11

WHEAT: THE GLOBAL MARKET, POLICIES, AND PRIORITIES

Donald O. Mitchell and Myles Mielke

Wheat is one of the most important food crops, providing nearly one-fifth of the world's calorie supplies. About 19 percent of the world's production is traded internationally, primarily as exports from the countries of the Organisation for Economic Co-operation and Development (OECD)—including Australia, Canada, the European Union (EU), and the United States—to developing countries to supply basic food needs and the growing demand for products made from wheat flour, such as bread, pasta, and noodles.[1] Wheat is also the food crop most commonly stored as a buffer against production shortfalls, with an average of 30 percent of the world's wheat production carried over from one crop year to the next. The global wheat situation and wheat policies of major actors are thus central to the food security and dietary preferences of many countries.

Major OECD wheat exporters, such as the European Union and the United States, support domestic production. The support policies often lead to surpluses, which are then exported with subsidies or donated as food aid that is not emergency related. Developing countries sometimes benefit from such surplus disposal programs because they pay lower import prices or receive food aid. However, countries are also harmed by such programs because they depress world prices and discourage local production. Competing exporters such as Argentina, Kazakhstan, the Russian Federation, and Ukraine are also harmed because they receive lower prices for their wheat. The surplus disposal programs are reduced during periods of low stocks and relative wheat shortages, thus contributing to global price volatility. In addition, many exporting countries have resorted to export restrictions to protect domestic consumers when prices are high, a practice that further adds to global price volatility. Such policies make it very difficult for importing countries to rely on the world wheat market to fulfill a significant portion of their needs because of the uncertainty of world supply. Consequently, many countries follow policies aimed at self-sufficiency and thus are deprived of the benefits of trade. Policy reforms that reduced global volatility in wheat prices, cut production subsidies, and improved access to exports during periods of high prices would reduce food security concerns.

This chapter discusses major trends and developments in the world wheat market and their impact on trade and food security. We begin by looking at the characteristics of wheat and trends in wheat production, use, trade, stocks, and prices. We then examine the policy environment, focusing especially on trade policy and domestic support.

Wheat Characteristics and Trends

Wheat is produced in 120 countries and accounts for about 19 percent of the world's calorie supplies. It is used primarily as flour for making bread, pastry, pasta, or noodles. It is also used to feed livestock, with feed use accounting for about 17 percent of global wheat consumption. In addition, the by-products from milling wheat into flour are used as feed. Wheat stores for several years without deterioration under proper conditions, making it well suited for use as a buffer against food shortages.

The many varieties of wheat have different protein levels and varying milling and baking characteristics. The protein levels range from about 8 to 18 percent. High-protein wheat is better suited to bread and pasta making, while lower protein wheat is better suited for pastry and noodles. There is substitution between wheat varieties and blending of different varieties to produce flour with specific characteristics. The demand for high-quality wheat and wheat with specific characteristics is increasing, as buyers become more sophisticated. Protein premiums have steadily increased since the early 1980s, as responsibility for import decisions has shifted to the private sector, which is better able to evaluate quality and more willing to pay premiums (Wilson and Dahl 1999). There has also been greater specificity in purchasing contracts. For example, the Australian Wheat Board offered 34 different segregations of wheat in the mid-1990s, compared to just 2 in 1980 (Carter and Wilson 1999).

Production and Yields

Wheat is produced under a variety of climatic conditions using technologies ranging from fully mechanized production and harvesting on large tracts to manual planting and harvesting on small plots. About 61 percent of wheat is produced in non-OECD countries (table 11.1); this share has been increasing over time as production has grown more rapidly in developing countries than in OECD countries. The European Union, China, and India are the largest producers, with 18, 16, and 13 percent of global production, respectively.

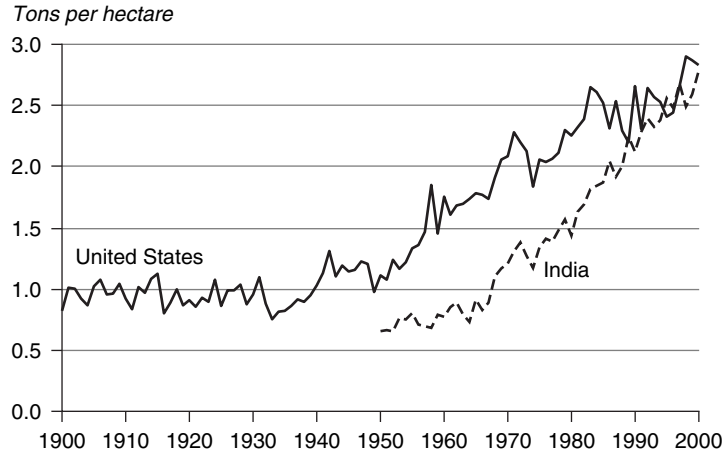
Wheat yields have increased significantly since the middle of the 20th century. From 1961 (when data on many countries first became available) to 2000, world wheat yields increased by an average of 2.4 percent each year. The increase in yields in developing countries came from using more inputs (such as fertilizer) and high-yielding semi-dwarf seed varieties developed at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico and released to developing countries in the mid-1960s in what is now known as the Green Revolution. These varieties, adapted to local conditions, were quickly adopted (Dalrymple 1974). As shown in figure 11.1, average yields in India are now very similar to those in the United States, at

TABLE 11.1 Wheat Production, Trade, and Growth Rates 1989–91 to 1999–2001, by Region

	Millions of Tons			*Growth Rates (percent)*		
Region	Production	Imports	Exports	Production	Imports	Exports
World	583	107	108	0.5	0.4	0.4
OECD	227	19	80	0.6	6.2	−1.1
Non-OECD	356	88	28	0.4	−0.5	5.4
Africa	17	26	0	1.3	3.3	9.7
Americas	111	25	58	−0.4	6.8	−0.3
Asia	199	27	4	1.7	−2.1	15.1
Europe	130	8	17	−1.0	−4.3	−2.2
FSU	75	6	9	−1.5	−12.2	4.8
Middle East	29	12	4	0.5	3.2	−6.3
Oceania	24	1	17	6.6	5.4	5.4

Note: Production, imports, and exports are the average for 1999–2001 crop years, which begin with harvest and vary by country. Growth rates are for the average of 1999–2001 compared with 1989–91.
Source: USDA PSD online database and USDA 2003.

FIGURE 11.1 Wheat Yields, U.S. and India, 1900–2000



Source: USDA.

TABLE 11.2 Global Wheat and Wheat Products Exports, Selected Periods
(millions of US$)

Product	*Average Value*				*Annual Percentage Increase*		
	1970*	1980*	1990*	2000*	1970–80	1980–90	1990–2000
Wheat	3,146	15,502	15,572	14,399	17.3	0.0	−0.8
Bakery	227	1,362	3,913	8,108	19.6	11.1	7.6
Flour	408	1,889	1,748	1,763	16.6	−0.8	0.1
Pasta	39	285	841	1,508	21.9	11.4	6.0
Other	113	894	1,237	972	23.0	3.3	−2.4
Total wheat products	787	4,430	7,738	12,352	18.9	5.7	4.8

*Data is three-year average centered on year shown.
Note: Values are in nominal U.S. dollars. Bakery products include bread and pastry. Other products include gluten feed and meal, bran, germ, and whole meal bulgur.
Source: FAOSTAT.

about 2.8 tons per hectare, thanks largely to the Green Revolution. The annual increase in yields from 1950 to 2000 was 1.89 percent in the United States and 2.95 percent in India.[2]

While improvements in wheat yields have continued along historical trends, the growth of global wheat production has slowed to just 0.5 percent per year over the last decade (see table 11.1), largely because of slower consumption growth and the corresponding adjustment in production. Area planted with wheat declined by 5.5 percent from 1989–91 to 1999–2001, mostly as a result of land-diversion policies of major exporters such as the United States. Certain regions, such as Oceania, increased production and exports during this period because of favorable exchange rates and low production costs, while others, such as the former Soviet Union (FSU), reduced production because of reduced input use and lower domestic demand.

