yen	179	189	166	152	169
Policy transfers to producers:						
Income support	Bil. Yen	44	21	20	17	19
Price intervention	Bil. Yen	103	150	123	111	128
Infrastructure	Bil. Yen	24	27	28	25	27
Total	Bil. Yen	171	200	172	155	176
PSE as % of producer value:						
PSE per ton	Yen/ton	230553	196072	174812	162321	178130
PSE per ton	Dol./ton	929	1532	1267	1127	1303
Consumer subsidy equiv.:						
Consumption	1000 tons	6035	5710	5693	5722	5708
Consumer price	Yen/ton	76621	75450	71750	68750	71983
Consumer cost	Bil. Yen	462	446	421	406	424
Policy transfers to consumers:						
Price intervention	Bil. Yen	-100	-234	-172	-189	-198
Total	Bil. Yen	-100	-234	-172	-189	-198
CSE as % of consumer cost						
CSE per ton	Bil. Yen	-16623	-40984	-30227	-33030	-34750
CSE per ton	Dol./ton	-73	-320	-219	-229	-254
Exchange rate	Yen/dol.	249	128	138	144	137

ERS estimates.

Figure 8. Flow chart of wheat distribution in Japan



Source: Adapted from Food Agency, 1991

Wheat sales to flour millers are made in line with an annual supply-and-demand plan, and are based on the Food Agency's review (every 4 months) of past sales and recent demand trends. Selling methods, prices, and other conditions for sales of feed wheat for direct use in mixed feed are determined according to the provisions of the Feedstuffs Supply Stabilization Law (Food Agency, 1992).

Government Control

Wheat, along with rice, rye, and barley, is a state-traded commodity in Japan: the Food Agency strictly controls the import and export of these grains. Wheat imports are governed by a global quota system, and although a 20-percent nominal duty on wheat imports exists, it has been suspended for over two decades. The Food Agency is the sole buying authority for 90-95 percent of Japan's wheat imports. The remaining 5-10 percent is imported directly by wheat millers, with the Food Agency's approval (U.S. Wheat Associates, Feb. 1992). These so-called "free-wheat" purchases are allowed in proportion to equivalent exports of flour, mixes, or other processed wheat products, such as noodles, on a value basis.

Because other flour-exporting countries often protest this trade, the Food Agency attempts to keep Japanese wheat flour exports at a fairly constant level (FAS, 1992). Wheat flour exports during 1990-1992 averaged just over 300,000 tons per year. In recent years, flour exports have gone mainly to other Asian countries. Hong Kong, Thailand, Singapore, and Vietnam are the leading markets.

Tendering Procedures

The Food Agency conducts tenders for its wheat purchases, which cover wheat types, grades, and terms and conditions of purchase. About 45 tenders are conducted annually, and shipment is expected 60 days from date of tender. While 20 trading firms are registered to participate in Food Agency tenders, in practice, 11 large trading companies actively participate by submitting bids. Although Food Agency tenders do not specify wheat source, specifications of type and protein content effectively determine the supplier (ABARE, 1988).

The Food Agency issues an import permit once a bid is accepted. It selects the bidder whose offering price meets the target purchase range and which is among the lowest tender prices. The Food Agency, within 10 days following the tender, then enters into a sales contract with the trading company explicitly stipulating all terms of sale (Japan Flour Millers Association, 1978). The trading company retains title to the wheat until delivery to Japan and final payment by the Food Agency. Final payment is made after the wheat is offloaded and the Food Agency verifies that it meets contract specifications.

Import Inspection

Trading companies deliver wheat to the Food Agency on a cost, insurance, and freight (c.i.f.) basis, and are penalized if the wheat does not meet Food Agency specifications. The Food Agency inspects every shipment upon arrival in Japan to ensure that the delivered wheat meets the tendered specifications. The Wheat Flour Institute, an independent arm of the Japan Flour Millers Association (JFMA), does grain quality testing on behalf of the Food Agency. With the exception of a contract with the Food Agency to do the import cargo testing, all Wheat Flour Institute funding comes from the flour millers.

