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Rice

Background for 1990 Farm Legislation

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Abstract

Rice ranks ninth among major U.S. field crops in terms of value of production. All U.S. rice production is irrigated, providing more stable yields than many other crops. Three classes of rice are produced in the United States--long, medium, and short grain--with long grain predominant. Domestic use and exports of U.S. rice have increased in recent years due in part to the implementation of the marketing loan program in the mid-1980's following declines in both domestic use and exports in the early 1980's. As a result, carryover stocks have declined from a record high of 77.3 million cwt in 1985/86 to 32.4 million cwt in 1988/89. Costs of rice programs, however, rose to an estimated record $1 billion in fiscal year 1989 due to marketing loan costs and increased deficiency payments. Rice growers in the southern rice growing States are rapidly adopting high-yielding, semidwarf varieties of long-grain rice which could raise U.S. production. Rice issues facing farm legislators relate to rising production capacity, stagnant world trade, multilateral trade negotiations, high costs of marketing loans and other rice programs, loan rate differentials between long and medium/short grains, and adjusting the world price formula to further enhance U.S. competitiveness in the world rice market.

Keywords: production, domestic use, farm programs, farm returns, rice, prices, program effects, world trade

Foreword

Congress will soon consider new farm legislation to replace the expiring Food Security Act of 1985. In preparation for these deliberations, the Department of Agriculture and many groups throughout the Nation are studying preceding legislation to see what lessons can be learned that are applicable to the 1990's. This report updates Rice: Background for 1985 Farm Legislation (AIB-470) by Barbara C. Stucker. It was updated by Nathan W. Childs and William Lin with contributions from Andrew Novick. This report is one of a series of updated and new Economic Research Service background papers for farm legislation discussions. These reports summarize in a nontechnical form the experience with various farm programs and the key characteristics of the commodities and the farm industries which produce them. For more information, see the Additional Readings listed at the end of the text.

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Contents

	Page
Summary	v
Introduction	1
The Structure of the Rice Industry	1
Production Characteristics	1
Trends in Production	4
Rice Breeding and Emerging Technology	10
From Farm to Consumer	12
Defining the Product	12
Trends in Domestic Use	13
The World Rice Market	16
Trends in Production and Consumption	16
Trends in World Rice Trade	17
The Role of Government in World Rice Trade	19
Trends in Importing Countries	20
Developments in Exporting Countries	23
The U.S. Role in the World Rice Market	25
The Role of PL 480 in U.S. Rice Exports	27
Future Developments in Rice Trade	28
Prices and Returns	29
History of Rice Programs	30
Programs of the 1920's	30
Programs of the 1930's	30
Program Adjustments from World War II Through the 1960's	32
Legislation of the 1970's	33
Legislation of the 1980's	34
Program Costs	37
Program Effects	38
Farmers	38
Taxpayers	40
Consumers	40
Resources	41
Exports	42
Additional Readings	43
Glossary	44
Appendix	53

Summary

The Food Security Act of 1985 will expire at a critical time for the U.S. rice industry. The industry faces underutilized production and processing capacity, unstable foreign demand, depressed farm prices below target levels, stiffer foreign competition, increasing Government costs, and potential trade liberalization.

These issues will become more urgent as new high-yielding varieties of rice become more prevalent in the United States. Already, use of one new variety--Lemont--has produced yields 25-35 percent higher than the record achieved in 1981. Arkansas could have produced nearly 90 percent of the 1983 U.S. rice crop had it planted this variety.

Three classes of rice are produced in the United States and there is relatively little substitution between classes by users. Problems arise when the market for one class of rice is in disequilibrium. The entire rice sector may appear to be burdened with excess supplies even though this is true for only one class of rice. Since the rice program treats all rice the same, government programs are often unable to address excess supply problems that arise for just one class.

Rice ranks ninth among major field crops in value of production, followed by oats, sunflower seed, flaxseed, and rye. Government payments for rice, including the value of deficiency payments and marketing loan certificates, accounted for more than 40 percent of total producer receipts from the 1987/88 crop.

Rice growers tend to be younger, more inclined to be part-owners and tenants, and are generally heavier program participants than other grain producers. New technology is often more readily adopted by rice growers. The rice industry is smaller than other grain industries and, since rice growing is extremely concentrated in five Southern States and California, market information is more quickly disseminated.

Domestic demand for rice tends to be unresponsive to changes in prices. This limits domestic surplus disposal program options. Small swings in foreign demand can exert relatively quick and strong impacts on rice prices. One negative consequence of this is that the industry is more vulnerable to shocks reverberating from unstable foreign demand than other crop sectors. This was especially true in the early 1980's after a period of rising exports drew specialized resources with few alternative uses into rice production.

Some of the issues likely to surface during the upcoming rice policy debate include the following:

- The role of U.S. rice in world trade. Should the United States be a passive residual supplier or aggressive exporter? Since 1986/87, the marketing loan provision of the 1985 Act has allowed the United States to regain some of the world rice market share it lost after 1980/81. However, this program has been very costly to taxpayers. Will public support for subsidized exports continue?

- The current round of multilateral trade negotiations being held under the auspices of the GATT are focusing on removing all protective and trade-distorting policies in the industrial market economies. This would include eliminating subsidized export programs. How well could the U.S. rice sector compete in a freer trading environment?

- Does the entire rice sector need comprehensive Federal price and income support or are some components of the sector more in need of protection from price risks and income enhancements than others?

- If support is to be continued, at what level should it be set and how flexible should it be? Could price and income support be decoupled from production?

- If support should be segmented--possibly by type of rice or by farm income situation--how can it be done without requiring severe resource adjustments by the rice industry?

Rice

Background for 1990 Farm Legislation

Nathan W. Childs
William Lin

Introduction

Three classes of rice are produced in the United States--short, medium, and long grain. There is relatively little substitution among classes for most users of rice. Hence, a supply-demand imbalance in the market for one class of rice can mask balance in the market for another. Moreover, the market situation within these classes can change quickly and dramatically over time. Planting of high-yielding, semidwarf, long-grain rice varieties became popular throughout the South in the mid-1980's, a development which is aggravating imbalances in the market for one rice type compared with another. However, farmers have begun to diversify their planting of rice varieties by including more disease-resistant ones such as Lemont to combat blast and other diseases in Arkansas or early-maturing varieties such as Gulfmont.

The Structure of the Rice Industry

Production Characteristics

Rice accounts for less than 2 percent of the field crops produced in the United States and about 3-4 percent of food and feed grain production. The bulk of the U.S. rice crop is produced in six States. Rice accounts for 8-11 percent of the value of field crop production in the four primary rice-producing Southern States--Arkansas, Louisiana, Mississippi, and Texas--and between 6-7 percent in California. The six rice-producing States supplied about 19 percent of the world's rice exports in 1985-88.

Structure of Rice Farms

The rice sector tends to be dominated by a relatively few large producers. According to the 1982 Census of Agriculture, 11,445 farms harvested just over 3.2 million acres of rice and all acreage was irrigated (table 1). The rice area of rice farms averaged 282 acres. But only 40 percent of the farms harvested 250 or more acres, and they produced three-quarters of the crop. Farms harvesting fewer than 100 acres of rice comprised more than a quarter of all rice farms, but contributed less than 5 percent of U.S. production.

Table 1--Number of rice farms by size and share of output, 1982

Acres of rice harvested	Number of farms	Percentage of farms	Percentage of output	Average yield per acre
	Number	- - - Percent	- - -	Pounds
1-99	3,142	27.5	4.7	4,536
100-249	3,880	33.9	18.7	4,549
250-499	2,775	24.2	28.7	4,664
500-999	1,244	10.9	26.2	4,862
1,000 or more	404	3.5	21.7	5,196
Total	11,445	100.0	100.0	4,793

Sources: (1) Special tabulation of the 1982 Census of Agriculture data. (2) U.S. Census Bureau, 1982 Census of Agriculture: United States Summary.

Table 2--Number of farms by State and share of output, 1982

State	Number of farms	Share of U.S. output	Average size	Average yield per acre
	Number	Percent	Acres	Pounds
Arkansas	5,436	36.7	232	4,503
Louisiana	2,508	15.2	228	4,100
Mississippi	714	6.5	337	4,206
Missouri	303	1.9	217	4,571
Texas	1,157	15.9	450	4,740
South	10,118	76.2	263	4,438
California	1,322	23.7	429	6,470
Total 1/	11,445	100.0	282	4,710

1/ Includes some farms in minor rice-producing States: Florida, Oklahoma, South Carolina, and Tennessee.