Trade

Trade of wheat is primarily from OECD to non-OECD countries, with about three-quarters of global wheat exports coming from OECD countries and 82 percent of imports absorbed by non-OECD countries (see table 11.1). Trade of wheat grew only 0.4 percent per year during the 1990s, while trade in processed products made from wheat (bakery products, flour, pasta, and other products) expanded more rapidly (table 11.2). This increase in wheat product trade has occurred despite tariff escalation with higher levels of processing. Most of the trade in processed products has been between

developed countries. During 1999–2001 about 85 percent of global exports and 77 percent of global imports of processed wheat products were by developed countries. Developing countries primarily import wheat rather than products, with about 80 percent of total expenditures on wheat going for grain imports during 1999–2001. At the same time, developing countries have increased their wheat product exports from one-third of the average value of total wheat and product exports during 1979–81 to one-half the average value in 1999–2001.

Use

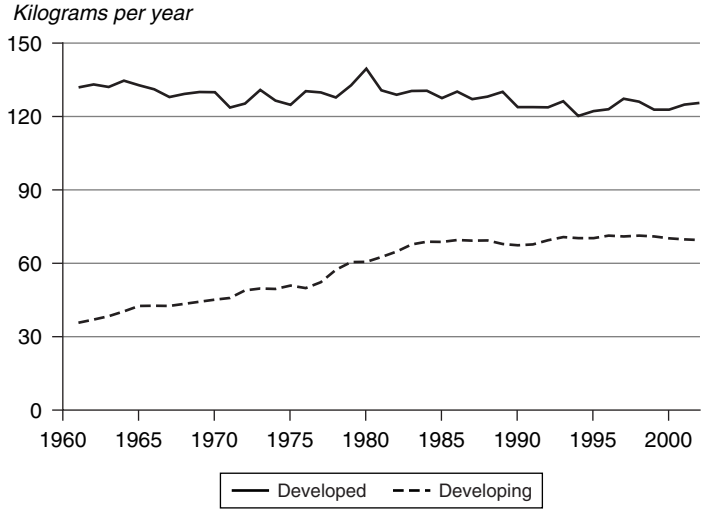
Wheat use has grown faster than population—at 2.5 percent per year since 1961, compared with population growth of 1.7 percent. More recently, however, use has slowed, and per capita food consumption has remained nearly constant for more than a decade in both developed and developing countries (figure 11.2). Feed use has shown strong growth among both developed and developing countries, but this growth has been offset by the dramatic drop in feed use in the countries of the FSU following the breakup of the Soviet Union. Global use of wheat for feed rose hardly at all during 1981–2001, compared with average annual growth of 7 percent during 1961–81. Among developing countries, feed use grew by 2.4 percent per year in 1981–2001, compared to 6 percent per year during the previous two decades. Developing countries tended to substitute wheat for other grains when prices were advantageous; this was particularly true for those Asian countries that are sensitive to prices of grain imports for feed rations. The demand for other uses of wheat, such as industrial uses and as a food additive (gluten, starches, and so on), also has been steady during the past four decades, growing at an average of 1.6 percent per year.[3]

Stocks

Wheat carryover, or ending-stocks, provide a buffer against wheat shortages during years of low production or rapid increases in demand. When stocks are high, prices tend to be low, and vice-versa. The level of global ending-stocks as a percentage of consumption and real wheat prices are shown in figure 11.3. The inverse relationship is readily apparent.

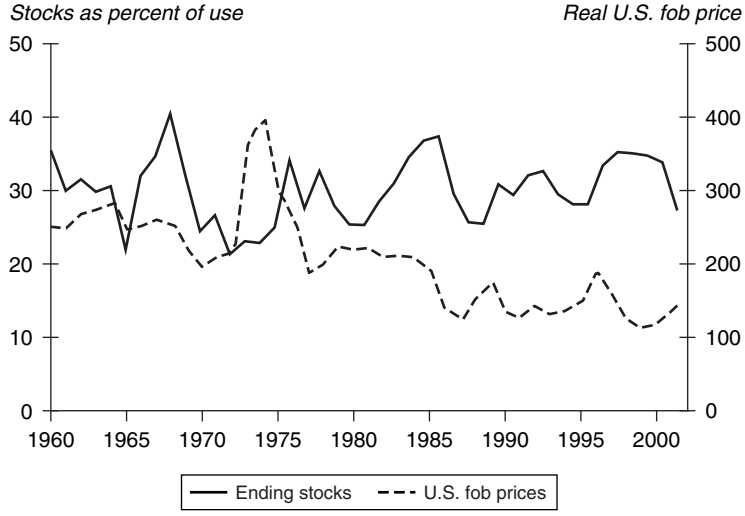
The share of global wheat stocks held by the five major exporters (Argentina, Australia, Canada, the European Union, and the United States), which together account for three-quarters of net exports, declined from 80 percent in 1960 to about 20 percent in 2002. This dramatic shift occurred for two main reasons. First, the share of global production of the five major exporters declined from a high of 46 percent in 1963 to 33 percent in 2002 as production in developing countries increased more rapidly than among major exporters. Second, policy changes in the major exporters reduced government-held stocks. The consequence has been a shrinking supply

FIGURE 11.2 Per Capita Food Consumption of Wheat



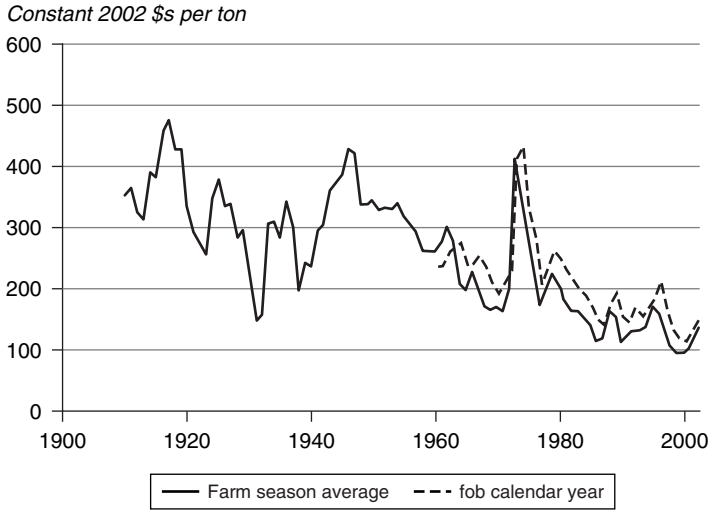
Source: FAO.

FIGURE 11.3 Wheat Ending-Stocks vs. Prices



Source: USDA and World Bank.

FIGURE 11.4 U.S. Wheat Price



Source: USDA.

of exportable wheat supplies that could lead to more volatile prices in the future.

Prices

During most of the 20th century, real wheat prices fell (by about 75 percent since 1900 and by about half since 1970), while the policies of the major exporters (with the exception of Argentina) were aimed primarily at supporting prices, expanding exports, and restricting production through various schemes. A surge in wheat exports during the 1970s, combined with the oil-price shock, led to sharp real price increases, but these were quickly reversed as production increased to meet the rising imports. By the end of the 20th century, real U.S. producer prices had declined by about 75 percent from the highs of the early 1900s (figure 11.4).

Overall Trends

The overall trends in wheat show that production has grown more rapidly than population since 1961, and that, in recent years, production and trade growth have slowed significantly because of slower consumption growth. Part of the recent

slowdown in consumption has been due to the collapse of the FSU, but, in addition, per capita consumption of wheat as food has stopped increasing in both developed and developing countries. Trade in wheat products has grown more rapidly than grain trade, especially among developed countries. The steady decline in real wheat prices and the decline in stocks held by the major exporting countries as a share of world stocks could lead to greater price volatility.