Import Requirements

The Food Agency's import requirements are figured on an annual basis, allocated by wheat class and country of origin. The annual volumes are then subdivided into monthly and weekly requirements. In the past, the factors determining the amount and type of wheat imports included demand estimates by wheat type based on the historical uses of the wheat (food, feed, and industrial), supply availability of exporting countries, budgetary considerations, the supply-demand situation for rice, warehouse space, and bilateral arrangements with supplier countries (Japan Flour Millers Association, 1978).

Wheat Storage

The Food Agency pays unloading charges and storage costs at port warehouses, which are privately owned, many of them by wheat millers. Millers are responsible for transporting the imported wheat from portside storage facilities to their mills. While flour mills are located throughout Japan, the larger mills are concentrated in the important port cities of Chiba, Yokohama, Nagoya, Osaka, Kobe, and Fukuoka. Smaller mills tend to be located near the domestic wheat-growing areas (Soslund, 1987).

The Food Agency is obligated to make wheat available, in the amounts and classes needed, at each of 18 designated delivery ports in Japan. However, only three of these ports can accommodate large Panamax-size vessels (50,000-tons capacity), and many can receive only much smaller ships. As a result, the Food Agency normally specifies delivery in vessels of 20,000-30,000 tons capacity, which usually offload grain at more than one port. Reflecting its concerns about food security, the Food Agency always maintains a 2.6-month inventory (roughly 1.3 million tons) of imported wheat for food (Food Agency, 1991).

Domestic Milling and Baking Industries

Japan's wheat milling industry is dominated by large firms: the four largest mills (Nisshin, Nippon, Showa Sangyo, and Nitto) together have 55 percent of total milling capacity. Only 37 of the approximately 160 milling companies in Japan are members of

the Japan Flour Millers Association (JFMA), but they represent about 95 percent of the wheat flour market.

The Flour Millers Association takes care of any technical problems related to flour milling, and conveys millers' concerns about wheat quality and requests for desired wheat classes to the Food Agency. It also sponsors visits by research teams to the United States, Canada, and Australia to investigate grain quality problems. According to the JFMA, having access to the Australian and Canadian Wheat Boards greatly facilitates resolution of wheat quality problems with these countries.

Japan's baking industry is also dominated by large companies, with the 28 largest firms accounting for about 63 percent of the market. The baking industry is fairly concentrated: the top five companies account for 44 percent of the market, the top three, 37 percent, and the leading firm, 25 percent. Large companies also tend to dominate the production of instant noodles, cookies and crackers, and pasta, while wet and dry noodles are manufactured by numerous smaller firms (U.S. Wheat Associates, Feb. 1992).

Milling and baking technology in Japan is very sophisticated, so as to meet the high quality requirements demanded by Japanese consumers. The major milling companies commonly produce several hundred different types of flour to meet specific end-user needs. A typical large wholesale bakery in Japan produces several hundred different products in a constantly changing product mix to meet consumer demand (U.S. Wheat Associates, Feb. 1992).

Review of Survey Results

Food Agency As Sole Wheat Buyer

The Food Agency, in its capacity as the sole wheat-buying authority in Japan, decides on the amounts and sources of wheat imports, with input from flour millers and traders. Because food security is a primary concern of the Food Agency, its main objective is to secure a steady and reliable wheat supply. To this end, Japan has established special customer relationships with each of its three suppliers: the United States, Canada, and Australia. Their respective market shares remained relatively fixed during the past decade, largely reflecting the availability of different wheat classes and processors' end-use requirements. Stable market shares also underscore the importance to the Food Agency of maintaining long-term customer relationships. Credit plays no role in Japan's wheat purchase decisions, since all imports are bought on a nonconcessional basis.

Because the Food Agency tends to value stability and consensus, it usually does not make changes in purchasing procedures and contract specifications without first consulting the millers, represented by the Flour Millers Association, and the registered trading firms, represented by the Grain Importers Association.

Millers benefit in some ways from the Food Agency's central purchasing authority because they all buy wheat from the Food Agency at the same established prices (albeit much higher than world prices), thereby avoiding the uncertainties and risks involved in buying wheat on the world market. The trading companies benefit from the Food Agency's intermediary role because it is a large buyer with well-established purchase criteria and procedures that are, to some degree, influenced by the trading companies themselves.

