

# Wheat

## Background for 1990 Farm Legislation

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### Introduction

The 1990 wheat crop will probably be the last one produced under the provisions of the 1985 Food Security Act. Experience with the 1985 Act has raised a number of important issues, with most of the debate focused on levels of income and price supports, the export enhancement program, the acreage base eligible for support, farmers' flexibility to produce alternative crops on part of their base acres, and ways of making crop production decisions more responsive to world prices. The 1988 and 1989 droughts and a sharp reduction in grain stocks have renewed interest in the role of the farmer-owned reserve.

Many observers argue that the 1985 Act functioned reasonably well and that with minor modifications it should continue to work for wheat production and marketing. However, others argue that the costs of the program are excessive and less costly alternatives, such as further reductions in target prices or in the amount of production eligible for income and price supports, are needed. Surplus stocks of wheat declined under the 1985 Act as exports expanded due in part to the combined effects of the export enhancement program, reductions in the loan rate, and the 1988 and 1989 droughts.

This report describes major factors and developments in wheat production and in wheat markets that must be considered in finding appropriate policies. The current and prospective economic well-being of wheat farmers is likely to affect the policy debate, as it has in the past. This report accordingly discusses the economic and structural factors affecting the current cost/returns position of wheat farmers. Trends in supply, exports, and domestic use are examined to explain the supply and price fluctuations that have historically plagued the wheat industry.

The report also defines the characteristics of wheat production and demand that distinguish it from other crops. There are five major classes of wheat which are grown in distinct regions and which have different uses. The economic and environmental conditions under which wheat is grown and accompanying trends greatly influence how wheat farmers respond to market conditions and to farm programs as well.

The historical review of wheat programs presented in this report, economic conditions motivating the programs, and the results of those programs are useful in developing future policy.

## **Structure of the Wheat Industry**

Background information on the characteristics and performance of the U.S. wheat industry is presented in this section to provide a basis for evaluating policy alternatives. Wheat is the principal food grain produced in the United States. Wheat exports frequently exceed domestic use but are highly variable.

### **Production Characteristics**

Wheat is the fourth leading field crop produced in the United States in terms of value of production. Only corn, hay, and soybeans are more important. In 1987/88, the farm value of wheat production was \$5.4 billion, about 8 percent of the total value of U.S. agricultural production. Wheat is the principal grain used for food consumption both in the United States and throughout the world. The United States exported about 40 percent of its wheat supply in 1987/88.

### Structure of Wheat Farms

About 446,000 farms harvested wheat according to the 1982 Census of Agriculture. These farms harvested an average 160 acres of wheat, up from 140 acres in 1978. About 18 percent of these farms harvested 250 or more acres of wheat, while 52 percent harvested fewer than 100 acres, indicating that wheat is often supplementary to other enterprises such as soybeans, sorghum, sunflowers, corn, and cattle. The wheat program would not be as important to a farmer growing wheat as a supplementary crop as it would to a farmer for whom wheat is the main enterprise.

Wheat is grown over a wide geographical area and under a variety of weather and soil conditions. The success of wheat production in the United States is, in part, a tribute to the adaptability of the wheat plant. In addition to being grown throughout the country, wheat has two distinct growing seasons. Winter wheat, sown in the fall and harvested during the following spring or summer, normally accounts for 70-80 percent of total production. Spring wheat, sown in the spring and harvested in the late summer or early fall, accounts for the remainder.

Because wheat production is less concentrated geographically than the production of other major crops and is grown throughout the year, aggregate production is less affected by regional weather patterns that affect yields than for other crops such as corn and soybeans. The national average yield for all wheat varies less from year to year than for other crops. During 1980-88, the average variability in national wheat yields was less than 6 percent, compared with almost 15 percent for corn. The widespread drought in 1988 further illustrates the lower variability of wheat yields. In 1988, the average wheat yield declined by 6 percent over its 1980-87 average, primarily because winter wheat yields were not affected by the drought, compared with a 20-percent decline in corn yields. This means that, compared with other crops, imbalances in total wheat supply

and demand are less likely to be caused by weather. Weather related problems can influence wheat yields in any particular region, especially since in the United States wheat is generally grown in poorer quality soils and in more arid regions.

Of the farms producing wheat as the principal crop in 1987, over 90 percent were located in the 18 leading wheat-producing States. The size distribution, in terms of total cropland and sales class, for wheat farms in those 18 States is shown in table 1. Farms with 500 acres of cropland or more accounted for 42 percent of wheat farms; those with fewer than 100 acres accounted for about 13 percent. About 25 percent of the farms had sales of \$100,000 or more, while 17 percent had sales of less than \$10,000.

About 68 percent of U.S. wheat farmers rented cropland in 1987: over three-fourths of these growers were part-owners and the remainder were tenants. Furthermore, census data indicate that about half of the land farmed by wheat farmers is leased from others. Farming is the principal occupation of 78 percent of the wheat farmers. In 1987, wheat farmers harvested wheat on 27 percent of their cropland and other crops on 37 percent of their cropland. Almost 17 percent of the cropland on wheat farms was fallow in 1987.

### Wheat Classes

Unlike most other crops, five major classes of wheat are grown in the United States: hard red winter (HRW), soft red winter (SRW), hard red spring (HRS), white, and durum. These classes are grown in distinct regions and have different end uses. The range of

Table 1--Number of wheat farms by cropland area and sales class, 18 leading States, 1987 <sup>1/</sup>