Policy Environment

Under the Uruguay Round Agreement on Agriculture (URAA), member countries of the World Trade Organization (WTO) had to convert quantitative restrictions on imports into bound tariffs, reduce those tariffs over an implementation period, open their markets to imports under minimum access provisions, limit and reduce the most trade-distorting forms of domestic support, and cap and reduce subsidized wheat exports. Despite these significant achievements, the amount of trade liberalization achieved in wheat was modest because of the way the reforms were implemented. Many countries applied the Uruguay Round provisions so that they could protect producers in key sectors from foreign competition. Applied tariffs were often set high, and bound tariffs even higher, leaving open the possibility of future increases in applied tariffs. Wheat export subsidies were reduced by the European Union and the United States—the countries with the largest export subsidies—but that was attributable more to budget constraints than to the URAA. Implementation of minimum access and tariff reductions have stalled as countries have introduced new measures to offset agreed commitments or to prevent them from taking effect.

Market Access

Most countries met the minimum market access requirements of the URAA by establishing tariff rate quotas (TRQs), which provided for reduced tariff rates on a specified volume of imports (table 11.3). Imports above these quotas faced higher tariffs. However, regional trading agreements often have provided even lower tariffs or duty-free access to regional trading partners. For example, Mexico established a TRQ for wheat of 605,000 tons at an in-quota tariff of 67 percent. Meanwhile, Canada and the United States receive a preferential tariff of 4.5 percent under the North

TABLE 11.3 Tariffs and Tariff Rate Quotas, by Country
(percent and millions of metric tons)

Country	Year of Report	*Bound Tariffs*			*Applied Tariffs*		Regional Trade Agreements
		Final TRQ	In-Quota	Above-Quota	Average	Preferential	
Brazil	2001	750	0.0	55.0	12.5	0.0	Mercosur
Canada	2001	227	0.7	62.8	1.3	0.0	NAFTA
China	2001	7,884	1.0	74.0	—	—	—
Colombia	2001	692	124.0	130.0	12.5	—	Andean
Ecuador	1999	480	19.0	23.6	9.2	—	—
European Union	2001	350	0.0	58.9	12.8	0.0	Central Europe
Israel	2000	450	92.0	137.8	—	0.0	EU, U.S.
Japan	2001	5,740	249.2	414.3	—	—	—
Mexico	2001	605	50.0	67.0	67.0	4.5	NAFTA
Morocco	2001	1,555	144.0	198.4	30.1	2.5	EU
Poland	2000	280	25.0	64.0	20.0	0.0	EU
South Africa	2001	108	20.0	93.0	—	—	—
Tunisia	2000	900	17.0	86.7	20.0	—	EU
Venezuela	2000	1,317	24.0	117.0	11.0	—	—

— Not available.
Source: WTO, FAO, USDA, and ABARE 2002.

American Free Trade Agreement (NAFTA). Consequently, virtually all of Mexico's wheat imports come from Canada and the United States. Brazil's wheat imports are mostly supplied by Argentina, which has a comparative advantage in geographic proximity and in preferential treatment under the Mercosur regional trade agreement (Diaz-Bonilla 1999).

Turkey did not establish a TRQ for wheat, but instead relied on tariff-only protection with a bound tariff of 188 percent and an applied tariff of 55 percent. Because imports from the European Union receive a zero tariff under a regional trade agreement, however, most of Turkey's imports come from the European Union. The Russian Federation, which is not a member of the WTO, provides preferential access to several FSU countries. The European Union has protected its producers through variable import levies for many years as part of the Common Agricultural Policy, but it more recently resorted to TRQs on low- to medium-grade wheat to slow wheat imports from Ukraine and the Russian Federation.

Tariff escalation is a common practice that encourages trade in wheat grain rather than in wheat products (table 11.4). Tariffs generally escalate with the degree of processing of wheat products. Brazil, the largest wheat importer during the 1990s, imposed an average tariff on wheat imports of 6.3 percent, but the tariff on wheat flour was 13.5 percent, and those for pasta and bakery products were 18.5 and 20.5 percent, respectively. Because of the high tariffs on value-added products, most imports were in the form of grain or flour. Bangladesh, Costa Rica, Egypt, Guatemala, Jordan, the Philippines, and Uganda showed similar patterns, with most tariffs escalating with greater processing and larger imports of the products with the lower tariffs. Kenya, the Republic of Korea, Japan, and Mexico had different patterns that may reflect stronger protection to producers or specific processors. For example, Kenya had a 35 percent tariff on wheat imports, but a 25 percent tariff on flour, pasta, and bakery products. Korea had prohibitive tariffs on wheat flour imports, but much lower tariffs on wheat grain, pasta, and bakery products. Consequently, there have been almost no flour imports, while wheat, pasta, and bakery products have had large imports. The very low tariffs on wheat probably reflect the fact that Korea produced less than 1 percent of its consumption but used high tariffs to protect flour millers. Japan has specific duties on wheat, flour, and pasta; Mexico had specific duties on bakery products. The relatively large imports of bakery products despite high tariffs suggest high demand or lack of competitiveness of local bakers.

Indonesia and Malaysia, which had low tariffs for wheat and all wheat products, provide an interesting case of imports without much distortion. There is still some tariff escalation, but the maximum tariff was a relatively low 6.3 percent on pasta imports in Malaysia and 5.0 percent on bakery products in Indonesia. Imports reflect these low tariffs, with wheat products accounting for almost half of the value of imports in Malaysia and for one-third in Indonesia. This suggests that without tariff escalation, wheat product trade would have increased significantly, benefiting consumers. Trade in processed wheat products is concentrated within free trade areas such as within the European Union and NAFTA. The shares of global trade occurring within these two regions alone during 2000–01 were 23, 36, 50, and 66 percent, respectively, for wheat, flour, pasta, and bakery products.

Some countries have used nontariff barriers (NTBs) to protect their domestic wheat markets. For example, the United States resorted to phytosanitary standards during the 1980s to block wheat imports from Mexico. At that time, durum wheat producers in the southwestern United States used the existence of Karnal bunt as a reason to block wheat imports from Mexico (Beattie and Biggerstaff 1999).[4] In an ironic twist, wheat imports from four southwestern states of the United States are currently banned by Mexico because of concerns about Karnal bunt (USDA 2004). U.S. wheat was also barred from three major wheat markets during the second half of the 1990s because of phytosanitary concerns. Brazil, China, and India banned the import of U.S. wheat, in particular from the Pacific Northwest, based on the possible presence of *tilletia controversa kuhn* (TCK) fungus and mycotoxins. While all three cases were resolved by the end of the decade, U.S. wheat exports to these markets have not recovered due to changing market conditions.

Several kinds of NTBs have also been administered by governments to control wheat imports—in many cases these have been lessened or