Because of its intermediary role, the Food Agency must balance the demands of the Flour Millers Association (representing millers) for higher quality wheat--which might entail stricter contract specifications--against the traders' desires not to incur greater risks associated with procuring and delivering higher quality wheat under stricter specifications. The Food Agency must also be concerned about fairness because it is obligated to make wheat of various classes available to all the millers in the amounts they desire; thus, the Food Agency would be unlikely to tender for a limited amount of very high quality wheat unless it could make it available to all the millers. Under these circumstances, the Food Agency has a history of making changes in contract specifications rather infrequently.

Food Agency Concerns

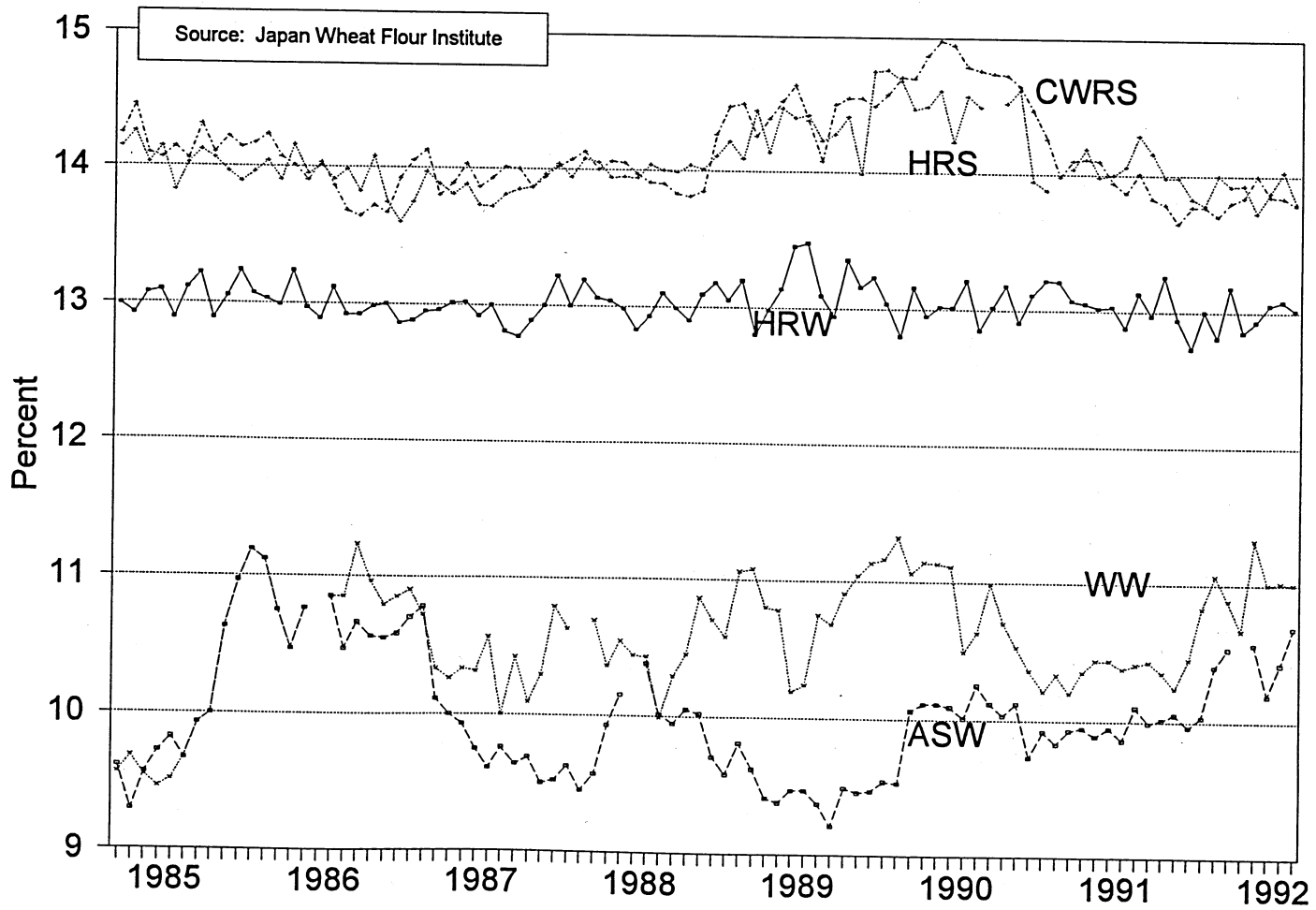
Food Agency officials emphasized that the issue of grain quality for U.S. wheat was very important to them. In this regard, Food Agency officials said they would like the United States to continue to make efforts to improve the quality of its wheat exports. They stressed four quality problems with U.S. wheat: dockage, protein content, overall quality variability, and pesticide residues.