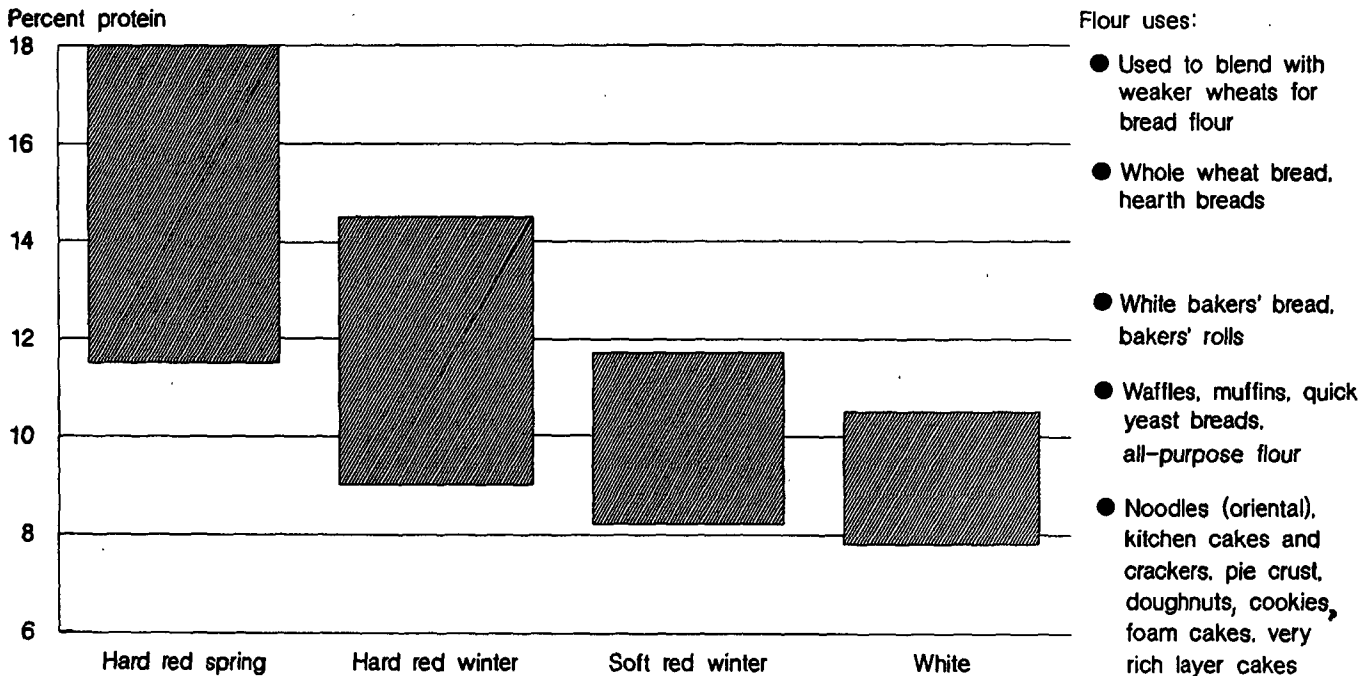
Cropland acres	Share		Gross sales	Share	
	Farms	of total		Farms	of total
	<u>Number</u>	<u>Percent</u>		<u>Number</u>	<u>Percent</u>
1-99	36,664	13.3	Less than \$2,500	9,148	3.3
100-249	58,870	21.5	\$2,500-\$9,999	36,438	13.3
250-499	62,227	22.7	\$10,000-\$39,999	87,432	31.9
500-999	63,381	23.1	\$40,000-\$99,999	72,518	26.4
1,000 and over	53,035	19.3	\$100,000-\$249,999	49,384	18.0
			\$250,000-\$499,999	13,375	4.9
			Greater than \$500,000	5,882	2.1
<b>Total</b>	<b>274,177</b>	<b>100.0</b>		<b>274,177</b>	<b>100.0</b>

<sup>1/</sup> Calculated from a 1987 Census of Agriculture tabulation for 18 States.

flour uses for the different classes and the potential for substitution among classes are illustrated in figure 1.

The United States exports all five classes. HRW, the largest class, is used for bread wheat or for all purpose flour. Since 1985 our primary customers for HRW have included the USSR, China, Iraq, Japan, Morocco, and Poland. China, Egypt, and Morocco frequently are our largest customers for SRW, which is used for cakes, pastries, and crackers. HRS, also an excellent bread wheat, is often exported primarily to Central America, Japan, the Philippines, and the USSR. White wheat is imported mostly by Asian countries, primarily South Korea and Japan, where it is used for noodle products. Egypt is also a large importer of white wheat and in some years Pakistan and India are major markets. SRW, HRS, and white wheat are exported in roughly equal amounts. Less than 5 percent of U.S. wheat exports are durum; the largest importer is Algeria.

Figure 1  
Protein range and flour uses of major wheat classes



Notes: Flour uses are approximate levels of protein required for specified wheat products. Durum is not shown because it is not traded on the basis of protein content. Source: (150).

Production by class is regionally concentrated (table 2 and fig. 2). So, even when total wheat supplies are large, the supply of a particular class may be tight and vice versa. For instance, while average wheat yields were off by only 6 percent in 1988, average yields for HRS and durum declined by 40 and 50 percent.

Parts of the wheat program have operated on the basis of a single national average farm price because of the fairly broad substitutability among the wheat classes. However, problems occasionally arise. For example, durum, which is used almost exclusively in pasta production, is the most specialized wheat class in terms of use. During the summer of 1988, durum prices were abnormally high relative to the national average farm price for all wheat. Yet, durum could not be sold from the farmer-owned wheat reserve without penalty because the rules for selling from the reserve are based on the national average price. As a result, durum sales may have been lost even though some supplies were available. Over 100 million bushels of durum stocks were in storage during the summer of 1988. The rules for computing the 5-day moving average price of wheat were revised in June 1989 to more accurately reflect the composition of stocks held in the farmer-owned reserve.

### Trends in Production

Before the mid-1970's, increases in wheat production came mostly from increasing yields per acre. The average yield increased from about 14 bushels per acre in 1930 to 31 bushels per acre in 1970 and almost 38 bushels per acre in 1987 (app. table 1). The year 1987 is used as a benchmark for yields and production trends due to weather-related production problems in 1988 and 1989. Throughout the 1970's and the first half of the 1980's, harvested acreage was also increasing. The 1985 Food Security Act restricted growth in wheat production through constraints on planted acreage which have held wheat production below 1980-85 levels.