TABLE 11.4 Average Tariff Rates and Imports for Wheat and Wheat Products

Country	Year	*Tariffs (percent)*				*Imports (million dollars)*			
		Wheat	Flour	Pasta	Bakery	Wheat	Flour	Pasta	Bakery
Australia	2001	0.0	0.0	4.0	7.0	0	0	—	—
Bangladesh	1999	5.0	8.3	37.5	37.5	361	19	0	1
Brazil	2001	6.3	13.5	18.5	20.5	872	36	11	21
Bulgaria	2001	23.1	25.0	39.1	54.4	3	1	—	—
China	2001	74.0	98.8	24.1	24.0	319	20	—	—
Costa Rica	2001	0.0	6.0	14.0	14.0	36	3	1	8
Egypt, Arab Rep.	1998	1.0	8.3	40.0	40.0	816	25	1	3
European Union	2001	65.7	45.1	20.8	22.7	844	9	—	—
Guatemala	1999	0.0	10.0	15.0	15.0	56	1	3	19
Hungary	2001	25.0	38.4	38.4	34.7	0	0	—	—
India	2000	41.7	38.5	38.5	38.5	1	1	—	—
Indonesia	1999	0.8	2.5	5.0	5.0	404	68	3	8
Jordan	2000	0.0	12.5	26.7	25.6	68	2	1	5
Kenya	2001	35.0	25.0	25.0	25.4	46	2	3	2
Korea, Rep. of	2001	2.7	151.4	8.0	8.0	530	1	34	34
Malawi	2000	0.0	16.7	25.0	22.9	3	4	0	1
Malaysia	2001	0.0	0.0	6.3	3.3	206	4	19	24
Mexico	2001	67.0	11.7	12.0	10.0	423	8	11	56
Morocco	1997	33.6	71.3	59.5	50.0	366	0	3	3
Pakistan	2001	5	25	70		27	0	—	—
Philippines	2001	4.8	8.0	15.0	15.0	427	6	14	24
Romania	1999	232.9	206.3	261.5	225.0	1	5	—	—
Russia	2001	5.0	10.0			102	19	—	—
South Africa	2001	0.0	20.0	25.0	27.6	32	0	—	—
Togo	2001	5.0	13.3	20.0	20.0	23	0	3	1
Uganda	2001	0.0	15.0	15.0	15.0	11	1	0	0
United States	2001	1.1	0.7	4.6	0.8	300	56	—	—
Zimbabwe	2001	5.0	30.0	40.0	40.0	5	0	0	0
SITC Code	—	410	460	483	484	410	460	483	484

— Not available.

Note: Unless otherwise noted, the duties applied to 100 percent of the tariff lines. The exceptions are as follows: Mexico 83 percent of pasta tariff lines covered; South Africa 50, 67, 75, and 88 percent of tariff lines covered for wheat, flour, pasta, and bakery, respectively; Turkey had only 25 percent of pasta and 14 percent of bakery tariff lines covered; the European Union had 25, 0, 9, and 0 percent of tariff lines covered for wheat, flour, pasta, and bakery, respectively; the United States had only 33 percent of wheat and flour tariff lines covered.

Source: For Egypt's tariff data, TRAINS database. For Pakistan, all data from WTO tables. For all others: tariffs from WTO Integrated Database, MFN (most-favored-nation) Applied Duties; imports from FAOSTAT and COMTRADE.

eliminated following liberalization of domestic markets and international trade. Government import controls include the issuing of import licenses, quantity and quality restrictions, state trading, and bureaucratic red tape in general.[5] State trading is still practiced by many governments, but the private sector is responsible for a growing share of global wheat imports. Among large wheat importers, examples of greater private sector involvement can be found in Indonesia, Pakistan, the Philippines, and Turkey in Asia; Algeria, the Arab Republic of Egypt, and Morocco in Africa; and Brazil and Mexico in Latin America. However, many governments—among them those of China,

the Islamic Republic of Iran, India, and Japan—still control wheat imports through various schemes.

Export promotion

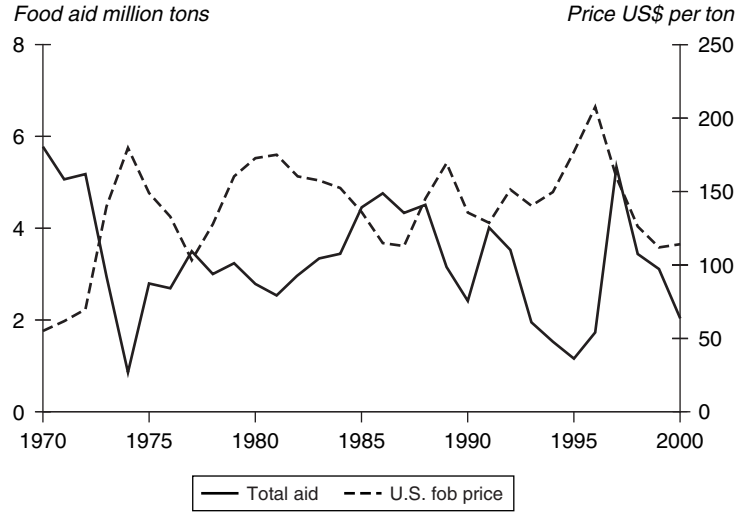
The two largest providers of wheat export subsidies, the European Union and the United States, had largely eliminated export subsidies by 2001 as global prices rose and the European Union reduced intervention prices under its 1992 and Agenda 2000 policy reforms. The European Union agreed to reduce subsidized exports to 14.4 million tons by 2000 and thereafter under the URAA and has not reported export subsidies since the 2001–02 season.[6] The United States agreed to reduce subsidized wheat exports to 14.5 million tons by 2000 and thereafter under the URAA, although the U.S. primary export subsidy facility, the Export Enhancement Program, has not been used for wheat since 1995. Under URAA, however, both countries could revive their export subsidy programs and together could subsidize nearly one-quarter of global wheat exports. Export credits were still used by Australia, Canada, the European Union, and the United States as recently as 1998, the most recent period for which complete data were available (OECD 2000).

Food aid has been provided by many countries to respond to emergencies or persistent food shortages. It has often been charged, however, that food aid is partly used as a way to dispose of surplus production. This charge is supported by the fact that 85 percent of global wheat food aid during 1990–2000 was provided by four of the world's major wheat exporters. The United States provided 54 percent of world wheat food aid, the European Union 20 percent, Canada 8 percent, and Australia 3 percent (FAOSTAT). In total, wheat food aid accounted for about 6 percent of wheat trade during 1990–2000. Over a longer period, the United States provided an average of 3.3 million tons of wheat food aid from 1970 to 2000, averaging 10 percent of U.S. wheat exports. The level of food aid varied with price (figure 11.5), which suggests that it was partly surplus disposal.[7]

Food Security and Global Wheat Trade

Since wheat is the food grain most often used as a buffer against food shortages, any disruption of trade flows or sharp increases in prices causes food security concerns for importing countries. When real wheat export prices doubled from 1970 to 1974, for example, policymakers in wheat-importing countries were quick to raise concerns. These were further heightened when the United States imposed grain export embargoes in 1974 and 1975 to protect its own consumers from high prices.[8] Such actions likely contributed to the strong desire for food self-sufficiency in many food-importing countries. The United States again embargoed grain sales to the Soviet Union in 1980 as a foreign policy action motivated by the USSR's invasion of Afghanistan.

FIGURE 11.5 U.S. Wheat Food Aid vs. Prices



Source: USDA and World Bank.

The embargo lasted nearly 16 months and included a wide range of products. The European Union provoked anxiety over food security again in 1995, after it had become a wheat exporter, when it imposed an export tax of $35 per ton on wheat during 1995–96 to protect its consumers from high prices.[9] The Russian Federation recently took similar action by imposing an export tax on wheat of 25 euros per ton during the period from January 15 to May 1, 2004. Several other wheat exporters also imposed restrictions on wheat exports, including Hungary, India, and Ukraine. As with the previous actions, the policies were intended to protect domestic supplies and control prices. All came at times when world prices were rising and the availability of supplies was uncertain. Such actions send the signal that access to wheat exports cannot be relied upon during periods of shortages and high prices.