Undesirably high protein content (above 9-10 percent) in western white wheat (WW), the principal wheat used for some confectionery products, and variability in protein content were cited as major problems. According to Food Agency officials, millers desire protein content in WW to be in the range of 9-10 percent because when the protein content exceeds that level, it is difficult for millers to adjust their flour blends. Figure 9 shows the average protein content in wheat shipments from all three suppliers by month from 1985 to 1992. The protein content in U.S. WW wheat consistently exceeded 10 percent, and occasionally it was above 11 percent.

Food Agency officials also expressed concern about undesirably low protein content (below 14 percent) in U.S. dark northern spring (DNS) wheat. Food Agency officials said that although the contract calls for protein content of 14 percent or better, some wheat shipments do not achieve that level. This has been a problem in the past and in more recent years (fig. 9).⁹

⁹ DNS is labeled as HRS in figure 9.

Figure 9. Wheat import protein levels



The presence of pesticide residues in food has become a health issue of growing concern in Japan. Japan's Ministry of Health and Welfare (MHW) came out with new limits for chemical residues in imported foods, which became effective in January 1993. However, the new tolerance standards are not strict enough to affect wheat imports. Food Agency officials noted that pesticide residue levels in imports of U.S. wheat were higher than those in wheat from Canada and Australia, but were still below the new MHW tolerances. The officials could not give us any comparative data for pesticide residue levels in U.S., Canadian, and Australian wheat; however, they did show us some test results for U.S. wheat. These indicated that residue levels of certain pesticides, including malathion, chlorpyrifos-methyl, and bromide, were frequently found to be "high," while residue levels of other pesticides, including ethylene dibromide, carbon tetrachloride, phosphine, and methoxychlor, were found to be "high" less frequently.

Wheat Millers' Concerns

Personnel from the four Japanese wheat milling companies we interviewed generally were more dissatisfied with the quality of U.S. wheat, compared with Canadian and Australian wheat. For the milling companies, the key quality issues for U.S. wheat were: **undesirably high protein levels in WW**, which affects baking characteristics; **undesirably low protein levels in DNS**; **variability in protein levels, moisture, ash content, and test weight among shipments during the year and from year-to-year**; and **excessive dockage and high post-harvest chemical residue levels compared with Australian and Canadian wheats**.

Like the Food Agency, millers also were concerned that the desired 10-percent maximum protein level in U.S. WW wheat was often exceeded. Millers also expressed a **preference for Canadian wheat for breadmaking** because of higher water absorption, better color, greater loaf volume, and more consistency in quality overall than in U.S. bread wheats.

Contract Specifications for U.S. Wheat

The Food Agency usually specifies No. 2 or better for most classes of U.S. wheat. Additional specifications in Food Agency tenders include:

- ▶ Sprout damage (not to exceed 0.2 percent);
- ▶ Dockage (0.8 percent maximum, all classes);
- ▶ Falling number for HRW, DNS, and WW (300 minimum);
- ▶ Test weight (U.S. No. 1 basis, that is, minimum of 58.0 or 60.0 pounds per bushel); heat damage (0 percent); and
- ▶ Shrunken & broken kernels (U.S. No. 1 basis for HRW high-protein and semi-hard, that is, 3.0 percent).¹⁰

¹⁰ The Food Agency announced a new specification for protein content in WW wheat of 10.5 percent maximum, effective with contracts for wheat shipped after October 1, 1993 (U.S. Wheat Associates, March 1993).