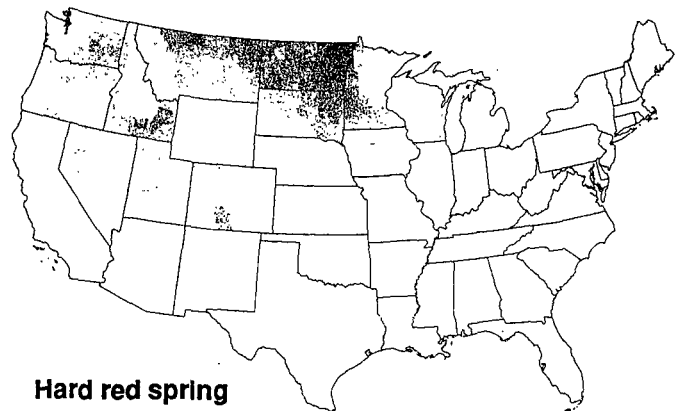
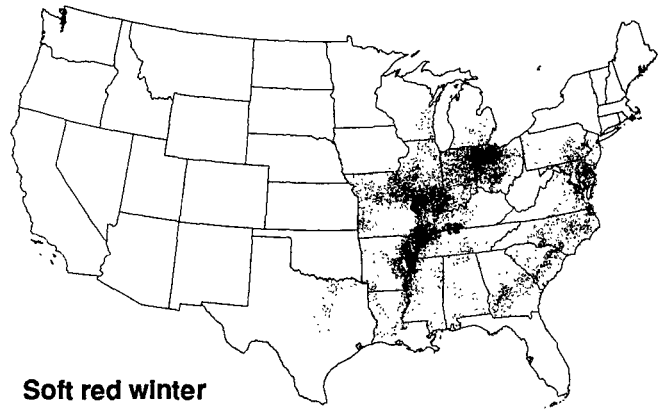
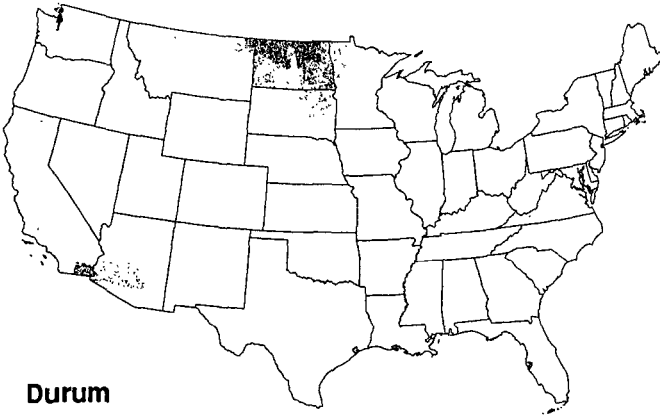
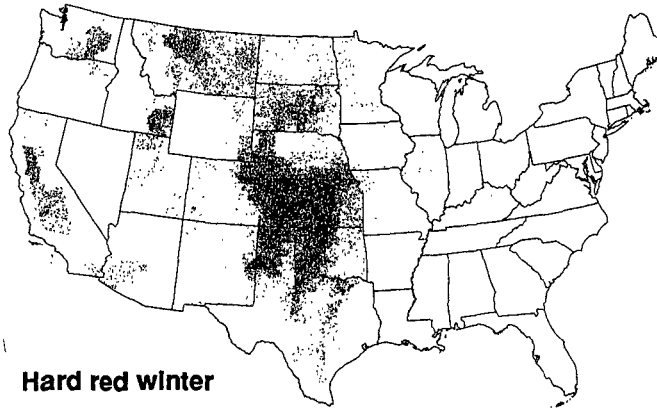
Table 2--Wheat production by class: Total and leading States, 1987

Class	Production	Share	Leading States and percentage of class
	Mil. bu.	Percent <sup>1/</sup>	
Hard red winter	1,019	48	KS 36, OK 13, TX 9
Soft red winter	348	17	MO 10, IL 16, OH 13
Hard red spring	431	20	ND 44, MN 23, MT 15
White	216	10	WA 42, OR 24, ID 24
Durum	93	4	ND 80, CA 6, MT 6
Total	2,107	100	

<sup>1/</sup> Total does not add due to rounding.

Figure 2

**Distribution of the five U.S. market classes of wheat**



1 Dot = 5,000 acres.  
Source (9).

Wheat yields for the next 5-10 years are projected to increase 1-2 percent per year in the United States, or even faster as long as marginal acreage is idled and weather is favorable. While wheat yields historically have been increasing at about 3 percent per year, the rate of increase in yields appears to be leveling off. Weak demand for alternative uses of cropland is likely to leave wheat farmers holding about an 80-million-acre effective base that could be planted even with lower prices.

Many factors affect yield: weather, disease, chemical input use, weeds, management practices, variety, total acreage level, and regional distribution of acreage. But plant breeding has been responsible for significant strides in wheat yields. Potential exists for improvements in yields. Average dryland yields of 60 bushels per acre are achieved in some States, while average irrigated yields have approached 100 bushels per acre. This simply shows the genetic potential in the wheat plant. Yield increases in the hard wheat producing States may be limited by moisture availability.

U.S. yields and average yields in foreign countries were virtually the same in 1930. The United States slowly pulled away until 1970. Then, between 1970 and 1980, foreign producers narrowed the gap. This is the result of the green revolution throughout the world and technological advances in the European Community that started in the late 1960's. So far in the 1980's, yields appear to be growing by 1-2 percent per year for most of the major wheat producers, except in the European Community and in China where yield increases are greater. In 1987/88, yields in the European Community and China exceeded average yields in the United States. The European Community and China grow high yielding soft wheats. Yield increases in many countries can affect U.S. exports. China is a major importer of U.S. wheat, while in other markets the European Community, with its aggressive export policy, is a major competitor.