Sources: (1) Special tabulation of the 1982 Census of Agriculture data. (2) U.S. Census Bureau, 1982 Census of Agriculture: United States Summary.

Arkansas has the greatest number of rice farms, but Texas and California have the largest farms (table 2). The five Southern States produced over 76 percent of the U.S. crop in 1982 and over 80 percent in 1988.

The average yield in 1982 was 4,710 pounds of rice per acre. Larger farms in California and Texas reported the highest yields while Louisiana and Mississippi reported 20-25 percent lower yields. Yields on farms of more than 1,000 acres averaged 400 pounds an acre higher than that for all farms.

Profile of Rice Operators

Rice producers tend to be younger than producers of wheat, corn, cotton, or soybeans. About 45 percent of rice farm operators were under the age of 45, compared with only a third for operators of other crop enterprises (table 3). But there are also proportionately fewer full-owners of rice farms than other farms. Less than one-fourth of rice farm operators are full-owners, and roughly half are part-owners. The difference in tenure between producers of rice and other crops may largely be explained by the high cost of entry into rice farming.

Rice is very capital-intensive, as demonstrated by the value of land and buildings, machinery, and equipment. In 1982, the value of land and buildings for all farms averaged $350,000, according to the Census of Agriculture. But for rice, this figure was about $1.4 million per farm. Cotton had the next highest value at $1 million. The Census reported that for all farms, average machinery and equipment value was about $41,900. But, the value of rice farm machinery was four times higher at $163,800. Cotton ranked second again, but the value was only $109,600. These data suggest that entry costs are higher for rice producers than for other crop producers. It also helps explain why there are fewer full owner-operated rice farms than other crop enterprises.

Table 3--Enterprise and operator characteristics of selected grains, 1982

Characteristic	Rice	Wheat	Feed grain	Cotton	Soybeans	All farms
			Percent			
Tenure:						
Full-owner	23	35	42	27	36	59
Part-owner	50	50	43	50	46	29
Tenant	27	15	15	23	18	12
Age:						
Less than 35	21	18	19	19	20	16
35-44	24	18	19	18	20	20
45-54	24	22	23	23	22	23
55-64	22	25	25	25	25	24
65 or older	9	17	14	15	13	17
			1,000 dollars			
Per-farm value of land and buildings	1,396.2	580.8	464.8	1,001.0	335.7	345.9
Per-farm value of machinery and equipment	163.8	78.1	65.2	109.6	46.0	41.9

Sources: (1) Special tabulation of the 1982 Census of Agriculture data. (2) U.S. Census Bureau, 1982 Census of Agriculture: United States Summary.

Full-owners harvested almost 15 percent of the 1982 rice crop. Part-owners harvested 59 percent, while tenants harvested the remaining 27 percent. Part-owners, on average, farm more acres than tenants or full-owners. Output per farm was also greater for part-owners than for tenants or full-owners.

Rice Classes

In the United States, rice is referred to by length of grain: long, medium, or short. Other terms commonly used, especially in the world rice trade, are indica, glutinous, japonica, and aromatic. Indica rice is long grain, while glutinous and japonica refer to the shorter grains. Aromatic rice varieties comprise a negligible, specialty portion of world rice production. Large-scale production of aromatic varieties is generally confined to the few countries with a specific preference for them. The United States produces mostly indica, or long-grain rice. The bulk of the world rice trade is indica rice.

In addition, the different types of rice are considered imperfect substitutes, except by users who purchase rice for further processing. Five of the six rice-producing States--Arkansas, Mississippi, Louisiana, Texas, and Missouri--are in the South and they produce most of the long-grain rice. The sixth State, California, produces the bulk of the U.S. medium- and short-grain rice. Yields vary by type of rice produced, with short grain achieving the highest yields per acre, followed by medium and long grain.

For final use, long-grain rice is generally unsubstitutable for medium or short grain, especially among consumers in Japan and South Korea. Most U.S. consumers also prefer long-grain rice for direct consumption. Long-grain rice commands the premium price in the rice market and is the dominant type found in retail outlets. The shorter grains are lower priced and are predominantly used in processed foods and beer where processors are more price-sensitive.

Hence, supply-demand imbalances for the rice market as a whole are not necessarily good indicators of the market situation for any single class of rice. In the mid-1980's, medium-grain supplies were excessive in relation to demand because of the loss of the South Korean market, while long-grain supplies were in approximate balance. However, in 1986/87 and 1987/88, supplies of both long and medium grains were in line with demand, although medium grain's stock-to-use ratio still exceeded long grain's. However, the U.S. rice program does not distinguish between the various types of rice other than specifying short/medium and long grain loan rates. The loan rate was set at $6.75 per hundredweight (cwt) for 1988/89 long grain on rough basis while the rate for medium and short grain was set at $6.19. However, the acreage reduction and target price provisions of the program are uniformly applied to all rice classes and much of the information available for supply, demand, and price movements focuses on the all-rice market.

Trends in Production

Until the mid-1970's, increases in yield per acre were primarily responsible for most of the steady increase in rice production since the mid-1950's. At the turn of the century, average rice yields per acre were 1,144 pounds. By the 1950's, yields had increased to 2,800 pounds per acre and, in the next decade, yields increased to more than 4,000 pounds (tables 4 and 5). In the mid-1970's, historical acreage restrictions were suspended and harvested acreage rose,

Table 4--U.S. and State average rice yields per harvested acre, selected years

Crop year	United States	Arkansas	Louisiana	Mississippi	Texas	California
			Pounds			
1950	2,371	2,250	1,950	2,700	2,400	3,475
1955	3,061	3,125	2,800	2,850	3,050	3,450
1960	3,423	3,525	2,850	2,950	3,075	4,775
1965	4,255	4,300	3,550	3,700	4,600	4,900
1970	4,617	4,900	3,900	4,400	4,450	5,700
1971	4,558	4,770	3,810	3,900	4,560	5,750
1980	4,413	4,111	3,550	3,840	4,230	6,440
1985	5,414	5,200	4,370	5,350	5,490	7,300
1988 1/	5,511	5,350	4,500	5,300	6,000	7,000

1/ Estimate.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

Table 5--Average U.S. yields by length of grain, 1975-88

Crop year	Long	Medium	Short	All rice
		Pounds per harvested acre		
1975	4,375	4,590	5,687	4,558
1976	4,576	4,634	5,681	4,663
1977	4,240	4,415	5,746	4,412
1978	4,405	4,464	5,221	4,484
1979	4,159	5,397	6,019	4,599
1980	4,002	5,122	5,702	4,413
1981	4,449	5,347	6,770	4,819
1982	4,293	5,402	6,499	4,710
1983	4,169	5,402	6,932	4,598
1984	4,584	5,845	7,259	4,954
1985	5,168	6,050	7,650	5,414
1986	5,358	6,474	7,757	5,651
1987	5,241	6,339	7,212	5,555
1988	5,338	6,005	7,157	5,511

Source: U.S. Dept. Agr., National Agricultural Statistics Service.

Table 6--Rice acres harvested, yield, and production, selected years

Crop year	Area harvested	Yield per harvested acre	Production
	1,000 acres	Cwt 1/	Million cwt
1970	1,815	46.2	83.8
1975	2,818	45.6	128.4
1980	3,312	44.1	146.2
1985	2,492	54.1	134.9
1986	2,360	56.5	133.4
1987	2,330	55.6	129.6
1988	2,900	55.1	159.5

1/ Cwt = 100 pounds.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

increasing by 1.5 million acres from 1970 to 1980 (table 6). Record acreage and yields were both reported in 1981, with harvested acres totaling 3.8 million and yields averaging 4,819 pounds per acre. The 1981 yield record was broken again in 1984 and again in 1986 when yields reached 5,651 pounds per acre due in large part to widespread adoption of new semi-dwarf varieties.

U.S. rice yields are not as subject to many of the weather-related swings that affect other U.S. crops because the entire crop is irrigated and fertilized. Hence, rice yields have both higher and more stable yields than many other crops. Yields per acre during 1980-88 averaged 5,069 pounds, with annual variations of about 4 percent (200 pounds) per acre. Government acreage reduction programs during recent years have restricted the acres devoted to rice, but soil and climate data make it clear that U.S. rice acreage could expand well beyond the levels needed to meet domestic and export demand at current yield levels.