Dockage

Personnel from all four Japanese milling companies that were interviewed complained about high levels of dockage (non-grain material that can be readily removed from wheat) in U.S. wheat. Food Agency data¹¹ of the average dockage content in imported wheat (from all sources) during 1985-92 is plotted in figure 10. The graph shows that dockage levels in Canadian (CWRS) and Australian (ASW) wheats were consistently and significantly lower than in U.S. wheats (HRS and HRW). However, the figure also reveals that dockage levels in U.S. wheat shipments were mostly below 0.8 percent since June 1989, when the Food Agency lowered its dockage specification for U.S. wheat from 1.0 percent to 0.8 percent. Japanese trading companies incur a penalty if they deliver wheat containing higher-than-specified amounts of dockage (for example, base price multiplied by the amount of dockage above 0.8 percent).

Japanese millers desire wheat that contains only small amounts of dockage because there is no commercial market for the screenings. While some small portion of the dockage may be used for animal feed, most of the millers interviewed said that dockage must be hauled away and disposed of as industrial waste. Dockage is burdensome because costs are incurred to dispose of it. The two closest estimates millers gave for disposal costs were \$76 and \$79 per ton of dockage. A dockage level of 0.7 percent implies disposal costs of roughly \$0.50 per ton of wheat cleaned.¹²

Japanese millers prefer to remove as much dockage as possible. One miller said his firm's equipment cleans wheat so that it contains no more than 0.02 percent dockage. Another miller said his firm's target was 0.05 percent, but acknowledged that it was not always possible to clean wheat to that degree. The Flour Millers Association said their target is zero dockage, but a more realistic level is 0.1 percent. The millers interviewed gave no exact cost estimates for cleaning wheat. One flour miller estimated energy costs between \$2.36 and \$3.15 per ton of wheat cleaned.