Domestic support

Because domestic support commitments under the URAA apply to the whole of agriculture rather than to individual commodities, countries have been able to protect their most politically sensitive sectors by keeping support high. According to OECD estimates, domestic support to OECD wheat producers averaged $17.3 billion per year during 1999–2001 (table 11.5), compared with $18.7 billion per year during the 1986–88 base period of the URAA. Domestic support in 1999–2001 accounted for 41 percent of the value of wheat production at farm-gate prices. The European Union and the United States provided the largest absolute support to wheat, amounting to $9.6 billion and $4.9 billion per year, respectively. However, support representing a higher percentage of the value of wheat

TABLE 11.5 Support to OECD Wheat Producers, 1999–2001

OECD Country/Region	Producer Support (millions of dollars)	PSE Percentage	Producer NPC	Producer NAC
OECD	17,331	41	1.16	1.70
Australia	119	5	1.01	1.05
Canada	358	15	1.01	1.17
Czech Republic	−10	−3	0.87	0.97
European Union	9,565	48	1.15	1.95
Hungary	53	13	1.06	1.15
Japan	822	86	6.38	7.20
Mexico	237	39	1.44	1.64
Norway	67	71	2.63	3.58
Poland	251	21	1.22	1.27
Slovak Republic	5	5	0.86	1.06
Switzerland	191	63	2.33	2.82
Turkey	551	26	1.30	1.41
United States	4,928	46	1.12	1.86

Note: Producer support was converted from local currency to U.S. dollars using period average annual exchange rates from International Monetary Fund's International Financial Statistics, 2002 Yearbook. PSE percentage is producer support estimate, an indicator of the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm-gate level as a percentage of the value of production arising from policy measures, regardless of their nature, objectives, or impact on farm production or income. Producer NPC is producer nominal protection coefficient, an indicator of the nominal rate of protection for producers measuring the ratio between the average price received by producers (at farm gate), including payments per ton of current output, and the border price (measured at farm-gate level). Producer NAC is producer nominal assistance coefficient, an indicator of the nominal rate of assistance to producers measuring the ratio between the value of gross farm receipts including support and gross farm receipts valued at world market prices without support. No calculations were made for Canada, Iceland, New Zealand, Norway, or the Republic of Korea.

Source: OECD 2002

TABLE 11.6 Major Wheat Exporters' Shares of Global Wheat Net Exports
(percent)

Exporter	1970–79	1980–89	1990–99
United States	40.9	36.1	27.1
Canada	19.5	18.4	17.9
Australia	12.1	12.8	12.0
European Union	0.0	7.8	9.9
Argentina	3.9	5.6	6.2
Total	76.4	80.7	73.1

Note: The average export shares were calculated on net exports because the European Union was both a large importer and exporter and net exports capture the net trade situation better than gross exports. When net exports were negative, a zero was assigned. The European Union was defined as the current 15 members even though not all of these countries were members during the entire period.
Source: FAOSTAT.

production was provided by Japan (86 percent), Norway (71 percent), and Switzerland (63 percent).

Major Wheat Exporters

Five countries accounted for about three-quarters of net global wheat exports in 1970–1999 (table 11.6). The United States was the largest net exporter over this period, but its share declined from nearly 41 percent during the 1970s to 27 percent during the 1990s. Canada was the second-largest net exporter with an 18–19 percent share. Australia maintained its 12 percent share throughout the period, and Argentina expanded its share from about 4 to 6 percent of global exports. The European Union exported 10 percent of global net exports during the 1990s after being a net importer of about 10 percent of global trade during the 1970s. The emergence of the European Union as a major exporter was attributable to highly subsidized production and exports under the Common Agricultural Policy (CAP) and was largely at the expense of U.S. exports.

Wheat support policies of the major exporters have changed since the early 1980s, with Australia and Canada significantly reducing support to their wheat producers, while the European Union and the United States have decreased support more moderately according to OECD estimates (table 11.7). Argentina, which is not an OECD country and does not have producer support estimates comparable to the other major exporters, has historically taxed rather than supported its wheat producers.

Canada made the largest reductions in wheat support among major exporters between 1986–88 and 2000–02, with total producer support declining from 45 percent of the value of production to 16 percent. The country largely abandoned direct price support to individual commodities in favor of income support in the early 1990s (Gardiner 1999). This led to reduced wheat production and reduced net exports by 13 percent between 1990–95 and 1996–2001 (table 11.8).

TABLE 11.7 Producer Support Estimates, 1986–88 and 2000–02
(percent)

Exporter	1986–88	2000–02
Australia	9	5
Canada	45	16
European Union	52	46
United States	49	40

Source: OECD 2003.

The European Union sharply reduced wheat intervention prices in the CAP reform of 1992 and implemented a mandatory land set-aside policy (Rayner and others 1999). Further reforms were taken in 2000 and 2003. However, total support did not decline significantly (see table 11.7), and production continued to increase (see table 11.8). Consumption increased because of the lower intervention prices, allowing net exports to fall by 41 percent between 1990–95 and 1996–2001.

The United States undertook major reforms in the 1980s, with the reduction in wheat loan rates and the introduction of the Conservation Reserve

TABLE 11.8 Percentage Change of Wheat Production, Area Harvested, Yields, and Net Exports of Major Exporters from 1990–95 to 1996–2001

Exporter	Production	Area Harvested	Yields	Net Exports
Argentina	47.2	28.0	14.7	53.8
Australia	66.2	37.5	21.7	61.9
Canada	−10.0	−13.4	4.0	−13.3
European Union	12.4	3.0	9.1	−40.8
United States	−2.0	−9.3	8.6	−16.7
Major exporters	10.2	1.4	8.6	−6.3

Source: Authors' calculations.

Program, which removed about 10 million acres of wheat land from production (15 percent of wheat area) (Hoffman, Schwartz, and Chomo 1995). Net exports declined by nearly 17 percent from 1990–95 to 1996–2001, as area declined 9.3 percent. The 2002 U.S. Farm Bill somewhat reversed previous reforms but did continue the large wheat-land diversion program begun in the 1980s.

The changes in Argentina led to large investments in the Argentine grain marketing system, more intensive input use, and a 50 percent increase in net exports from 1990–95 to 1996–2001 (Schneph, Dohlman, and Collins 2001). The financial crisis of 2002 contributed to the profitability of exportable agriculture, as the peso was devalued by 70 percent after being fixed to the U.S. dollar for 10 years. Export taxes of 20 percent were reinstated to offset windfall profits from the currency devaluation.

The combined impacts of reduced production support, lower export subsidies, and land set-asides are reflected in lower production and reduced net exports by Canada, the European Union, and the United States (see table 11.8). These declines were mostly offset, however, by larger exports from Argentina and Australia. On balance, the five major exporters reduced net wheat exports from 80 million tons during 1990–95 to 75 million tons during 1996–2001, a decline of 6.3 percent. The largest decline in producer support came in Canada, where lower support led to lower area planted, production, and net exports.

Major Wheat Importers

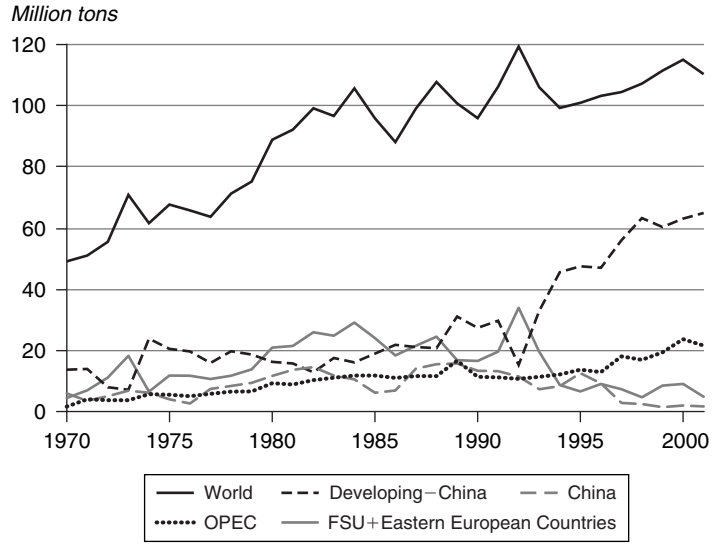
Global wheat imports have grown by just 1.2 percent per year since 1980, compared with nearly 6 percent per year between 1970 and 1980 (figure 11.6). The rapid increase in imports during the 1970s was caused by major economic and policy changes in several regions and countries. These include increased wheat imports by OPEC (Organization of Petroleum Exporting Countries), large net imports by the FSU and Eastern Europe because of poor production, and policy changes in China that led to large net imports. Most of these changes have either been reversed or had more moderate influences on wheat imports since 1980.