Rice culture requires level land suitable for irrigation and poor internal drainage to hold irrigation water. Studies have estimated that there are up to 10 million acres of land suitable for rice, and that a total of 5 million (of which 2.9 million acres were planted in 1988) of these could easily produce rice given current constraints on water supplies and crop rotation. Each rice farm has a USDA-certified rice acreage base, calculated from the farm's historical rice plantings record. This "program" acreage serves as the basis for USDA support payments and acreage control programs. The rice acreage base on record for 1988 totaled 4.2 million acres, 1.8 million less than the 5-million-acre short-term potential and roughly half the 10-million-acre longer term potential.

Acreage Response

The relationship between rice prices and production is important in estimating the effect of policies on supply and demand equilibrium. Rice acreage changes when expected net returns from producing rice change relative to returns from other crops. Changes in acreage also affect yields because, as prices change, less productive land is brought into rice production or withdrawn from it and

adjustments are made in input use. Using 1982 data, Grant, Beach, and Lin (1984) estimated that each 100,000-acre increase or decrease in rice acreage results in an opposite change in rice yields by 30-40 pounds per acre. Yields in Arkansas and Texas were estimated to be more responsive to acreage changes than the other rice-producing States which were found to be almost nonresponsive.

Statistical analysis by Grant, Beach, and Lin based on 1950-82 data also indicates that a change in the price of rice of $1.00 per cwt (14 percent of the 1987 price) adjusted for any offsetting change in cost of production will cause farmers to change harvested area in the same direction by about 44,000 acres (1.8 percent of the 1987 area). Empirical examples of this relationship can be seen in 1976, 1979-81, and 1986. During 1975, farm prices fell 27 percent. Farmers, expecting low returns to persist into 1976, reduced harvested area in that year by 12 percent. When rice prices rose 56 percent between 1978 and 1980, rice acreage rose 32 percent during 1979-81. Rice acreage declined 16 percent between 1984 and 1986 when prices dropped 54 percent. The 1983 payment-in-kind program coupled with a large mandatory acreage reduction program, made this relationship much less reliable between 1982 and 1984.

Sustained high or low prices over several years would likely result in even larger acreage shifts than short-term price changes. Farmers might be able to adjust resources that could not be changed in a single season, perhaps by preparing land for irrigation or acquiring equipment (irrigation, combines, and rice dryers) or finding alternative uses for idled land and machinery. Support prices and acreage reduction programs also make producers less responsive to price changes and nonresponsive to Government program changes.

The size of the acreage shift in response to a price change depends on profit opportunities with other crops. Table 7 indicates that rice farmers planted about 37 percent of their total harvested cropland to rice. In 1982, the principal alternative crops in the Delta region were wheat, soybeans, and cotton. Texas alternatives were feed grains and soybeans. However, wheat-soybean double-cropping was common in the South and competed for rice acreage. In California, a number of alternatives were similarly important: hay, sugar beets, vegetables, wheat, and feed grains. All of these alternative crops in California were irrigated. However, only a fifth of the soybean area was irrigated in Arkansas and less than a tenth was irrigated in the other Southern States. Rice has generally been competitive enough to hold on to its acreage base.

When cash receipts minus cash expenses are compared among crops, the relative economic advantage of producing rice is evident. Table 8 shows cash receipts (including marketing loan gain) less expenses have been higher for rice than other major field crops in all years since 1982. The data in table 8 reflect U.S. averages of yields, expenses, and receipts. Hence, regional returns may vary.

The lack of perfect substitutability among crops and rice's high entry costs likely cause rice acreage response to price increases to be less than for other major field crops and southern rice acreage to be less responsive than California acreage. And, once land is prepared for rice (leveled, levees constructed), sustained low prices may be required to shrink U.S. rice production capacity. Although farm prices for rice declined sharply after the 1980/81 marketing year and remained below that level since, capacity has not dropped and production has been maintained through yield increases.

Table 7--Crop acreage on farms harvesting rice, 1982

State	Rice	Wheat	Feed grains	Soybeans	Cotton crops 1/	Total five	Total harvested cropland
				1,000 harvested acres			
Arkansas	1,907	1,350	227	3,869	250	7,603	6,607
California	888	179	133	---	114	1,314	1,626
Louisiana	912	102	47	1,184	77	2,322	2,256
Mississippi	354	220	6	863	175	1,618	1,475
Texas	821	14	201	306	1	1,343	1,338
Total	4,882	1,865	614	6,222	617	14,200	13,302

--- = Not applicable.
1/ Exceeds harvested cropland for some States because of double-cropping.
Sources: (1) Special tabulation of the 1982 Census of Agriculture data. (2) U.S. Census Bureau, 1982 Census of Agriculture: United States Summary.

Table 8--U.S. average returns above cash expenses per planted acre, selected crops, 1982-87 1/

Crop 2/	1982	1983 3/	1984	1985	1986	1987
			Dollars per planted acre			
Rice	95	331	185	302	266	359
Wheat	36	64	39	51	54	64
Corn	98	146	61	82	73	108
Sorghum	49	68	41	59	55	85
Soybeans	71	98	44	71	65	108
Cotton	98	225	69	115	113	179

1/ Returns are cash receipts and Government payments less cash expenses. See table 16 for income and expense components for rice.
2/ Figures are for U.S. averages of receipts, expenses, and returns for crops.
3/ Value of payment-in-kind payments included.
Source: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service, and Costs of Production for Major Crops, 1975-87, U.S. Dept. Agr., Economic Research Service, May 1989.

Rice plantings, in the absence of acreage control programs, would likely approach the U.S. rice acreage base and possibly increase to the 5-million-acre short-term potential because the target price--the price the Government uses to determine the direct payment per cwt made to farmers and thus what the farmer could expect to

receive on all planted area--is set high enough even after recent reductions to more than cover full production costs. The Food Security Act of 1985 mandated small decreases in the target price beginning in 1987/88.

Production Classes

In 1987, 69 percent of the total U.S. rice crop was long grain, 29 percent was medium, and 2 percent was short. The short-grain crop has declined considerably in importance since 1950 due to the loss of the Japanese market when it made up 20 percent of the total rice crop. Medium grain's share has wavered over the past 30 years, settling at around 25 percent of the total crop. Long-grain rice has increased from less than half of the total crop in 1950 to over 70 percent. The shifts in production by type partly reflect domestic demand, but more importantly reflect the growing importance of U.S. rice in world trade where long grain is the most demanded rice.

About 73 percent of total U.S. rice supplies were long grain in 1988/89 (table 9). Estimated use by type indicates that use of long grain was about one-and-a-half times that of medium and short grain. The tight supply situation for medium and short grain restricted exports of these types in 1988/89. Use by type of rice in the 1980's points to two very different market situations. Long-grain carryover stocks as a percentage of total use have been much lower than those for medium/short grain.

Medium-grain stocks were equal to 97 percent of total use in 1982, while long grain's stocks-to-use ratio was only 30 percent. A sharp decline in foreign demand from South Korea for U.S. medium-grain rice accounted for much of the medium grain inventory buildup in 1982. Although the payment-in-kind program reduced inventories of both grain types in 1983/84, by 1985/86 medium grain's stocks-to-use ratio equaled 77 percent while long grain's was 54 percent. After 1985/86, stocks-to-use ratios for both grain types declined to more historical levels. By the close of 1987/88, stocks of both types of rice were in short supply and stocks-to-use ratios are estimated at below 20 percent for long and medium grain for 1988/89.

Ending stocks in California have risen in proportion to total U.S. carryover during most of the 1980's. At the end of the 1979/80 crop year, California carryover was about 22 percent of the total U.S. carryover. This share rose to 34 percent by 1980/81 to 39 percent in 1981/82, and to 43 percent in 1982/83. The share peaked at almost 50 percent at the close of the 1983/84 crop year. The imbalance is further heightened in view of California's share of U.S. production. Since 1982, California has produced a little over one-fifth of the U.S. crop, yet it currently holds about a third of the total stocks and held over 40 percent at the beginning of the 1987/88 season. In the 1983/84 crop year, when production was reduced by heavy participation in the acreage reduction program, California's beginning stocks were actually 40 percent greater than its production.