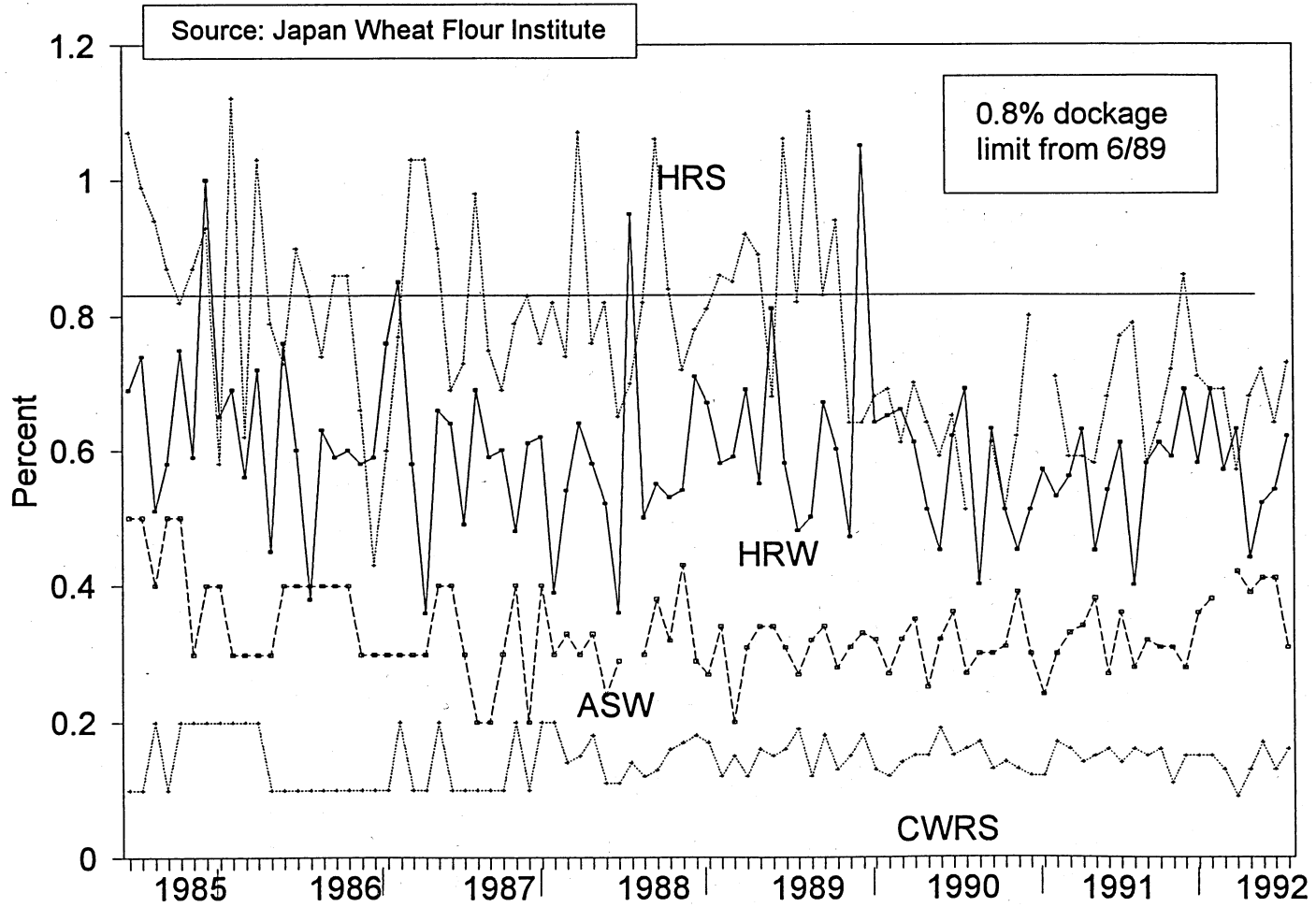
Trade Impacts of Grain Quality Factors

The United States, Canada, and Australia are Japan's preferred wheat suppliers. However, availability and consistent delivery of wheats with desired quality characteristics can attract price premiums. For example, the Food Agency resale price (to millers) for Canadian hard wheat (CWRS, 13.5 percent protein) historically has been higher than for U.S. hard wheats, probably reflecting higher import prices (c.i.f. basis) and quality differences.

¹¹ Data supplied by the Wheat Flour Institute.

¹² At 0.7 percent dockage, a mill must clean 142 tons of wheat to generate a ton of dockage.

Figure 10. Monthly dockage levels



Food Agency officials indicated they might be willing to pay a higher price for cleaner U.S. wheat (containing less dockage), if the price were "reasonable" (that is, if the landed price of U.S. wheat did not exceed that of Canadian wheat). During the first 6 months of 1992, the landed price of CWRS, 13.5-percent protein was \$15-\$20 above the landed price of U.S. DNS, 14-percent protein. An estimated premium that the Food Agency might be willing to pay for cleaner U.S. wheat is \$2-\$3 per ton.¹³

Implications of Policy Reform

Japan's agricultural policies have been changing gradually. One of the more significant changes was the liberalization of the beef and citrus markets in the late 1980's, allowing almost free trade of these products. Another change almost as important was the partial easing of domestic rice marketing rules and the gradual reduction (in nominal terms) of rice support prices starting in 1987.

Since state-trading of wheat is linked closely to Japan's rice policies, any major policy reform for rice could presage a change in policies affecting wheat imports, particularly the Food Agency's central role. If the Food Agency's monopoly control over wheat imports and pricing is ended, grain quality issues could become more important in purchase decisions. Moreover, the U.S. share of the Japanese wheat market would likely be less secure than under the current state-trading system, where import shares for Japan's three wheat suppliers have remained fairly constant.

Under the terms of the Uruguay Round GATT agreement, concluded in December 1993, Japan is obligated to gradually increase market access for rice and wheat. The quota system for wheat imports will be replaced by tariffs--a process called tariffication--by April 1995. An amount similar to the volume of wheat currently imported (around 5.5 million tons) will be allowed in at zero or significantly low tariffs, and any wheat imported beyond the so-called minimum access amount will be subject to a tariff of 556.5 percent (Nikkei Weekly, December 1993). Tariffication will likely reduce the disparity between wheat prices in Japan and international prices, but at the same time, might contribute to greater price instability for both millers and end-users.