A second, more recent trend is the growth in wheat acreage outside the traditional areas of the Great Plains. In 1970, the Great Plains, Texas to Montana, accounted for 73 percent of harvested wheat acreage, while the Pacific Northwest accounted for 9 percent and the South accounted for only 3 percent. In recent years, harvested area in the Plains and Northwest declined slightly, while the South's share has averaged about 7 percent. This means that soft red production has grown relative to other classes (table 3). In 1970, soft red accounted for 13 percent of U.S. wheat production (17 percent in 1987 and over 26 percent in 1988).

There are several reasons for the changes in the level and location of wheat acreage. First, since wheat is grown in many areas where there are limited alternatives, it has not faced the competition that soybeans, for example, have given corn and cotton. In addition, land can be converted from idle or fallow to wheat at a relatively low cost. As a result, wheat acreage varies from one year to the next, especially SRW acreage in the Delta region.

Second, wheat production costs per acre are relatively low, so wheat production may be favored during times when either inflation rates or interest rates are high. Since 1985, however, the wheat program has exerted a greater influence on total production than macroeconomic factors such as inflation rates and interest rates.

Third, changes in the wheat program have affected wheat plantings. The Food and Agriculture Act of 1977 increased the acreage of wheat covered by price and income supports. Farm program benefits previously covered production from a historical allotment (62 million acres in 1977). Since 1978, price and income supports have applied to a base acreage that reflects current plantings. Under the 1981 Act, base acres were defined as the number of acres planted or considered to have been planted. Acres considered to have been planted include acres set aside due to acreage reduction programs or paid land diversions. Under the 1985 Act, wheat base acres were defined as a 5-year moving average of acreage planted or considered planted. Under the 1985 Act, acreage reduction programs played a significant role in limiting wheat acreage as a condition for participating in the wheat program. For example, in 1988 wheat farmers had to set aside 27.5 percent of their wheat base acres; in 1989, the set aside was reduced to 10 percent; and in 1990, it was reduced to 5 percent. The conservation reserve program, new with the 1985 Act, also acted to limit wheat plantings. By the end of 1988, 47 percent of the base acres or 8.4 million acres enrolled in the conservation reserve were wheat base acres. Thus, the farm programs have become more important in shaping producers' planting decisions. For example, price and income supports would

Table 3--Wheat harvested area by region, 1960-88

Selected regions	1960	1970	1980	1986	1987	1988
	<u>Percent</u>					
Great Plains <u>1/</u>	72	73	68	71	72	67
North Central <u>2/</u>	15	11	15	11	11	14
South <u>3/</u>	3	3	5	6	7	8
Northwest <u>4/</u>	7	9	9	8	7	7
Southwest <u>5/</u>	2	3	3	2	2	2
Northeast <u>6/</u>	2	1	1	1	1	1
	<u>Million acres</u>					
U.S. wheat acreage	51.9	43.6	71.1	60.7	56.0	53.2

1/ CO, KS, MT, NE, ND, OK, SD, TX, and WY. 2/ IL, IN, IA, MI, MN, MO, OH, and WI. 3/ AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV. 4/ ID, OR, and WA. 5/ AZ, CA, NV, NM, and UT. 6/ DE, MD, NJ, NY, PA, and New England States.



probably cover 85-90 million acres today in the absence of an acreage reduction program and the conservation reserve program.

A fourth reason for the change in wheat acreage is that growers are reducing the ratio of summer fallow to harvested wheat acreage on their farms. In 1980, 38 percent of wheat followed summer fallow, dropping to an estimated 19 percent by 1987. While more recent farm-level land use data are unavailable, comparison of total fallow acres to total wheat acres indicates that this trend is continuing, especially in the Northern Plains region. Better varieties, better tillage practices, financial pressure, and the reduction in risk afforded by price and income supports have likely encouraged this adjustment.

Finally, farmers in the Delta and Southeast can double-crop wheat with soybeans and sorghum. Throughout the 1980's, the amount of land double-cropped with soybeans has varied depending in part on the relative profitability of wheat and soybean production. In the fall of 1979, for example, 4.3 million acres had been seeded to wheat in the Southeast. In 1986/87, area seeded fell to 3.6 million acres. In 1988/89, as wheat prices rose in response to the 1988 drought, 5.7 million acres were seeded in the region.

#### Double-Cropping

Double-cropping is a significant factor behind the variability in wheat acreage in the Southeast. Much of the wheat in the Southeast is part of a double-crop rotation, and it is likely that the majority of double-cropped soybeans follow wheat.

From the farmer's standpoint, double-cropping wheat and soybeans has obvious advantages such as reduction of risk through diversification, more efficient use of fixed resources (land, equipment, labor), and the potential for increased earnings. An important additional advantage is improved cash flow in terms of both amount and timing. This is important when interest rates are high, because it can reduce borrowing needs. However, with double-cropping, it is difficult to harvest wheat in a timely manner so that the second crop, usually soybeans, has a sufficiently long growing season. Planting delays for the second crop can result in lower yields, thereby increasing risk.

The three leading States in double-cropped acreage have been Arkansas, Georgia, and Missouri. Other States with significant double-cropped acreage are Mississippi, Louisiana, Tennessee, Kentucky, and North Carolina.

Double-cropping wheat with another crop peaked at over 10 million acres in 1982, declined to a low of about 4 million acres in 1987, and began to increase in 1988 and 1989. Changes in the relative prices of wheat and soybeans and USDA programs have contributed to the variability in double-cropping. When wheat acreage reduction program requirements are high, double-cropping is restricted since soybeans cannot be planted on the set-aside land. A constraint to growth of double-cropping is length of growing season. Moisture at wheat harvest-soybean planting time

is critical. Wet conditions may delay the wheat harvest. However, sufficient soil moisture must be available to insure soybean seed germination. So, irrigation of soybeans could play a major role in determining the rapid growth areas of double-cropping. Experiments have shown that under irrigation, double-cropped soybean yields can be nearly equal to single-cropped yields. Thus, there is a strong economic incentive to plant wheat in front of soybeans, as long as wheat production covers the low variable costs of planting and harvesting. However, reduced soybean yields constrain incentives to double-crop. The ability of acreage reduction programs to bring about desired reductions in production is higher when double-cropped wheat acreage is low.