California began to shift some acreage planted from medium- to long-grain rice in the early 1980's. Prior to that time, climate and other growing conditions limited California's success in adopting southern long-grain rice varieties. But recent successes with new, higher yielding, early-maturing varieties (for example, the L-202 variety) have enabled California to expand production of this type of rice. Long-grain planted acreage in California grew from 14,000 acres in 1982/83

Table 9--Estimated supply and disappearance, by type of rice, 1987/88 and 1988/89

Item	1987/88 Total	1987/88 Long	1987/88 Medium/ short	1988/89 1/ Total	1988/89 1/ Long	1988/89 1/ Medium/ short
			Million cwt			
Supply:						
Carry-in	51.4	27.4	21.1	31.4	19.1	10.8
Production	127.7	88.9	38.8	159.5	118.7	40.9
Supply 2/	182.1	119.3	59.9	194.6	141.4	51.7
Use:						
Food	55.3	39.5	15.8	56.0	39.1	16.4
Seed	3.0	1.9	1.1	3.2	2.4	.8
Brewers	15.4	4.0	11.4	16.0	4.0	12.0
Domestic use	73.9	44.2	28.3	75.2	46.0	29.2
Exports	72.2	50.5	21.7	74.0	60.0	14.0
Total use 3/	152.6	100.3	50.9	156.2	112.0	44.2
Carryover	31.4	19.1	10.8	38.4	29.4	7.5
			Percent			
Stocks-to-use ratio	20.9	19.1	22.0	20.2	19.0	17.9

1/ Preliminary.
2/ Includes imports.
3/ Includes residual.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

to 57,000 in 1984/85, but declined to 20,000 acres in 1986 and then leveled off at 50,000 acres in 1988, 12 percent of all U.S. long-grain rice acres.

Rice Breeding and Emerging Technology

Productivity gains in rice have been realized through a combination of improvements in fertilizer, water management, and varieties. Increased water availability improves rice response to nitrogen fertilizer. All rice grown in the United States is irrigated and almost all planted area is fertilized. No other U.S. crop is entirely irrigated. Although fertilizer and irrigation were two important contributing factors to the yield increases achieved in the 1960's, varietal improvement became the dominant factor in the 1980's.

Not until after World War II was plant height given much consideration by plant researchers. Farmers continued to increase the application of high analysis fertilizer to increase yields, but this also increased the likelihood of plant lodging. Lodging is the tendency for plants to fall over or bend. This impedes efficient harvesting, thus reducing yield potential and lowering quality.

Although the Japanese had successfully bred shorter, stiffer rice varieties, U.S. researchers and farmers paid little attention until the early 1950's. When they did pay attention, few varieties were found to be satisfactory. Shorter rice varieties finally found their way into production with the release of Bluebelle in 1965 and Starbonnet in 1967. Shorter height and reduced lodging were also obtained by changing fertilizer applications in the 1960's. With a split fertilizer application, relatively high yields could be obtained with little lodging from plants of moderate height.

Since the late 1970's, the push for short-stemmed varieties has accelerated. These varieties are referred to as semidwarfs and their resistance to lodging as well as their increased yields--up to 25 percent higher than traditional varieties--could dramatically alter U.S. rice production. The use of semi dwarfs has raised production costs per acre, but unit costs of production have declined. The increased per-acre costs reflect additional fertilizer, pesticide, and irrigation costs that have been incurred. But these additional costs have been more than offset by yield increases.

Lemont, a new variety of long-grain rice selected for yield, was developed in Texas in the early 1980's. On test plots, Lemont produced yields 20-35 percent higher than conventional long-grain (such as Labelle) yields in Texas, bringing long-grain yields up to levels achieved by medium-grain rice at that time. U.S. rice yields showed little growth during the 1970's, with declines in long-grain offsetting gains in medium/short-grain yields. Some declines in long-grain yields had offset the medium/short-grain yield increases. With Lemont, national average rice yields began to increase and reached over 5,500 pounds per acre in 1986. Yields have stabilized at that level in more recent years.

Lemont was quickly adopted by Texas producers because of its higher profitability. Acreage planted in Lemont in Texas reached 72 percent of the total in 1987, a phenomenal rate of adoption. Lemont's share declined to 64 percent in 1988 as plantings of Gulfmont, an even newer variety, increased from 10 percent in 1987 to 26 percent in 1988. Lemont's popularity has spread to other Southern States. In 1988, the adoption rate reached 47 percent in Louisiana and 70 percent in Mississippi, up from 39 and 34 percent in 1987 (The Rice Journal, 1988).

Despite the popularity of Lemont in Texas, Louisiana, and Mississippi, it has not become as common in Arkansas for at least two reasons. First, while Lemont promised higher yields than conventional varieties such as Labelle in Texas, it did not increase yields over other varieties such as Newbonnet already in use in Arkansas. Second, cost of producing Lemont was considerably higher than the conventional varieties. As a result, Newbonnet remained the most popular variety, 55 percent of all rice acres, compared with 16 percent for Lemont in 1987. However, due to problems with blast for the 1986 and 1987 crops, producers reduced their planting in Newbonnet to a third of all rice acres in 1988 and increased the planting to Lemont to 28 percent because of Lemont's disease resistance.

Higher yielding varieties could dramatically expand the productive capacity of the rice industry if sufficient demand exists to provide the appropriate price incentive for adoption. Field demonstrations show Lemont has a slight advantage in resisting plant disease over current popular varieties. Lemont also requires more fertilizer, herbicides, and fungicides, as well as more labor and management related to water control and chemical use. Nevertheless, Lemont remains popular because of its increased field yield and milling outturn. Estimated 1988 acreage

devoted to the new high-yielding rice varieties totaled over 1.1 million acres, or about 38 percent of the total acreage. Long-grain rice production reached 119 million cwt in 1988, accounting for over 74 percent of the U.S. rice crop.

Should the adoption rate of high-yielding varieties increase, the policy implications of new technology are enormous. At present demand levels, substantially less acreage will be needed to produce the rice required to meet domestic and export requirements. At current support levels, supplies would be excessive without regular large-scale acreage reduction programs.

From Farm to Consumer

Defining the Product

Nearly all rice is traded in some processed form, but Government programs treat only the farm product. Thus, it is important to distinguish between rough or paddy rice (the farm product) and milled rice (the traded commodity). Physical characteristics, demand, and prices vary considerably between the farm and consumer.

Rough, or paddy, rice contains the hull and bran. Depending on the extent of the milling process, four different products can be produced from rough rice. Rough rice may be parboiled, a process of soaking and pressure-cooking which causes the bran to blend with the inner kernel. From an economic position, millers can gain from purchasing lower quality rice at a price discount, parboiling the rice, and then selling at a higher price than for the regular milled product. In general, only long-grain rice is parboiled. This is because the shorter grains are too gummy for parboiling equipment.

Whether the rice is parboiled or not, the next stage of milling is removing the hull. This produces an intermediate product called brown rice. The final stage of milling removes the bran, leaving white milled rice.

Many of the kernels are broken when rice is milled. These pieces of rice are referred to as brokens and are classified and priced according to their length: second heads (the longest), screenings, and brewers (the shortest). Brokens are generally used in processed foods, primarily cereal, candy, and pet food, or in beer brewing where length of grain and appearance are less important.

Thus, there are four types of final rice products: parboiled, brown, milled, and broken rice. Rice is usually referred to using the length of grain and the milling process: long-grain parboiled, medium brown, or short milled, and so on. However, broken kernels lose their class identity and are often sold simply as brewers or screenings.

Long-grain rice usually receives a premium price relative to medium and short grain and whole kernels are always worth more than brokens. Parboiled rice ordinarily sells at a premium to white rice since it is usually processed for specific domestic and export markets. Discounts and premiums are also applied to reflect the presence or absence of certain quality characteristics (such as smut or peck) in the rough or milled rice.

Prices for milled rice (f.o.b. mills) are roughly two to three times the farm price. This margin partly reflects the actual costs incurred in milling rough rice. But it also reflects the cost of obtaining whole kernels. On average, the whole kernel yield from milling is about 58-63 percent (table 10). The rest will be hulls, bran, and broken pieces. On average, at least 145 pounds of rough rice must be processed to obtain about 100 pounds of milled, edible rice. If the milled rice is to be all whole kernels, then about 165 pounds of rough rice would be required. At an average farm price of $7.50 per cwt for long-grain rice, it would require approximately $13.00 worth of rough long-grain rice to produce the final milled product, excluding costs for drying, milling, bagging, transporting, and storing. These costs vary but generally add $4 to $5 per cwt to the price of milled rice. This adds up to milled prices at wholesale 2.3 to 3 times farm level prices after provisions are made to cover processing and marketing cost.

Trends in Domestic Use

Domestic use of rice is small compared with other grains. Very little rough and no milled rice is used as a livestock or poultry feed. Direct food, processed food, and beer comprise the domestic outlets for rice, which have more than tripled since 1950. Domestic use of rice (rough-equivalent basis) has increased from less than 18 million cwt in market year 1950 to over 55 million in market year 1987/88.