Imports by the FSU accounted for one-quarter of global imports at their peak in 1984 and then steadily declined to only 3 percent by 1995. Imports by Eastern European countries, while much smaller than those of the FSU, declined by 75 percent during the same period (FSU+Eastern European countries in figure 11.6). China's imports peaked at 16 million tons in 1989 (16 percent of global trade) and declined to 2 million tons in 2000 due to rapidly increasing domestic production following policy changes (see figure 11.6).

OPEC's import increases slowed during the 1980s as oil prices fell. Imports have only recently begun to increase with the recovery in oil prices that began in 1999. Thus the countries that fueled the large increase in wheat trade during the 1970s largely accounted for its stagnation after 1980. Offsetting these declines have been steady increases in imports by other developing countries (shown as Developing minus China in figure 11.6), but the increases were not large enough to raise global trade significantly. Imports by the developed countries have remained largely constant since 1980, with lower imports by Western Europe offsetting increases from high-income Asia.

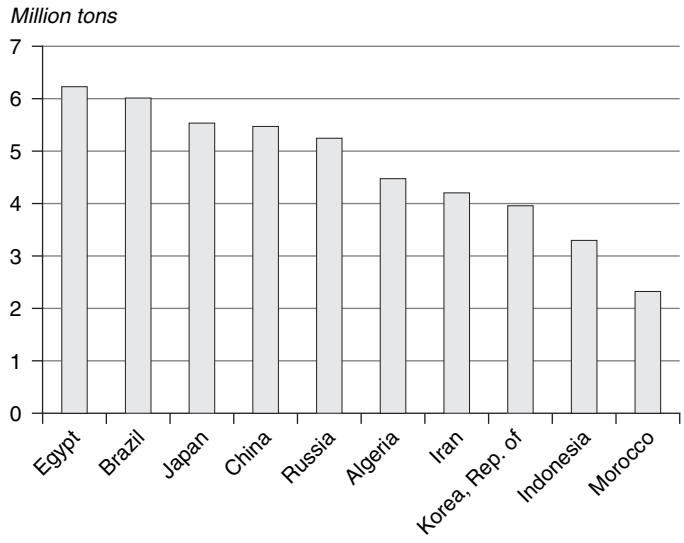
Brazil, China, Egypt, Japan, and the Russian Federation were the largest importers during 1990–2000, each with 5–7 percent of global imports (figure 11.7). They were followed by Algeria,

FIGURE 11.6 Global Wheat Imports



Source: FAO.

FIGURE 11.7 Wheat Net Imports, Average for 1990–2000



Source: USDA.

Indonesia, Iran, and Korea, each with 2–5 percent of global imports. The 10 largest net importers during 1990–2000 accounted for 46 percent of global imports. Many of these large importers undertook policy reforms during the late 1980s or 1990s that removed government monopolies on imports.

Egypt was the largest importer during 1990–2000, with average imports of slightly more than six million tons per year. Wheat is considered a strategic commodity in Egypt, providing more than one-third of the daily caloric intake of Egyptian consumers and 45 percent of protein consumption. It is also the major staple crop produced in the country, occupying about one-third of the total winter crop area. The government's policy objectives in the agricultural sector have been to provide an adequate supply of food to all income groups, to promote greater self-sufficiency in crop production, and to increase farm income.

In the mid-1980s the widening food gap, stagnation of the agricultural sector, and the rising costs of the food subsidy system encouraged the government to reform agriculture and the wheat sector under the Agricultural Reform Program, initiated

in 1987. In the first phase of the reform, prices, quotas, and marketing controls were partially liberalized. Import subsidies were reduced, and markets were opened to private investment. The second phase of the reform coincided with the launching of the Economic Reform and Structural Adjustment Program in 1991, which sought to shift Egypt from a state-controlled economy into a more market-oriented economy in which the private sector could play a major role (Kherallah and others 2000).

In 1992 the Egyptian government also began to liberalize the wheat-milling sector, which up to that time had maintained a monopoly over the importation of all types of wheat grain and flour. In addition, around 80 percent of all industrial wheat mills in the country belonged to the public sector—the rest were licensed to mill for the government under specific arrangements. The partial liberalization of wheat trading started in the flour market in 1992, when the government freed the prices of flour and bread and allowed the private sector to import wheat for the production of flour. Resale of wheat in excess of the milling needs for flour was not permitted. The government also allowed private traders to import flour directly. All the remaining restrictions on flour production and trading were removed in 1993, allowing both the public and private sectors to freely import, produce, distribute, and sell flour at free-market prices. The quotas of government-milled flour going to food-processing factories, shops, and bakeries were also eliminated, thus allowing these outlets to purchase their flour freely in the market.

Brazil was the second-largest importer during 1990–2000, with imports averaging 6 million tons per year. Before 1991 the Brazilian government heavily subsidized wheat flour, but consumer subsidies were removed in late 1991 along with other price controls, and the mill-quota system was eliminated (Brandão and Salazar 2003). Brazil now obtains nearly all of its wheat from Argentina with a zero import duty because of its membership in the regional trade group, Mercosur. In 2002, to reduce wheat imports, the government introduced a program to expand domestic wheat production to 50 percent of total consumption by 2004. The government operates a minimum-support-price system for wheat and other commodities. Other policies and programs to support domestic wheat production include subsidized loan programs for farmers and processors to borrow against their products at below-market-interest rates while holding their products as collateral in accredited warehouses. Small producers are eligible for financing of production costs at subsidized interest rates under a program to strengthen family farms. Longer-term support for production and processing of agricultural products is available from the Brazilian Bank for Economic and Social Development and the Special Agency for Industrial Financing.

Japan was the third-largest wheat importer during 1990–2000, but unlike other importers it has not reduced import controls or significantly reduced producer support. Japan's agricultural policy is strongly influenced by concerns for food security and self-sufficiency. In addition, postwar land reforms created a very small-scale farm structure that is inefficient by global standards; thus income support for farmers is also a high priority. Wheat producers receive about $1,200 per ton for wheat—about 10 times the U.S. f.o.b. (free on board) price and 6 times the c.i.f. (cost, insurance, and freight) import price. Domestic wheat production is about 10 percent of domestic consumption, and the Japanese Food Agency imports about 6 million tons of wheat per year. Import policy has focused on food security and diversification of supplies in an effort to ensure guaranteed supplies rather than low import prices. Domestic producers are paid an administered purchase price for wheat, which is then resold at higher prices to the domestic milling industry. Imported wheat is resold to millers at prices that are about double the import price. A margin between the resale of domestic and imported wheat is necessary to adjust for quality differences between Japanese and imported wheat.

A new wheat policy was introduced in 1998 by the Japanese Food Agency, with implementation occurring during the 2000 to 2002 crop years. The Japanese Food Agency retained control over the pricing and marketing of domestic wheat, as well as the importing and pricing of foreign wheat. The new policy allows the private sector to import wheat, whereas the Japanese Food Agency had been the exclusive importer under the previous system. The new policy also introduced a new compensation system for domestic wheat producers. Other programs to improve quality allow continuous

importation of wheat for food use by the Japanese Food Agency and a simultaneous-buy-and-sell system for imported feed wheat.

China was the fourth-largest importer during the 1990–2000 period, but it has undertaken major reforms in the past few years, lowering support prices to near world market levels and reducing imports by 90 percent (Crook 1996 and 1997; USDA 1998 and 2001a). The government's long-standing policy has been to approximate self-sufficiency in food staples, including wheat. This began in the 1950s with producer quotas, but the system changed significantly with the introduction of the Household Responsibility System in 1978. Under this system, local leaders began contracting production quotas with small work units and family farms instead of large collectives. China initiated the Governors' Grain-Bag Responsibility System in 1995, whereby provincial authorities were given the task of stimulating production, stabilizing prices, making provisions for adequate grain stocks, reducing imports, and ensuring supplies for urban areas and the military. These reforms led to an increase in wheat production of about 22 percent between 1990–92 and 1997–99 and to huge stocks by the end of the 1990s. Since the mid-1990s, the state grain procurement program has not been altered to any significant degree, although there have been revisions in some procurement procedures and efforts to improve wheat quality. In 2000 the government introduced new wheat standards to upgrade the average quality of the crop. Protected prices were removed from spring wheat in the north and winter wheat south of the Yangtze River. In 2001 market reforms eliminated protected prices in many provinces but not in the major producing regions.