### Trends in Domestic Wheat Use

Wheat is used domestically for food, feed, seed, and industrial purposes. Over 60 percent of domestic use of wheat is for food, by far the largest component of domestic use. However, whenever wheat prices have been low relative to corn, sharp increases in the amount of wheat fed to livestock have occurred. During the early 1950's, domestic uses of wheat often were double the amount exported. In recent years, wheat exports frequently have been much larger than domestic use but highly variable, and as a result, analyses of wheat demand have focused on exports (table 4 and app. table 2).

### Food Use

Consumer preferences have changed over time, and these changes have affected the relative demand for the different classes of wheat. It was not until World War II that flour sold to bakeries exceeded flour sold directly to consumers. Consumers increasingly favor processed foods and eating away from home. Expenditures on food eaten away from home increased by 76 percent between 1980 and 1988. Fast food restaurants have led the way, and the types of products offered by these firms have provided a demand for soft wheats. This changing product demand has coincided with the increased soft red wheat production in the Southeast.

Table 4--Domestic use of wheat, selected crop years

Use	1970		1980		1985		1988 1/	
	Use	Share of total use	Use	Share of total use	Use	Share of total use	Use	Share of total use
	Mil. bu.	Pct.	Mil. bu.	Pct.	Mil. bu.	Pct.	Mil. bu.	Pct.
Total domestic	772	51	783	35	1,046	53	1,040	42
Seed	62	4	114	5	93	5	100	4
Food	517	34	610	27	674	34	730	29
Feed 2/	193	13	59	3	279	14	210	9

1/ Estimated. 2/ Calculated as a residual.

The demand for wheat for food uses is relatively unaffected by changes in wheat prices and in economic conditions. Demand is closely related to population growth and the trend toward convenience in food consumption. Between 1980 and 1988, consumption of wheat as flour increased from 117 lbs. per person to 128 lbs.

The outlook for flour consumption has a downside, however. Baking analysts contend that flour quality, when measured by laboratory tests, has dropped substantially in the past 25 years. Several factors have contributed to the change in flour quality, including: the characteristics of semi-dwarf varieties, increased irrigation and fertilization, changes in milling practices, declines in average protein content, and the proliferation of wheat varieties. Wheat varieties that represented 85 percent of the acreage planted in Kansas in 1986 did not exist in 1977. Solutions to this issue must emphasize communication among grain handlers, millers, and bakers, who typically measure quality using different standards.

### Wheat Feeding

During World War II, wheat feeding was subsidized by the Government in an effort to reduce wheat inventories and to increase output of meat, milk, eggs, and animal fat. Wheat feeding decreased in the 1950's because loan rates kept wheat prices at levels that were not competitive with feed grains. Substitution between corn and wheat has been moderated in the past by wheat programs that set wheat loan rates relative to corn loan rates at a level in excess of feed value. A bushel of wheat has 100-105 percent of the feed value of a bushel of corn while the wheat loan has usually been around 125 percent of the corn loan.

There is no firm estimate of feed use. The feed and residual category is what is left after deducting reported use from supply. Production, the beginning and ending stocks, and the seeding rates used to calculate seed use are reported by USDA's National Agricultural Statistics Service (NASS). Exports and imports, as well as the data for calculating food use, are reported by the Bureau of the Census. The residual (reported supply less reported use) potentially encompasses many things, including feed use. Losses from the farm to end user or port, either while in transit or storage, could show up in the residual. Measurement error could also play a role. Because of these many factors, estimating the feed and residual category with any degree of accuracy is impossible. This problem becomes even more pronounced on a quarterly basis, including negative estimates of feed and residual in later quarters.

Most wheat is fed during the first period (June-August) of the wheat marketing year when wheat supplies are largest and corn and sorghum stocks are generally lowest. During late summer, prices are seasonally low for wheat and high for corn and sorghum, especially in feed grain deficit areas.

Wheat feeding is important in the hard red winter wheat region, particularly the Southern Plains. The concentration of cattle feedlot operations there, along with large supplies of wheat, have

been conducive to wheat feeding. Cyclical changes in cattle feeding in Western States are usually accompanied by changes in wheat feeding.

Wheat feeding has also increased in the Southeast and Delta. When large supplies of soft red winter wheat are available, coupled with low wheat/corn price ratios, the profitability of wheat feeding improves in this region. Increased poultry production in this feed grain deficit area also pushed up the total demand for feed and thus for wheat.

In the 1980's, feed and residual use averaged over 10 percent of total use but was highly variable. As wheat prices rose in 1988, wheat feeding declined to less than 10 percent. Statistical analysis suggests that a 10-percent drop in the wheat/corn price ratio boosts wheat feed use by 35 percent.

### **Trends in the World Wheat Market**

Between the early 1960's and the 1980's, world wheat trade more than doubled, from an average of 1.74 billion bushels (47.3 million metric tons) in 1960-64 to 3.6 billion bushels (97.7 million metric tons) for 1980-88 (excluding intra-EC trade). American farmers have generally supplied about 40 percent of the wheat in world trade (app. tables 7-9). However, this percentage declined in the mid-1980's, but returned in 1987 and 1988 to the 40-percent range with the aid of the lower loan rate, the export enhancement program, other Government programs (such as GSM-102 and -103 and PL 480), and continued increases in world trade. (See Glossary for an explanation of these programs.)

Several factors contributed to this doubling of world wheat trade. Importing nations, particularly developing countries, experienced strong population growth. Population in third world countries increased by about 50 percent from 1970 through 1988. Some nations had rapid growth in income, especially in the 1970's. Income growth was most pronounced in oil-exporting and other middle-income developing nations. This growth, with massive population movement from rural areas to cities, caused a shift in demand toward staple foods such as bread that required imported grain. Some nations, such as those in central Africa, increased grain imports because per capita food production declined. Government policies subsidized wheat for consumers in China, Pakistan, Brazil, and Egypt, encouraging imports. Finally, industrial nations provided free or low-cost food aid.