The average American in 1987 consumed 128 pounds of wheat flour, 45 pounds of fresh potatoes, 23 pounds of frozen potatoes, and only 13.4 pounds of rice for food use (table 11). However, this represents more than a doubling in per capita food use of rice since 1978. Including brewery use of rice in per capita calculations increases the total per capita consumption to over 17 pounds in

Table 10--Rough rice milled and milling yields, 1978-87

Crop year	Rough rice milled	Total milled produced	Whole kernels 1/	Whole kernel yield
	- - - - - - -	1,000 cwt - - - - - - -		Percent
1978	117,961	83,427	68,749	58.3
1979	124,340	89,820	78,943	63.5
1980	141,192	103,037	89,602	63.5
1981	131,922	95,074	82,011	62.2
1982	118,726	84,517	73,713	62.1
1983	111,151	79,012	68,237	61.4
1984	107,195	74,580	64,063	59.8
1985	115,542	81,808	69,347	60.0
1986	140,804	100,257	83,760	59.5
1987	130,818	91,481	76,863	58.8

1/ Includes brown rice.
Sources: Rice Miller's Association Monthly Statistical Statements and Rice Market News, U.S. Dept. Agr., Agricultural Marketing Service.

Table 11--Per capita consumption of selected foods, selected years

Year	Rice	Wheat flour	Fresh potatoes	Frozen potatoes	Pasta
			Pounds		
1929	5.8	177.0	159.0	N/A	N/A
1939	5.6	158.0	122.0	N/A	N/A
1949	5.0	136.0	110.0	0.1	N/A
1959	5.0	120.0	107.0	2.0	N/A
1969	8.3	112.5	61.3	9.8	N/A
1978	5.7	115.2	49.2	21.0	10.3
1979	9.4	117.2	47.6	20.7	10.2
1980	9.4	116.8	49.0	17.9	10.0
1981	11.0	115.8	43.8	19.1	10.0
1982	11.8	116.7	44.8	20.0	9.9
1983	9.7	117.4	47.9	19.1	10.5
1984	8.6	118.1	46.8	20.7	11.3
1985	9.1	123.3	44.7	22.0	12.9
1986	11.6	123.6	47.6	22.0	14.4
1987 1/	13.4	128.0	45.1	23.2	17.1

N/A = Not available.
1/ Preliminary.
Source: Food Consumption, Prices, and Expenditures, 1966-87, U.S. Dept. Agr., Economic Research Service, SB-773, 1989.

1986/87 (Childs, 1989). The rice industry has much competition in the domestic food grain market, but its low market share indicates room for expansion.

Direct food use is the largest domestic outlet, averaging 60-64 percent of the total domestic disappearance of rice since the 1950's. Beer and processed foods account for the balance, with beer claiming 20-25 percent and processed foods the remainder. Processed foods include soups, cereals, pet foods, rice cakes, and baby foods. Most of the direct food use is long-grain rice. Processors and brewers usually purchase cheap medium grain, short grain, and brokens. However, all rice used in soups and about one-third of rice used in cereals is long-grain rice. Since the rice will be processed further and starch content is an important factor to many food processors, these groups tend to use the shorter, stickier grains. Processors are also more price-sensitive than direct food users because substitution among classes is feasible in some processed products such as candy and cereal, and the shorter grains tend to be cheaper than the long grains.

The predominate consumption of rice is still table use, often called direct food use. This category excludes all products for which rice is used as an ingredient in the manufacture of a new product. Direct food use of milled rice grew from 8 million cwt in 1955/56 to over 23 million in 1986/87, the last year of available distribution data (table 12). This represents almost a doubling of direct food use of rice since 1975/76.

Table 12--Distribution of milled rice to domestic outlets, selected years

Crop year	Unit	Direct food	Processed food	Beer	Total
1955/56	1,000 cwt	8,118	1,507	3,167	12,791
	Percent 1/	64	12	25	100
1966/67	1,000 cwt	11,087	2,961	3,148	17,196
	Percent 1/	65	17	18	100
1975/76	1,000 cwt	12,958	2,849	4,642	20,450
	Percent 1/	63	14	23	100
1980/81	1,000 cwt	18,790	4,491	7,667	30,948
	Percent 1/	61	15	25	100
1982/83	1,000 cwt	19,173	3,342	9,095	31,610
	Percent 1/	61	11	29	100
1984/85	1,000 cwt	21,664	4,971	7,038	33,673
	Percent 1/	64	15	21	100
1986/87	1,000 cwt	23,429	7,075	7,825	38,329
	Percent 1/	61	19	20	100

1/ May not add to 100 percent due to rounding.
Source: Childs (1989).

Processed food use accounted for 19 percent of total domestic demand for milled rice in 1986/87, up from 15 percent in 1984/85. Processed food use of rice has more than doubled since 1975/76, growing from 2.8 million cwt to 7.1 million cwt in 1986/87. Almost one-fourth of the growth in domestic rice consumption over the past decade has come from increased use by food processors. Between 1984/85 and 1986/87, processed food use accounted for 45 percent of the increase in domestic rice consumption. Cereals account for over half the processed food use of rice; this market grew from 2.1 million cwt in 1978/79 to 4.8 million in 1986/87. With numerous new products and effective marketing, use of rice in processed foods is the fastest growing segment of the domestic rice market (Childs, 1989).

Total domestic rice demand is very stable. Food demand changes very little in response to changes in farm and retail rice prices. Statistical analysis indicates that a 10-percent change in retail rice price is associated with a change of about 1.8 percent, in the opposite direction, in food use (Grant, Beach, Lin, 1984). The demand response to changes in farm prices is also very low. Changes in prices of potatoes, corn, and wheat products have been estimated to have almost no effect on domestic rice demand.

Population and income are more important than price in determining food demand for rice. A 5-percent increase in U.S. per capita income has been estimated to cause per capita food use to rise by about 3 percent (Grant, Beach, Lin, 1984). An increase in the Asian, and to a lesser extent Hispanic, population in the United

States has been a factor in the upward trend of rice consumption. Health benefits associated with increased consumption of rice and effective marketing have also been important factors increasing per capita consumption of rice in the United States.

There are several other reasons for this stable domestic rice market, including a simple marketing process and the lack of much exposure to volatile feed markets. Only rice millfeed--a mill byproduct consisting of bran and hulls--is fed to animals. Moreover, slowly changing tastes and preferences probably have more influence on the demand for rice than price or availability. Rice consumption is very much influenced by ethnic demographics. Per capita rice consumption is highest in the Pacific region (primarily California) and the Middle Atlantic region (primarily New York and New Jersey), both areas of high Hispanic and Asian concentrations.

The World Rice Market

Trends in Production and Consumption

The doubling of world rice production over the past 28 years is largely attributable to growth in yields. Research by the International Rice Research Institute (IRRI) in the Philippines on higher yielding rice varieties has significantly raised yields in major rice-producing countries. Since 1960, harvested area has increased just 21 percent, but yields have risen 75 percent. Global rough rice production in 1988/89 is estimated at a record 479 million metric tons, up 4 percent from 1987/88 (compiled from World Grain Situation and World Agricultural Production, U.S. Dept. Agr., Foreign Agricultural Service.)

Approximately 90 percent of the world's rice is produced in Asia. China alone harvests almost 40 percent of the global crop. But unlike the U.S. crop, only half of the Asian crop is irrigated. Thus, almost 45 percent of the world rice harvest depends on the critical timing of the Asian monsoon. Weather fluctuations in just one major rice consuming or exporting country can significantly shock world trade volume and patterns, and prices.

Rice accounts for about a fifth of the world's grain consumption. Although much of the Western and developed world relies on wheat as their principal food grain, rice remains a primary staple in Asian developing countries. Rice provides about 40 percent of the calories of the average Asian diet (Barker, Herot, Rose, 1985). China alone consumes nearly 40 percent of total world consumption. China, India, and Indonesia account for almost two-thirds of the world's rice consumption. Asia accounts for about 90 percent of world rice consumption.

Four types of rice are consumed in the world: glutinous, aromatic, japonica, and indica. Each is distinguished by the length of grain, starch content, and cooking qualities. As in the U.S. domestic market, countries generally have specific tastes and preferences for particular types of rice. Thus, there is typically not much substitution among the four types of rice.