Conclusions

The Food Agency's commitment to securing a stable wheat supply, and its desire to maintain good customer relationships with its three suppliers--the United States, Canada, and Australia--are

¹³ Calculated as the Japanese resale price of U.S. DNS, 14 percent protein, in 1992--\$512 per ton--multiplied by .005 (or 0.5 percent), the difference between 0.8 percent dockage level for U.S. wheat and 0.3 percent dockage level for Canadian wheat, equals \$2.56.

key factors in its wheat-purchasing decisions. Responses from Food Agency officials as well as the Food Agency's record of wheat imports for over a decade imply that the share of U.S. wheat in total Japanese wheat purchases will likely continue to remain roughly the same, despite some serious concerns regarding U.S. wheat quality. On the other hand, in a free trade situation without Food Agency involvement in wheat purchasing, grain quality issues could become more important: the U.S. share of Japan's wheat imports would likely be less secure than under the current state-trading system.

According to interviews with Food Agency officials, representatives from the Flour Millers Association, and wheat millers, the most serious quality problems with U.S. wheat were undesirably high protein levels (above 9-10 percent) in WW wheat, excessive dockage compared with Canadian and Australian wheat, undesirably low protein levels (below 14 percent) in DNS wheat, variability in certain intrinsic properties (especially protein) among shipments during the year and from year-to-year, and higher post-harvest chemical residue levels in certain U.S. wheat classes than existed in Canadian and Australian wheat. Food Agency officials indicated they might be willing to pay a small (estimated at \$2-\$3 per ton) premium for cleaner (lower dockage) U.S. wheat.

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Glossary

Blending: The systematic combining of two or more lots or kinds of grains to obtain a uniform mixture to meet a desired specification.

C & f: Cost and freight to the designated delivery point, paid by the seller.

C.i.f.: Cost, insurance, and freight to the designated delivery point, paid by the seller.

Commodity Credit Corporation (CCC): An agency of the U.S. Department of Agriculture created in 1933 to carry out loan and storage operations as a means of supporting prices above the level that would have prevailed in a free market.

Cu-Sum: A set of rules established by FGIS, that exporters must follow when loading grain on ocean vessels. The rules control variability among sublots blended to meet contract grade limits.

Damaged grain: In U.S. grading standards, the term damage refers primarily to biological deterioration associated with discoloration. Physical damage (such as cut or broken kernels) is not included in U.S. grades but is included in the standards of some other countries.

Defects: Computed total amount of damaged kernels, foreign material, and shrunken and broken kernels.

Dockage: Nongrain material that can be readily removed by accepted screening devices.

Durum wheat: Very hard, high-protein wheat used in the production of semolina flour for pasta products.

Export Credit Guarantee Program (GSM-102): U.S. agricultural export promotion program that guarantees repayment of private, short-term credit for up to 3 years.

Export Enhancement Program (EEP): Program to help U.S. exporters meet competitors' prices in subsidized markets: Exporters are awarded cash payments, enabling them to sell certain commodities to specified countries at prices below the U.S. market price.

Extraction rate: The fraction of the wheat kernel that is converted into flour during the milling process.

Falling number test: A test used to measure sprout damage in wheat.

F.a.s.: Free alongside ship specifies that the seller delivers goods to the port elevator or dock at a specified location and the buyer pays for loading the ship and ocean freight.

Federal Grain Inspection Service (FGIS): An agency of the U.S. Department of Agriculture that establishes grain standards and develops the technology to measure the factors contained in such standards. This agency also develops and publishes sampling and inspection procedures, evaluates and approves equipment, monitors inspection accuracy, and oversees mandatory export inspection of grain by agency or FGIS-licensed inspectors.

F.o.b.: Free on board specifies that the seller loads the ship or other conveyance at the specified delivery point with the buyer paying freight charges.