Since the early 1970's, instability in the world wheat market has been a major issue facing exporters, importers, and policymakers. There has been debate over the relative importance of the various factors contributing to price instability. Certainly, the events of the early 1970's led to increased price sensitivity: reductions in stocks by major exporters through the use of production controls in the United States and stock disposal in Canada, the decision by the Soviet Union to import grain rather than to adjust domestic use in response to crop failure, and the imposition of controls by both

importing and exporting countries to reduce the domestic impact of fluctuating prices.

Grain price variability has also been associated with changes in the world monetary system. The devaluation of the dollar in 1972 and the shift from a fixed to a floating exchange rate system have led to variations in the value of the dollar in relation to other currencies. The boom in U.S. wheat exports in the 1970's may have been due in part to the dollar's depreciation against foreign currencies. In turn, the dollar's appreciation against foreign currencies in the early 1980's in effect raised the price of U.S. wheat and reduced our competitiveness. However, some studies of U.S. exports during the mid- to late 1980's found that changes in the value of the dollar had a minimal effect on U.S. exports in the short run. Some longer run effects (3-4 years) on exports have been attributed to currency fluctuations.

Export subsidy programs in the European Community and in the United States in the 1980's also contributed to price instability. For the United States, export enhancement bonuses from the start of the program through July 1989 have been valued at \$2.6 billion.

A system of restitutions is the primary tool used by the EC to compete in the world wheat market. Intervention prices for wheat in the EC are set high above the world market price. Export restitutions, equal to the difference between the EC market price and the world market price, allow wheat to be exported. The restitutions differ depending on the destination of the wheat, thus permitting certain markets to be targeted at different price levels.

The U.S. export enhancement program operates by way of a two-step bid process to help U.S. exporters compete. USDA initially targets a country for a specific quantity of a commodity. Then, U.S. exporters compete for sales to the targeted market. U.S. exporters can offer competitive prices to that market because they know they may have the opportunity to obtain a USDA bonus. If the sale is completed, the exporter receives the bonus in the form of generic certificates exchangeable for CCC commodities.

### Major Importers

Wheat imports by developing and centrally planned countries have grown rapidly over the past two decades while those of developed countries have declined, from about 30 percent in 1960-64 to about 15 percent in 1982. Most of the decline occurred in the European Community. EC imports declined to 2 million metric tons in 1988/89 from almost 6 million metric tons in 1978/79 (table 5). The EC shifted from being a net importer to a net exporter during the mid-1970's when policies setting high farm prices stimulated wheat production via both area expansion and yield increases, and dampened consumption. Until 1974, feeding wheat to livestock was subsidized. Thereafter, some of the excess supplies were exported at subsidized prices.

The proportion of world wheat trade imported by developing nations peaked during 1975-79. The recession and the rise in interest rates

in the early 1980's caused debt-servicing problems for many of these nations throughout the 1980's and a decline in imports. Further, the cost of subsidizing consumers proved burdensome, causing some nations to shift toward self-sufficiency.

The Japanese share of world wheat imports increased during the early 1970's with income growth and a change in food habits favoring bread and noodles. Although domestic wheat prices were fixed by the Japan Food Agency above world market prices, wheat prices at the consumer level still fell relative to rice. After 1974, Japan's share of world imports fell because rising incomes no longer increased wheat demand. Japanese consumers, because of domestic policies, often are not affected by changes in the world prices for wheat and rice.

In 1972/73, the Soviet Union decided to import grain rather than to internally absorb crop shortfalls. In 1976, the United States signed a grain trade agreement with the USSR which was expected to limit the unforeseen fluctuations in grain trade between the two countries. In most years, the Soviet Union is the world's largest wheat producer. Slightly less than half of the wheat it grows is fed. Imports are generally used for food, although some wheat from the EC has been imported for feed. Soviet imports continue to exhibit large annual fluctuations.

Limited supplies of foreign exchange contributed to a decline in the importance of Eastern Europe as a market for U.S. agricultural commodities, including wheat. Eastern Europe is a potentially large market for U.S. exports, including some wheat, if economic progress is sufficient to meet the demand for better diets.

China has emerged in recent years as a major importer of wheat. Closer U.S.-Chinese relations enabled China to become a major purchaser of U.S. wheat (table 6). In 1988/89, China imported

Table 5--World wheat imports, selected countries, 1983/84-1988/89 1/

Country	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89 <u>2/</u>
<u>Million metric tons</u>						
EC-12 <u>3/</u>	4.0	3.4	2.8	2.4	2.2	2.0
USSR	20.5	28.1	15.7	16.0	21.5	13.0
Japan	5.9	5.6	5.5	5.8	5.7	5.4
East Europe	3.8	2.6	3.4	3.7	3.2	2.3
China	9.6	7.4	6.6	8.5	15.0	15.0
All others	58.2	59.8	50.9	54.3	57.8	57.7
World total	102.0	107.0	85.0	90.7	105.4	95.4

1/ July-June year. 2/ Preliminary. 3/ EC numbers include current EC-12 countries for all years.

about 8 million metric tons of U.S. wheat, making China our largest customer.

The growing importance of centrally planned and developing countries in the world wheat trade in the past decade has led to an increased reliance on long-term agreements. Such agreements are estimated to have accounted for 10-30 percent of world wheat trade during the 1980's. The state trading agencies, which control grain trade for many of these countries, frequently prefer arrangements which assure long-term supplies. In addition, exporters favor long-term agreements when wheat stocks are ample and competition is greater for sales. Future U.S. wheat exports may not be affected by long-term agreements as long as they comprise a small proportion of trade or merely formalize a trade flow which would have occurred anyway.

Some foreign buyers of U.S. wheat have complained about the low quality of U.S. exports. Complaints focused on dirty, molded, or infested grain and that characteristics of the grain contracted for were not met. Improvement of grain quality may lead to higher prices or to increased exports, especially when competition for sales is high.