Indica (long grain) rice is grown in warm or tropical regions, principally in China, South and Southeast Asia, Brazil, and the Southern United States. The bulk of world rice production and trade is in indica. Of the total rice traded in the world, only one-sixth is japonica (Bateman, 1988). This shorter grain, scented

rice is grown in cooler climates, primarily Japan, northern China, Taiwan, northern California, Italy, North and South Korea, and southern Brazil. Japonica rice accounts for 10-11 percent of total production. High-quality varieties of japonica rice are especially popular among consumers in Japan, South Korea, and Taiwan. Only limited substitution in production between grain types can occur without a significant loss in quality. Glutinous and aromatic rices account for 1-2 percent of production and less than 1 percent of trade, reflecting their more specialized nature.

Trends in World Rice Trade

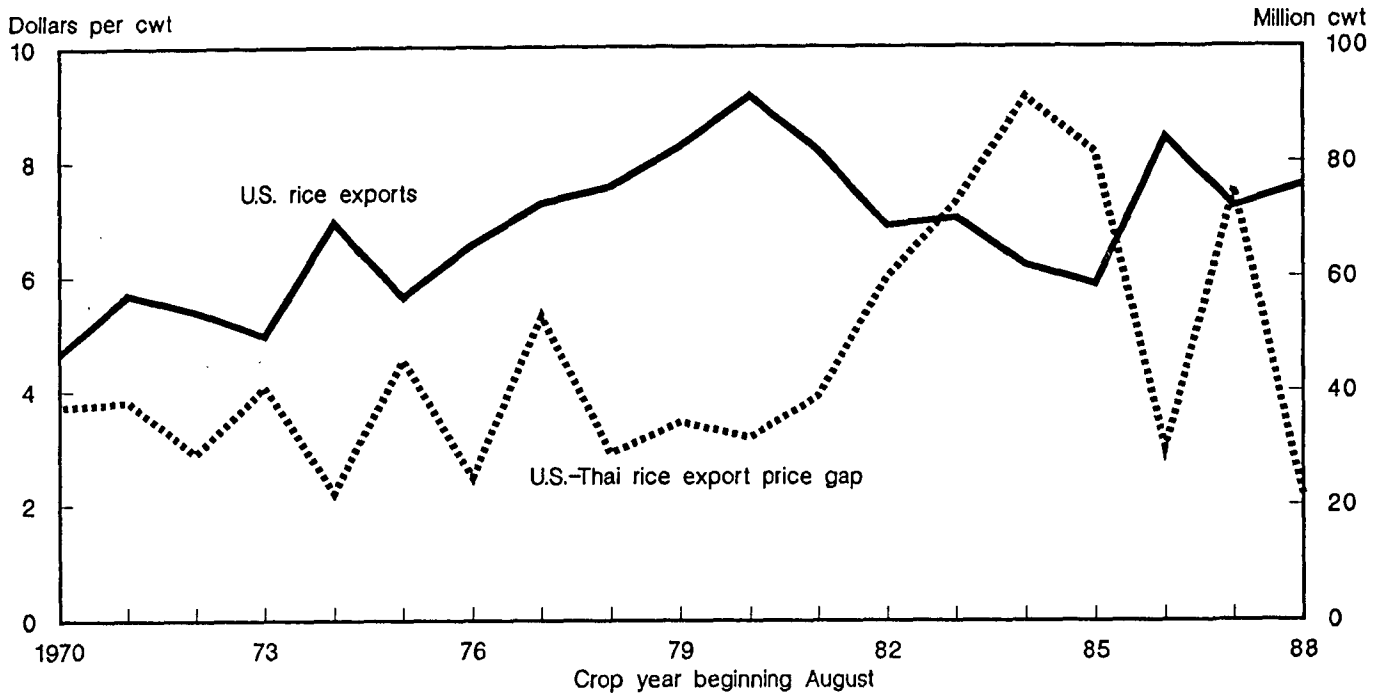
Despite the importance of rice as a food staple for a third of the world's population, the volume traded is small. Between 1983/84 and 1987/88, only about 12.4 million tons--or less than 4 percent of production--was traded. This compares with 18-19 percent for wheat. Hence, most rice is consumed in the country in which it is produced. Moreover, 70-75 percent of world exports are supplied by just five countries: Thailand, the United States, Burma, Pakistan, and China. The United States and Thailand normally account for over half of the rice exported.

Since 1981/82, Thailand has become the world's largest rice exporter, mainly because of uncompetitive U.S. rice prices and the Thais' elimination of export taxes in 1986. U.S. milled rice prices exceeded Thai prices for comparable rice by $3.19 per cwt in 1980/81, but by $9.10 in 1984/85. The marketing loan provision of the Food Security Act of 1985 was largely responsible for narrowing this differential to $3.01 in 1986/87, more in keeping with U.S. quality advantages (fig. 1). Thailand eliminated its export tax and special stockholding requirements for exporters in January 1986. This has allowed domestic rice prices in Thailand to rise, benefiting farmers, but allowing them to remain competitive in world markets.

The world rice market is both volatile and risky because of the weather uncertainty, the concentration of trade among a few key countries, and the relatively small volume of production entering world trade. These characteristics have led many governments to intervene in their domestic rice markets to ensure adequate food supplies at politically acceptable prices. These policies have distorted trade patterns and reduced traded volumes. Over the years, trade patterns have changed frequently and sometimes drastically, as growing conditions and government policies shifted a country from a net importing position to temporary self-sufficiency or, in the extreme, to a net exporter position.

Government involvement in the rice market is usually aimed at ensuring domestic stability. However, the policies enacted typically affect the world market also, as governments attempt to estimate the appropriate level of stocks to maintain, subsidize domestic production, provide some domestic food rations, restrict or ban imports, or subsidize exports. Hence, some countries' producers and consumers (for example, in Indonesia, Japan, and South Korea) are less responsive to changes in the world price. Finally, since many importing and exporting countries are developing nations, foreign exchange problems are more likely to beset them and cause them to substantially reduce imports or shift suppliers. Factors accounting for recent variations in the volume of world rice trade have included exchange rate fluctuations, declining oil revenues, high real interest rates, the prevalence of government-to-government trade, and export subsidies and discounting of announced prices.

Figure 1
U.S.-Thai rice export price gap and U.S. rice exports[1]



1/ U.S. exports are on a rough-equivalent basis.

Thus, the world rice market is inherently unstable with respect to price and sources of demand and supply. With a limited number of exporters, one unexpected or new buyer can have dramatic consequences on trade volume and prices. A sudden downturn in demand of a key importer, or an unexpected seller caught with a large surplus and inadequate storage, will cause equally sharp price swings. And, errors by governments in executing food policies, such as self-sufficiency at any cost, also contribute to price variability. Finally, no country plays the role of residual supplier for rice as the United States does for wheat and corn.

There is no single world market price recognized by traders due to the lack of uniform grades and standards. The price of rice depends on specific quality characteristics of the rice. And, because consumer preferences can exert a powerful influence over demand, prices for different types or qualities move somewhat independently of each other based on the supply-demand factors for that market.

Trading of long-grain rough rice futures on the Chicago Board of Trade began in August 1986 with May (old crop) and September (new crop) contracts. The number of traded contracts remains quite small in comparison with total rice production. The lack of an effective, sizable, and liquid futures market for rice means most trade is conducted without hedging. So traders often incur large profits or losses, reflecting the substantial risk exposure. Traded volumes of each class and type of rice are insufficient to allow the futures market to effectively reduce producers' risks. However, an effective futures market for rice may eventually develop. Rice futures trading grew from 31,114 contracts (2,000 cwt per contract)

in 1987 to 47,627 contracts in 1988 and the acquisition of a July contract in April 1989 allowed trading to expand even more.

The Role of Government in World Rice Trade

Governments play a large and growing role in world rice trade. An exception is Thailand which eliminated its export tax in January 1986. In most lower income Asian developing countries, governments attempt to assure adequate supplies at low retail prices, especially in urban areas. But this type of price policy often conflicts with farm income and employment in countries where rice farmers represent a significant share of the population. These two objectives often imply tight reins on both domestic production and trade by the government. A government monopoly will typically purchase all the domestic rice that meets a given standard at a specified price often below the border price. The government will typically supplement this with imports to assure stable retail prices at or below a preset level. Many lower income Asian developing countries provide producers with subsidies for various inputs such as fertilizer, fuel, and credit to help compensate for farm prices below cost of production.

Higher income developing Asian countries, such as South Korea and Taiwan, and developed countries typically set producer prices above the world level and restrict or ban imports. Consumers bear most of the cost of these programs. Farm income, food security, and foreign exchange policy objectives tend to dominate in these countries. Consumers in South Korea, Taiwan, the European Community, and especially Japan pay prices substantially above world levels to support domestic production. This myriad of programs is reflected in the very limited role the private trade plays in the world rice market.