One of the most significant consequences of China's domestic policies has been the shift in its cereal trade balances. The accumulation of large grain stocks caused average annual wheat imports to fall from 10 million tons in the early 1990s to below 1 million tons since 2000. China became a net exporter of wheat in 2002.

Other factors contributed to the decline in wheat imports, including local market conditions and government actions. China assessed a 13 percent value-added tax on imported wheat (while not collecting the tax on most domestic wheat production), and a 1 percent import duty, thus making imported wheat uncompetitive in some years. During the phase-in period after China's entry into the WTO in 2001, the volume of imports was regulated by a tariff rate quota system. The initial TRQ for wheat was 7.3 million tons in 2001; it rose to 9.64 million tons in 2004. China also agreed to expand the role of private traders after WTO accession, but state trading enterprises would still control 90 percent of the wheat TRQ. Notwithstanding China's WTO commitments, however, the fill rate of the wheat TRQ has been minimal—8 percent in 2002 and 5 percent in 2003, according to periodic reports from the Global Agricultural Information Network of the U.S. Department of Agriculture.

While many of the major importing countries have reformed policies, high protection is still evident in many countries, as shown by disparities between producer prices and U.S. fob prices (figure 11.8). Japan, has the highest producer prices, but several other countries also have high prices. Consumers in these countries have the most to gain from more liberal trade policies.

Emerging Wheat Exporters

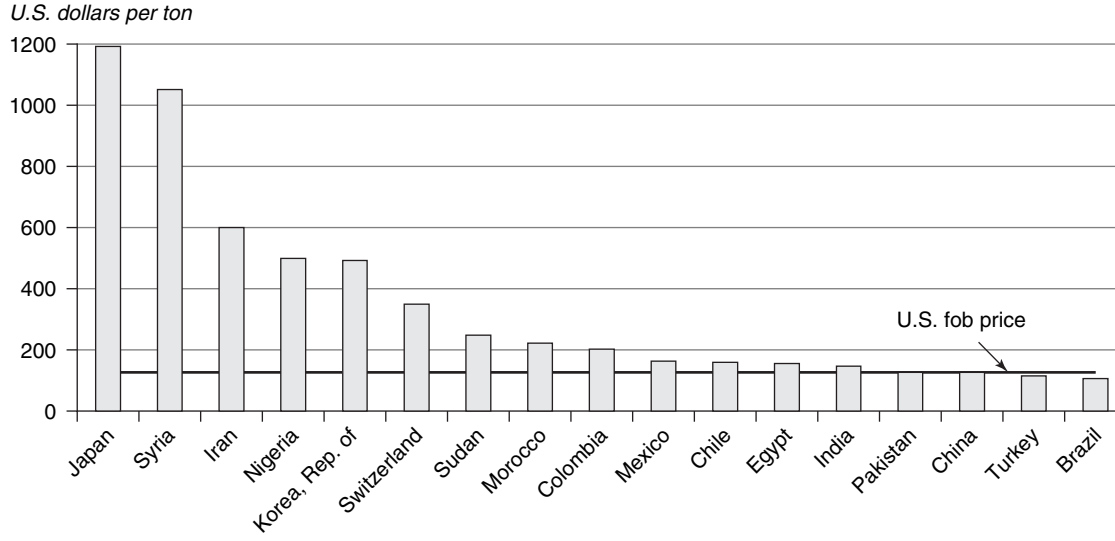
China, India, Pakistan, and several countries of the FSU have emerged as wheat exporters. This is a shift from the past when these countries were either large regular importers or occasional importers.

Former Soviet Union

Several countries of the FSU have the potential to become large exporters—among them Kazakhstan, the Russian Federation, and Ukraine, which collectively moved from being net importers of 15 million tons of wheat in 1992 to net exporters of 23 million tons in 2002 (figure 11.9).

The emerging exporters of the FSU have many common problems, including weak marketing systems; inefficient storage, transport, and grain handling systems; lack of credit; and the challenge of making the transition from collective farms to private production systems. Policy reforms have been slow and only partially effective in stimulating private-sector initiative. Despite these problems, all of these countries have large land areas well suited to wheat production and low production costs. They also have an advantage in transporting wheat to importers in the Middle East compared with

FIGURE 11.8 Wheat Producer Prices in 2001 for Selected Countries



Source: FAO.

FIGURE 11.9 Emerging Wheat Net Exports of Emerging Exporters in the FSU

Source: FAOSTAT.

major exporters such as Australia, Canada, and the United States.

Kazakhstan, a major wheat producer and exporter during the Soviet era, used intensive farming methods that relied on subsidized inputs. These intensive farming methods, which are not profitable without large subsidies, have been abandoned. The country has a large land area, however, with considerable potential for expanding wheat production and exports using low-input farming methods. Production remains constrained by high domestic marketing and transport costs traceable to a lack of competition and insufficient private sector activity. Production is mostly high-protein spring wheat, which, with quality improvements, could compete with the best wheat from other exporters. Large investments during the Soviet era left the country with considerable infrastructure for grain transport and exports. If costs can be controlled and production increased, Kazakhstan could become a major wheat exporter (Longmire and Moldashev 1999).

Russia accounted for one-quarter of world wheat exports in the early years of the 20th century, when its yields were only slightly less than those of the United States. Whether the Russian Federation

can return to its former role as a major exporter depends largely on policy developments. Input subsidies and price supports were largely dismantled in January 1992, when the transition toward a market economy began. Decreases in real incomes and changes in food prices led to substantial changes in food consumption and declines in feed use. Government procurement of wheat declined from nearly all before the reform to just 21 percent by 1995—in part because of lack of funds by the state procurement agency. Private grain-trading companies have largely replaced the state. Simultaneously, subsidies have been reversed and the agricultural sector (including wheat) are taxed. Grains are still produced on large farms and under the same management as before the reforms, but many of the farms have been converted into private stock companies. Regional authorities use wholesale and retail price controls, subsidies, and barriers to interregional trade to regulate prices and food stocks. The emerging private sector must deal with the high transaction costs of these interregional trade restrictions. Producers have considerable potential to increase yields if economic incentives improve. Efficient transportation and marketing systems could make the Russian Federation a net exporter (Goodwin and Grennes 1999).

Ukraine emerged from a decade of adjustment following the end of the Soviet era to become a significant wheat exporter. In 2002–03 the country exported about 6.6 million tons of wheat before a production slump in 2003–04 forced a return to imports. However, low production costs and shifts in resource use since the Soviet era suggest that wheat exports will likely increase in the future. During the Soviet era, Ukraine concentrated on livestock and poultry production, but soon after independence in 1991 poultry and livestock numbers declined by more than half. Wheat production fell as well (in part because of lower demand for animal feed) until 2000, rebounding in the two years before the severe drought of 2003. Production costs are estimated by the U.S. Department of Agriculture (USDA) to be $50 per ton (Thursland and Prikhodko 2002), offsetting inefficiencies in handling, storage, and transport.

Policy reforms began with price liberalization in 1992, but many agricultural subsidies were continued, resulting in budget deficits and inflation. Economywide price and trade reforms were fully implemented, but specific agricultural and institutional reforms were only partially implemented. Land reform has been slow to develop in the years since transfer and ownership legislation was passed in 1994 and 1995. The result has been a slow recovery of production (Debatisse and Chabot 2000).

Asia

Several Asian countries have become net wheat exporters in recent years because of large crops and stocks. It remains to be seen, however, whether they can sustain exports or will revert back to being net importers. Domestic policies in Asia remain aimed at self-sufficiency and self-reliance rather than on promoting surpluses for export.