Table 6--U.S. wheat exports to selected countries, June-May years, 1984-88

Destination	1984	1985	1986	1987	1988 <u>1/</u>
<u>1,000 metric tons</u>					
European Community <u>2/</u>	1,410	1,331	1,020	708	752
Egypt	1,419	1,478	2,487	2,474	2,983
Algeria	543	1,296	1,705	1,979	1,125
Morocco	1,611	1,084	1,362	1,842	1,004
Nigeria	1,569	885	800	6	2
Poland	31	68	520	1,503	0
Mexico	21	0	83	237	1,009
Brazil	3,153	753	647	0	0
Iraq	753	626	765	1,016	679
India	64	2	0	9	1,839
South Korea	1,970	1,928	1,849	2,129	1,816
China	2,770	541	61	3,883	7,798
Japan	3,287	3,167	3,268	3,021	2,586
Soviet Union	6,292	153	0	12,276	4,634
Bangladesh	1,138	487	520	795	908
Total wheat and wheat products	38,722	24,932	27,329	42,562	38,200

1/ Preliminary. 2/ EC numbers include current EC-12 countries for all years.

## Major Exporters

The major foreign exporters do not grow the variety of wheat classes grown in the United States. Argentina is a competitor for medium protein hard wheat. The Canadians sell mostly hard spring, durum, and white wheat, while the EC sells low-protein soft bread wheat and durum. Australia exports hard and soft white wheat. Lower quality wheat is sold as feed by several exporters. But only an insignificant quantity of such wheat is exported in most years, unless the crop is damaged and is considered to be only feed quality as occurred in Australia in 1984/85 and in Canada in 1986/87.

The United States, Canada, and Australia supplied about three-fourths of world wheat exports throughout the 1970's. World market shares for Canada and Australia have not changed significantly, except in 1988 when drought reduced Canada's exports. However, the U.S. share fell from over 40 percent prior to 1985 to less than 35 percent during 1985-87. The EC greatly expanded its market share over time (table 7). The striking gain in the EC share was due to price-support and trade policies that encouraged production in excess of domestic needs and subsidized exports.

Table 7--Distribution of world wheat exports and stocks, 1970-88

Country or region	1970-74	1975-79	1980-84	1985-87	1988 <u>1/</u>
	<u>Percent share <u>2/</u></u>				
Exports: <u>3/</u>					
United States	42.5	44.0	41.3	34.5	42.9
Canada	21.2	19.2	19.3	21.8	12.3
Australia	12.5	13.6	11.1	15.3	11.3
European Community <u>4/</u>	0	6.8	16.2	16.8	19.9
Argentina	3.2	5.4	6.6	5.0	3.5
Other	20.6	10.9	5.4	6.6	10.2
Ending stocks:					
United States	21.0	22.5	26.6	27.8	14.8
Canada	15.5	10.2	6.8	5.8	5.0
Australia	2.3	2.5	3.8	2.6	2.4
European Community <u>4/</u>	10.3	8.2	8.9	9.8	9.3
Argentina	.7	.9	.6	.2	--
Other	50.2	55.6	53.4	53.8	68.5

-- = Negligible.

1/ Preliminary. 2/ Totals may not add to 100 percent due to rounding.  
3/ Excludes intra-EC trade; July/June year. 4/ EC numbers include current EC-12 countries for all years.



The Australian market share has been about 13 percent since 1970, except for the drought year of 1982. Both Australia and Canada rely on marketing boards which can partially insulate producers from world market price changes. These nations have been increasingly willing to sign bilateral trade agreements with importers to guarantee access to key markets.

The market share of Argentina was highly variable from 1970-88, peaking in 1980-84. Restrictive agricultural policies, such as export taxes and differential exchange rates, in the early 1970's reduced that nation's competitiveness. The change in government policies in 1976 made Argentina more competitive, especially in meeting the needs of the Soviet Union following the 1980 U.S. embargo. For many years, Argentina's export taxes on wheat, coarse grains, and soybeans were a major source of government revenue. The export taxes for wheat reached a peak of 24.7 percent of total value in 1983, and were gradually reduced until they were eliminated in December 1987. These taxes discouraged wheat production and reallocated resources toward industrial production. Export taxes on agricultural products were again imposed in 1989.

The United States increased its share of exports the most during the 1970's, because it was able to increase production fast enough to meet the growing needs of importers. The U.S. market share peaked at 47 percent in 1981/82 and then dropped to less than 30 percent in 1985/86 (app. table 7), as U.S. prices remained higher than world prices due in part to the relatively high loan rate. The U.S. share returned to over 40 percent in 1987/88 and 1988/89, due in part to the aggressive export enhancement program and wheat auctions, increased import demand by the centrally planned economies, and reductions in the U.S. loan rate. (See the "The Food Security Act of 1985" section for information about the export enhancement program and wheat auctions.) Wheat exports are projected to decline in 1989/90 due to the large drop in U.S. wheat supplies and subsequent high wheat prices.

#### Strategies of Major Exporters

U.S. wheat policy plays an important role in determining exports. When the loan rate provided a price floor to the world market and CCC stocks were often isolated from the market from 1981-85, importers purchased less from the United States and competing exporters sold more in world markets, thereby reducing U.S. wheat exports. The United States has operated a wheat storage program which actively contributes to the stabilization of shortrun fluctuations in the world market. In the past, therefore, the United States absorbed much of the shock resulting from changing world market conditions. It stored excess grain when world supplies were large and provided additional supplies when the market ran short. The policies instituted under the 1985 Act, especially the lower loan rates, wheat auctions, and the export enhancement program, reduced the U.S. role in stabilizing the world wheat market. While there were year-to-year fluctuations, exportable supplies of wheat in foreign countries have expanded

since the 1970's as competitors' yields and area expanded (table 8). Average yields in the EC rose by about 4 percent per year from 1970/71 to 1987/88, greatly expanding exportable supplies.

The Australian Wheat Board is the sole marketing authority for its export sales. Because Australia has limited storage capacity, supplies held at the end of the local marketing year are primarily pipeline supplies. The board provides extended payment terms, but only to a limited number of overseas markets. The board has entered long-term agreements with Egypt, Iraq, Japan and Yemen.