Of the 12 million tons of rice traded in 1983, government agencies imported over 60 percent, 7.2 million tons. Government agencies exported about 46 percent of all rice exported in 1983, about 5.6 million tons. Except for Thailand, which removed its export tax in January 1986, government involvement is also becoming more pervasive. The world's current leading exporter, Thailand, sells an average of 25 percent of its rice through a government agency, although the amount has been as high as 40 percent in some years, depending on domestic conditions. And even in countries where sales transactions are made through private parties (such as the United States, Italy, and Spain), government subsidies play a big role in export volumes.

Exports under government programs, primarily PL 480 and other aid programs, accounted for 32 percent of total U.S. exports in calendar year 1985, but only 12 percent in 1986. The marketing loan provision of the Food Security Act of 1985 made U.S. commercial exports more competitive, thus reducing use of PL 480. Although currently larger in absolute volume, PL 480 shipments now account for a much smaller share of U.S. rice exports than in the 1950's, 1960's, and early 1970's.

Government involvement varies widely in form but generally adds to international instability by treating the rice market as a residual source of supply, sharply varying the amount of rice imported from year to year. In addition, government purchasing agencies are often slow to anticipate needs and slow to act on them. Although government policies add to world rice market instability, the policies are more a reaction to instability and thinness caused by weather than the primary cause. The importance of the timing of the Asian monsoon to almost half the

world's rice producers is the primary cause of market instability. The thinness of traded volumes compared with other agricultural commodities is sometimes more a reaction to instability than a cause of instability.

Trends in Importing Countries

Developed countries account for a relatively small but stable portion of world imports, about 14 percent in 1980-88. This reflects rice's position as a relatively new or minor item in developed country diets, excluding Japan. Developments in Japan are important enough, however, that policy affects the operation of the world market.

Japan has long maintained a policy of high price supports for producers and has kept consumer prices high to minimize taxpayer costs. But Japan has also allowed the consumer price of rice to increase relative to wheat, encouraging a shift toward more westernized diets. Japanese consumers currently pay three to four times the world price for rice but roughly 100-150 percent of the world price for wheat. The Japan Food Agency uses its import monopoly to support the price of rice. Japanese consumers prefer a high-quality japonica rice currently produced only in a few areas outside Japan, primarily California, Italy, Taiwan, and Australia.

Japanese rice consumption peaked in 1971 at 12.5 million tons and has been falling since in response to more westernized diets. Japanese production increased through the late 1960's and peaked in 1968 at 13.1 million tons.

Production declined during most of the 1970's but stabilized thereafter at 9-11 million tons. By the late 1970's, production exceeded consumption by 1-2 million tons and carryover stocks grew. In response to the large ending stocks, the Japanese Government offered payments to producers to divert acreage to other grain crops, subsidized use of rice in livestock feed, and subsidized exports. These policies stimulated Japanese barley production, displaced imported U.S. corn and sorghum in the Japanese livestock feeding rations, and displaced U.S. rice exports in key Asian markets such as Korea and Indonesia.

Although a net importer of rice from 1960 to 1967, Japan became a net exporter between 1968 and 1982 as a result of its price support and surplus disposal policies. Although rice diversion schemes were able to reduce carryover stocks between 1979 and 1983, surpluses have been growing since 1984. Rice diversion schemes have had only limited and temporary success in Japan because of continued high net returns, no program provision preventing returning diverted acres to rice production, and rice farming's special "part-time" appeal to many operators. The Japanese government has recently indicated a willingness to reduce the price support-import price differential and increase imports but in combination with measures that will increase productivity.

Imports of rice by the centrally planned countries, particularly China, increased as a share of world imports from the early 1960's through the 1970's. The centrally planned countries' share of world imports peaked at over 20 percent in the late 1960's and 1970 because of large imports by North Vietnam and the Soviet Union. However, the centrally planned countries accounted for an average of only 11 percent in the 1980's. The Soviet Union substantially increased its purchases of rice in the late 1970's and early 1980's, exceeding 1.2 million tons in 1980. Much of the Soviet's purchases of rice are shipped to Vietnam. Both consumption

and production of rice by the Soviets increased rapidly between 1960 and 1980. However, consumption peaked at almost 3 million tons in 1980 and has remained below 2 million tons since then. Imports of rice by the Soviet Union have declined in response to declining consumption in the country.

Although a net exporter of rice, China has increased its imports of rice since 1985 and imports may exceed 1 million metric tons in 1989. Chinese policy sets rice retail prices below world levels to provide low-cost food to urban workers. Yet this policy discourages farmers from producing rice and puts pressure on Chinese foreign exchange earnings. China may have difficulty meeting domestic demand unless its policies are changed.

Developing countries import about 70 percent of world rice imports. While the share of this group of countries in total has remained relatively constant, there have been major changes in market shares by individual countries and regions. Since the early 1960's, the African and Middle Eastern countries have increased their shares of world imports, while the shares of Asian countries have fallen.

Several factors are responsible for these changes. In the 1970's, rapid income growth and increased urbanization caused the demand for rice in many African and Middle Eastern countries to expand sharply. Increased urbanization shifted consumption patterns away from traditional staples, such as cassava in Africa, toward rice and wheat. Increased urban populations also prompted many governments to institute cheap food policies subsidizing politically active and vocal urban consumers while taxing farmers. These low prices for rice further stimulated consumption and dampened production increases, adding to large imports.

From 1962 to 1971, milled rice imports by Middle Eastern countries annually averaged 373,000 metric tons. But in the next 10 years, total rice imports tripled to an annual average of 1.3 million tons each year. In 1987, the Middle East imported a record 2.8 million tons of rice. African rice imports followed a similar pattern, averaging about 635,000 tons from 1962 to 1971, then doubling to nearly 1.5 million tons (average annual basis) in the following decade. Africa imported a record 3 million tons of rice in 1982. These imports were paid for by earnings on oil exports (Middle Eastern countries and Nigeria), through increased borrowing in international financial markets, and additional food aid from rice exporters, particularly the United States. Rice imports by Africa have declined since 1982 due to declining food aid and lower national incomes.

Iran, Iraq, and the EC have consistently been among the largest importers of rice, although countries such as Bangladesh, India, and, in 1989, China occasionally made sizable purchases. Saudi Arabia is also a large importer of rice, importing about 500,000 tons each year. Iraq and Saudi Arabia constitute important markets for U.S. rice exporters. Whether the Middle East will continue to grow as a rice market is unclear. Iran has attempted to increase domestic production since the war with Iraq ended.

Many of the same demand factors that contributed to the growth in imports by Middle Eastern countries, such as rising incomes and increasing populations, are at work in Asia. But these countries have generally reduced their shares of world trade. Asia's share of world imports declined from almost two-thirds in 1961 to less than one-third in the 1980's. Income growth, increased urbanization, oil exports by Indonesia, and low-cost credit in the 1970's expanded import demand. However, two factors have worked to reduce the Asian countries' share of world

trade while the African and Middle Eastern shares have increased. First, unlike the African countries, most importing Asian countries did not tax producers and discourage production. Also, nominal rates of producer protection for rice importers in East Asia have been rising, supporting higher domestic prices and stronger production incentives. India pursued policies designed to encourage production and stocks, and from 1976 to 1988 was a small net exporter. One reason that former large importers of rice--such as Indonesia, Malaysia, and South Korea --have become almost self-sufficient is that their governments have raised support prices and other producer supports, investment in irrigation, and technological assistance.

The second important factor in reducing the Asian share of world imports has been the successful adoption of high-yielding varieties of rice in many Asian countries. Yields in Africa have stagnated or declined, but yields in many Asian countries have risen dramatically. Adoption of high-yielding varieties has been much more widespread in the importing countries of Asia than in the traditional exporting countries (Burma and Thailand). This has been true because these varieties are generally successful only when grown on irrigated rice land using fertilizer. This type of farming predominates in most former large rice-importing countries such as South Korea, India, China, and Indonesia. Burma instead relies more on natural rainwater, uses little fertilizer, and produces mostly in river deltas. Although Thailand's dry season crop is irrigated, much of Thailand's production is rainfed. Even the newer varieties of the 1970's and 1980's have not been successful on nonirrigated rice farms.

Thus, the Asian countries have been better able to expand production to meet consumption growth than the African countries that have been forced to rely more on area expansion. The International Rice Research Institute, located in the Philippines, has not been successful at finding high-yielding varieties suitable for Africa. This problem is due to the sensitivity of high-yielding varieties to fertilizer and moisture levels. High-yielding varieties tend to perform best with abundant fertilizer and moisture. Since water is scarce and irrigation expensive in much of Africa, high-yielding varieties may not be economical. In addition, consumers have been slow to accept these varieties, a problem being overcome in Asia.