Foreign material: Nonwheat material of similar size and weight to wheat kernels.

Gluten: A tenacious, elastic protein substance found especially in wheat flour that gives cohesiveness to dough.

Grade: A number or letter designation assigned to grain based on an established set of criteria.

Grade factor or grade determining factor: Those characteristics of grain used to determine the numerical grade. The grade factor is based on quantitative limits (either maximums or minimums) placed on each factor for each grade.

Grain grades and standards: Specific standards of grain quality established to maintain uniformity of grains from different lots and permit the purchase of grain without the need for visual inspection and testing by the buyer.

Hard Red Spring wheat: Spring seeded; includes the following three subclasses: dark northern, northern, or red: This wheat is high in protein and has a vitreous endosperm, is used primarily to produce bread flour and is produced in the upper Great Plains.

Hard Red Winter wheat: Fall seeded; This wheat may be either dark hard, hard, or yellow hard, medium to high in protein, a vitreous endosperm, and used primarily to produce bread flour. It is produced in the lower Great Plains.

Hard wheat: A generic term applied to wheat with a vitreous endosperm suitable for making bread flour or semolina; yields coarse, gritty flour that is free-flowing and easily sifted; and flour consists primarily of regularly shaped particles of whole endosperm.

Impurities: Any nongrain material contained within a shipment that could hinder the processing of a grain or detract from its end value.

Intrinsic value or end-use value: Characteristics critical to the end-use of grain. These are nonvisual and can only be determined by analytical tests. For example, the intrinsic quality of wheat is determined by characteristics such as protein, ash, and gluten content.

Moisture content: The amount of water in grain; measured by the weight of water as a percentage of the total weight of the grain including water (wet basis) or total weight of the dry matter excluding water (dry basis).

Nongrade determining factor: Factors that influence the quality of grain but are not taken into account in the grading of grain. These factors must be reported as information whenever an official inspection is made.

Nonmillable material: All material that is not wheat, includes shrunken and broken kernels.

Physical quality: Grain characteristics associated with the outward appearance of the grain kernel, including kernel size, shape, color, moisture, damage, and density.

Premiums: Prices that exceed the base price offered for grains with higher quality characteristics than specified. Generally calculated for factors that increase the value of the grain in market channels.

Public Law 480 (PL-480): Common name for the Agricultural Trade Development Assistance Act of 1954, which seeks to expand foreign markets for U.S. agricultural products, combat hunger, and encourage economic development in developing countries.

Sanitary quality: Grain characteristics associated with cleanliness. They include the presence of foreign material that detracts from the overall value and appearance of the grain, including the presence of dust, broken grain, rodent excreta, insects, residues, fungal infection, and nonmillable matter.

Screenings: The material removed from grain by means of mechanical sizing devices; generally include broken grain as well as nongrain material removed on the basis of density or particle size with mechanical cleaners.

Semolina: A coarse separation of endosperm extracted from Durum wheat to make pasta.

Shrunken and broken kernels: All matter that passes through a 0.064 inch by 3/8 inch oblong-hole sieve.

Soft wheat: A general term describing wheat with a chalky endosperm suitable for making pastry flour; yields a very fine flour consisting of irregularly shaped fragments of endosperm cells that adhere and sift with difficulty.

Spring wheat: A general term for wheat that is grown in the spring and harvested in the summer or fall; It has a relatively high protein content and is used in bread flours.

Test weight: Weight per unit volume as measured in pounds per bushel as defined in the United States. Determined by weighing the quantity of grain required to fill a 1-quart container. The

international equivalent measure is kilograms per hectoliter (conversion factor 0.77).

Uniformity: Conformity within and between shipments for quality attributes; such as physical, milling, and baking performances.

Wheat middlings: Fine particles of the bran and the wheat kernel. Normally used for livestock feed.

White wheat: Fall or spring seeded; it includes four subclasses: hard, soft, club, western: It is soft or hard and low in protein and is used mainly for pastry flours and oriental noodles.

Winter wheat: A general category describing wheats that are sown in the fall, lie dormant in the winter, and are harvested the following spring or summer.