Argentine export sales are transacted by the National Grain Board and private companies. Argentina engages in long-term agreements to move supplies into the export market. The long-term agreements often cover payment terms as well as quantities to be traded. The government generally does not provide credit to importers, but in recent years it has provided short-term credit to other Latin American countries, primarily Peru and Cuba.

Table 8--Wheat area, production, exports, and ending stocks, major exporters, 1977/78 and 1987/88

Country	Area harvested	Pro-duction	Exports <u>1/</u>	Ending stocks <u>1/</u>	Exports-to- production ratio	Ending stocks- to-exports ratio
	<u>Mil. ha.</u>	<u>--Million metric tons--</u>			<u>----Percent 2/----</u>	
1977/78:						
Argentina	3.9	5.7	2.6	1.2	45.6	45.2
Australia	10.0	9.4	11.1	.8	118.3	7.0
Canada	10.1	19.9	15.9	12.1	79.9	76.4
European Community <u>3/</u>	14.0	44.5	5.1	7.4	11.5	146.0
Major competitors	37.9	79.4	34.6	21.5	43.6	62.1
United States	27.0	55.7	31.5	32.1	56.6	101.7
1987/88:						
Argentina	4.8	8.8	3.7	.7	42.1	19.3
Australia	9.1	12.4	9.9	2.8	79.2	27.9
Canada	13.5	26.0	23.5	7.3	90.6	31.3
European Community <u>3/</u>	15.9	71.6	15.3	15.2	21.4	99.4
Major competitors	43.3	118.8	52.4	26.0	44.1	49.7
United States	22.7	57.4	43.4	34.3	75.6	79.1

1/ Local marketing year. 2/ Computed with unrounded data. 3/ EC numbers include current EC-12 countries for all years, but exclude intra-EC trade.

Wheat stocks are kept at a minimum because of storage constraints and high rates of inflation. However, the Argentine government and private exporters have not hesitated to undercut the U.S. price.

Like its Australian counterpart, the Canadian Wheat Board is the sole legal exporter of its wheat. Canada has had agreements with the USSR, Brazil, Bangladesh, Japan, Egypt, and Iraq. These agreements account for about 10 million tons, or less than half of Canada's total exports. Canada also offers credit to importers. The government provides guarantees to the board to extend credit to certain countries. Canada has provided credit to Brazil, Iraq, Egypt, and Algeria, among others.

The European Community dramatically increased its share of the export market by using export subsidies. The EC adjusts the export subsidy to reflect the difference between the world price and its high internal market prices, depending upon how much wheat it wishes to move into the export market. Individual member countries in the EC have had supply or credit arrangements with the USSR, China, Cuba, Brazil, Algeria, Egypt, Morocco, Portugal, Poland, and Vietnam. Credit arrangements are usually for a maximum of 2 years at market interest rates.

#### Wheat Agreements

International wheat agreements are difficult to negotiate. The major objective of international commodity agreements has been to stabilize world prices by getting importing and exporting countries to agree to trade within a mutually determined price band. The most successful International Wheat Agreement lasted from 1962 to 1967, but broke down because the United States and Canada began to export burdensome stocks. The success of the 1962 agreement was more a result than a cause of market stability.

The conflicting interests of importers and exporters cause these stockholding agreements to be inherently unstable. A price band too narrow is difficult to defend. But, a price band too wide indicates a meaningless agreement. Buffer stocks, necessary for defending the price bands, are frequently too small to be effective because no country wants to contribute funds or wheat to buffer stocks which may be used counter to its national interests.

The current international wheat agreement, covering 1986-91, has two primary functions: market information and food aid. Smooth operation of the markets for wheat, rice, and coarse grains is promoted through the collection and dissemination of information and the sponsoring of consultations between member countries. It does not involve stockholding schemes to stabilize prices. Food aid is maintained through an agreement that donor countries provide minimum food aid obligations.

## Trade Liberalization

Problems created by domestic policies--particularly heavy domestic costs and price-depressing surpluses--have brought agriculture to the forefront of the Uruguay Round of trade negotiations under the General Agreement on Tariffs and Trade (GATT). The Ministerial Declaration, made in September 1986, calls for the reform of domestic and trade policies and GATT principles governing world agricultural trade. Negotiators agreed to focus on:

- (1) Reducing the use of domestic and export subsidies.
- (2) Providing for greater market access.
- (3) Harmonizing sanitary and phytosanitary barriers.
- (4) Strengthening the role of GATT in agricultural trade.

At the April 1989 midterm review, negotiators agreed on a framework for both long- and short-term reform. Short-term measures would freeze support and protection levels in 1989, with unspecified reductions slated for 1990. Long-term measures call for "substantial progressive reductions" in agricultural support, encompassing all measures directly or indirectly affecting import and export competition.

This agreement offers the potential for substantial liberalization of agricultural markets. In the absence of government support, economic theory indicates that production would shift to those areas which can deliver to importers at the lowest costs. In any one country, the most efficient farmers would fare the best.

Studies disagree on whether world wheat trade would rise or fall after trade reform. The result depends on whether importers or exporters currently protect their producers more. As importers remove protection, their domestic prices (initially above world prices) likely would fall, production would decline, and imports would increase. These forces would push up now-depressed world prices. At the same time, despite higher world prices, some exporting countries' supplies should also decline as subsidies are removed and domestic prices fall toward world prices.

If production declines are larger in the major wheat exporting countries than in importing countries, world trade could contract rather than expand. However, on balance, research suggests that world trade volume would likely not change substantially. Some exporters would expand production, while other exporters would cut production.

World wheat prices under trade liberalization likely would rise as exporters cut back production and importers look even more to the world market. Even if world market prices rise, however, the removal of high supports could reduce domestic producer and consumer prices in countries with relatively high protection, such as the EC and Japan. Studies suggest that world wheat prices might increase as much as 25 percent, but the price rise