India has followed a policy of self-sufficiency since independence, increasing crop output by expanding irrigation, improving crop yields through high-yielding varieties, and increasing land-use intensity with multiple cropping. Better yields were possible because of the Green Revolution, which provided the high-yielding varieties that were adopted with support from production and price policies. To increase yields, the public sector provided agricultural inputs, such as fertilizers, power, and water for irrigation at subsidized prices. The government also established a system of minimum support prices to procure wheat from farmers. Subsequently, India made substantial gains in food grain production, and over the past 30 years wheat production has grown by about 3.5 percent per year.

In the early 1980s, India cautiously began to liberalize trade, but only since 1991 has the process of liberalization picked up speed. In July 1991 India introduced radical policy reforms in various economic sectors, but trade restrictions on agricultural products were left largely untouched. Subsequent changes in trade policy gradually lifted restrictions on agricultural products. Bumper wheat crops starting in 1999 led to large accumulations of public stocks, which eventually prompted wheat exports, making India a net wheat exporter in 2000. In order to be competitive in the Asian markets, the government subsidized exports, displacing sales in the region by the United States and other traditional suppliers. Exports reached a record 6 million tons in 2002–03. Wheat exports were halted in August 2003 as stocks diminished following a poor crop in 2003.

China has been exporting wheat since 1992. Exports reached 1 million tons in 2002–03, making China a significant net wheat exporter for the first time. Despite stagnant domestic demand, however, domestic surpluses have been falling in recent years in line with policy-driven production declines. Rozelle and Huang (1999) argue that China will remain a net importer at the levels of the early to mid-1990s.

Pakistan has been a net wheat exporter since 2000–01, reaching 1 million tons in 2002–03, but reverted to being a net importer during the 2003–04 season.

The Impact of Liberalization

Various studies have estimated the impact of liberalizing trade and reducing domestic support on the world wheat market. Results vary and do not always consider the full range of reforms. The Food and Agricultural Policy Research Institute (FAPRI 2002) at Iowa State University and the University of Missouri recently evaluated the impacts of liberalization of agricultural markets using a multimarket global agricultural model. The results for wheat are reported here. The study considered two scenarios. The first, full liberalization, explored the probable effects of removing all agricultural distortions—domestic farm programs and border measures—including all TRQ schemes, tariffs, and direct export subsidies such as the European Union's CAP. The second investigated the effects of removing only border measures. The two scenarios allow the impact of domestic programs to be evaluated separately from border measures. The question of how to examine domestic programs without border measures was addressed by assuming that government payments would be used to provide producers with the difference between current domestic price floors and the lower prices that would result without border measures. The simulations did not include the 2002 U.S. Farm Bill but instead used an extension of the previous farm bill in the baseline simulation. Nor did they include the reforms to the European Union's CAP in mid-2003. The URAA was assumed to extend after 2004, when the final provisions are to be implemented. The results are presented as average percentage changes relative to the baseline simulation for the period from 2002 to 2011.

The FAPRI results show that wheat prices (U.S. fob Gulf) would rise from the baseline by an average of 4.8 percent under the full liberalization scenario and by 7.6 percent in the trade-only scenario. The price increase is lower under full liberalization because set-asides would be removed in the European Union and the United States, resulting in a substantial increase in production and exports that would dampen the price effect. Global wheat trade would increase by 7.9 percent under full liberalization and by 5.0 percent under the trade-only scenario, with the largest export increase going to the European Union once set-asides were removed. China would reduce imports under both scenarios because it would face slightly higher prices on wheat allowed under the low in-quota tariff in its wheat tariff rate quota. India would reduce exports and become a net importer, because export subsidies would no longer be allowed.

A USDA study (2001b) found a larger wheat price increase from elimination of all policy distortions. It concluded that wheat prices would rise by 18.1 percent from elimination of all policy distortions. Removal of global tariffs would raise prices 3.4 percent; elimination of OECD domestic subsidies would raise them 12.0 percent; and global elimination of export subsidies would raise them 2.0 percent. A recent FAO study (Poonyth and Sharma 2003) concluded that wheat prices would rise by 11.9 percent under the U.S.-proposed WTO reform, which is similar to the USDA's full-liberalization scenario.

The three studies provide a range of estimates—from 4.8 to 18.1 percent—of the increase in world prices that would result from eliminating all producer support and trade distortions.

Conclusions

The global wheat market has become less distorted since the early 1990s, as several countries have undertaken reforms unilaterally or as a consequence of commitments under the URAA. Governments in OECD countries still provide substantial support to producers, however. The effects of that support have been partially offset by land set-aside programs and by the way in which support is provided; however, support policies still distort trade and depress world prices. The European Union and the United States have not used export subsidies in

recent years but still use other surplus disposal programs, such as nonemergency food aid and export credits. These programs make it more difficult for emerging exporters to compete with established exporters.

Most importing countries have reduced wheat tariffs or allowed duty-free imports from regional trading partners, thus benefiting from lower prices. A few countries, such as Japan, continue to apply extreme protection, with internal prices more than five times global market levels. Tariff escalation is a major problem for countries trying to diversify production and exports, with tariffs on flour well above those on wheat grain, and tariffs on bakery and pasta products even higher. Consequently, trade in wheat products is largely confined to free trade areas such as within the European Union or NAFTA.

A major concern for wheat-importing countries is the lack of assured access to wheat export markets during periods of supply shortages and high prices. Policies such as the U.S. grain export embargo of the 1970s, designed to protect domestic consumers, contribute to higher global wheat prices and increase the uncertainty of wheat-importing countries. The threat of such policy actions continues, with the European Union imposing export taxes on wheat in 1995 and the Russian Federation imposing export taxes in 2004—also to protect domestic consumers. Such actions reinforce the calls for food security through self-sufficiency in importing countries and deprive those countries of the benefits from trade.

Future reforms of the global wheat market should focus on reducing producer support in OECD countries, reducing protection in the remaining highly protected markets, reducing tariff escalation on wheat products, and ensuring access to exportable supplies during price spikes. Elimination of production subsidies and trade distortions could raise world wheat prices by 5–18 percent according to recent studies, but the large surplus capacity among major wheat exporters could boost production under policy reforms and prevent prices from rising further.

Notes

1. More detailed trade flow tables are given in the attached CD-ROM.

2. Note that the yields in India and the United States are not strictly comparable because a larger share of wheat area in India is irrigated than in the United States.

3. About 9 percent of global grain-based starch production comes from wheat (80 percent comes from maize). "Starch—Versatile and in Demand," *World Grain,* January 2004.

4. Karnal bunt is a wheat fungus that occurs during cool, rainy growing conditions. It is named after the city in India near where it was first reported in the 1930s. It is not harmful to humans or animals, but it causes an unpleasant odor in wheat flour.

5. Exchange rate controls are another means to regulate imports, but these are not normally commodity-specific.

6. Based on the use of wheat subsidies as reported to the WTO. Source: USDA, ERS WTO Agricultural Trade Policy Commitments Database.

7. Regressing wheat food aid (FA) on wheat prices (WP) shows a statistically significant relationship between the quantity of food aid and prices; as prices fall the quantity of food aid increases. The OLS regression estimated was FA = 6.487 − .023*WP. The R2 = .42 and the coefficient on prices was statistically significant at the 1 percent level of significance with $t = -4.6$.

8. The United States suspended grain exports in 1974 and again in 1975 because of low stocks, poor crop production prospects, and concern about the inflationary impacts of high grain prices. However, the action was directed only at the USSR in 1974 and at the USSR and Poland in 1975 since these countries were major buyers and perceived to be disrupting the markets (USDA 1986).

9. "EU Hits Grain Exporters, Steep New Tax Aims to Protect Supplies," *International Herald Tribune*, December 8, 1995. Most recently, however, the European Union declined to impose wheat export taxes following the 2003 production shortfall, but did temporarily suspend grain export licenses in August 2003. Reuters, July 31 and September 2, 2003.

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