The total volume of rice imported by Asia peaked in 1972 and basically declined until 1987. Imports by South Vietnam and Kampuchea dropped off in large part because of the end of Vietnam War. South Korea was the largest importer of rice in 1981, importing almost 2.3 million tons, yet was self-sufficient after 1983. Indonesia was the largest importer of rice in 1980, importing over 2 million tons. But by 1986, Indonesia was almost self-sufficient in rice. Sri Lanka annually imported almost 500,000 tons in the 1960's and about 400,000 tons in the early 1970's. Yet, since 1981, Sri Lanka has averaged annual imports of only 166,000 tons. However, imports of rice by some Asian countries increased in 1987 and 1988, especially by China (although a net exporter), Indonesia, and India. Although India's increase in imports was weather related and not a new trend, Indonesia is debating reducing its goal of 100-percent self-sufficiency in rice because of budget constraints. China has experienced difficulty in meeting domestic demand in recent years.

Developments in Exporting Countries

There have been several developments in the major rice exporting countries in the 1970's and 1980's that have dramatically shifted market shares and sources of supply. Positions have also changed among the smaller exporters. Thailand's share of world exports increased from about 20 percent in the 1970's to roughly 40 percent in 1988 in response to large-scale domestic policy reform. Australia entered the world market as a major exporter in the mid-1970's due to yield and quality gains and competitive pricing. Price policies designed to promote rice production in India and Pakistan resulted in India becoming a small net exporter and Pakistan becoming a major exporter in the 1970's. But price ceilings in Brazil enacted in the early 1960's and an overvalued currency in the 1970's and 1980's resulted in that country becoming a net importer.

In the early 1960's, the volume of rice exports was 6-7 million tons, compared with current levels of 11-13 million tons. More than two-thirds of the world's rice exports were supplied by four countries. Thailand and Burma supplied over 3 million tons, or about half of the world's rice exports in the 1960's. The United States shipped 15-16 percent, or a little over 1 million tons of rice, and China exported 7-9 percent of all rice exports. But by 1972, just three countries were supplying 63 percent of the 8.7 million tons traded in the world rice market: Thailand (2.1 million tons), the United States (1.9 million), and China (1.4 million). Policy and political turmoil had hindered Burma's ability to export. The United States and Thailand became the major exporters of rice in the mid- and late-1970's (table 13).

In 1981, world rice exports grew to 13.1 million metric tons, a record not broken until 1989. The leading exporter was Thailand with 3.05 million tons, followed by the United States with 3 million tons of rice exports. Pakistan was the third largest exporter, supplying almost 1.1 million tons. Thailand is currently the largest rice exporting country, with almost 40 percent of the market. The U.S. share has returned to almost 20 percent after declining to less than 17 percent in 1984. Pakistan ranks third with 8-9 percent. Both China's and Burma's shares declined during most of the 1980's.

As recently as the late 1970's, the United States and Thailand both exported about 22 percent of world trade. During that period, Thailand imposed special taxes and domestic sales quotas on exporters to generate revenue and assure adequate domestic supplies. This combination translated into a restrictive export policy. U.S. rice exports expanded rapidly during the 1970's while world prices were above the U.S. loan rate. The United States also provided aid to several Asian markets in the 1970's--South Vietnam, South Korea, Kampuchea, and Indonesia--and targeted market development activities to Iran. Also, the OPEC countries were flush with cash and at the time the United States was the only source of consistently high-quality milled and parboiled rice. Much of the U.S. commercial exports went to OPEC countries. U.S. parboiling capacity doubled, but Thailand was to soon recognize the importance of these markets and increase its production and processing to cash in on these marketing opportunities.

By the 1980's, several factors had emerged which hurt the U.S. market position. Thailand lowered its export taxes in response to lower world prices and expanded its market share in the early 1980's. Global recession, falling OPEC revenues, self-sufficiency policies in Indonesia and Korea, and government changes in Southeast Asia and Iran all worked to weaken demand for U.S. rice and U.S. prices

Table 13--Milled rice imports of selected regions by major suppliers, 1976-87

Importer and calendar year	Exporter			Total imports
	United States	Thailand	Others	
		1,000 metric tons		
Middle East:				
1976	465.2	199.4	456.4	1,121
1977	665.1	243.8	463.1	1,372
1978	712.6	265.8	499.6	1,478
1979	773.0	285.0	737.0	1,795
1980	717.2	477.1	634.7	1,829
1981	515.0	564.2	849.8	1,929
1982	667.6	650.2	668.2	1,986
1983	642.5	682.6	852.9	2,178
1984	785.6	828.7	823.7	2,438
1985	637.4	777.0	880.6	2,295
1986	688.3	691.9	1,109.8	2,190
1987	814.2	1,056.2	976.6	2,847
Sub-Saharan Africa:				
1976	154.6	359.1	437.3	951
1977	418.7	677.9	578.4	1,675
1978	524.7	601.0	990.3	2,116
1979	277.3	593.3	1,026.4	1,897
1980	423.0	549.4	1,147.6	2,120
1981	628.7	741.7	1,193.6	2,564
1982	699.0	1,448.4	819.6	2,967
1983	369.8	1,171.5	1,282.7	2,824
1984	307.8	1,452.7	833.5	2,594
1985	450.9	1,113.6	822.5	2,387
1986	362.8	1,574.3	669.9	2,607
1987	429.0	1,601.6	599.4	2,630
EC-12:				
1976	358.9	20.9	646.2	1,026
1977	413.0	32.7	487.3	933
1978	422.8	30.5	640.7	1,094
1979	306.3	56.7	671.0	1,034
1980	240.3	134.4	535.3	910
1981	414.4	83.3	923.3	1,421
1982	347.5	98.2	881.3	1,327
1983	330.1	140.5	576.4	1,047
1984	427.0	304.8	514.2	1,246
1985	254.5	350.4	653.1	1,258
1986	250.1	310.1	782.8	1,343
1987	406.4	116.8	638.8	1,162

Source: United Nations trade data.

fell to loan levels. The loan rate acted as a price floor for U.S. rice and allowed other exporters to undercut U.S. exporters. As a result, the U.S. market share declined from over 23 percent in 1980 to less than 17 percent in 1985. The marketing loan provision of the Food Security Act of 1985 freed up U.S. export prices from the loan rate and enabled the United States to regain some of its lost market shares.

The U.S. Role in the World Rice Market

The United States normally produces about 2 percent of the world rice crop. In 1983/84, because of a 30-percent decline in production induced by the payment-in-kind program, the U.S. crop accounted for just 1 percent of the world's production. However, the United States still accounted for almost 20 percent of world exports that year. Thus, while the U.S. rice crop is insignificant compared with world production, its impact on trade is large. Moreover, U.S. rice is a source of production stability in an often volatile, unreliable world rice market. The entire U.S. crop is irrigated, assuring more stable yields and, when combined with large stocks, more stable supplies. Production capacity is resilient and far outweighs domestic requirements. Hence, large increases in output are possible in a relatively short period of time. These factors make the United States a more important player in the world market than its production or even its export share suggest.

The mix of countries buying U.S. rice have changed several times over the past 40 years. Changes in political relations, improved production in foreign countries, and protectionist policies shifted many countries from net importers to self-sufficient countries or even net exporters. In the 1950's, Cuba, India, Pakistan, and Indonesia were the biggest markets for U.S. rice. In the next decade, India, Pakistan, and Indonesia remained strong markets, but demand for U.S. rice also grew in Western Europe, South Korea, South Vietnam, and South Africa. Japan was a significant importer of rice through 1966. But by the end of the 1960's, India ceased importing U.S. rice and Pakistan became a major exporter. Relations were severed with Cuba ending rice trade, but markets began to open in the Middle East and Africa.

Asia, primarily South Korea, South Vietnam, and Indonesia, was the principal market for U.S. rice in the early 1970's. However, successful policies aimed at self-sufficiency in South Korea and Indonesia and Vietnam's reunification under the Communist regime were responsible for the decline of the Asian market after the mid-1970's. Only Indonesia remained a strong market until the end of the decade. Asia's share of U.S. exports declined from almost 70 percent in 1970 to less than 21 percent in 1980.

By 1980, the Middle East and Africa had developed into the two strongest markets for U.S. rice. Exports to these regions were growing. Iran, Iraq, Saudi Arabia, South Africa, and Nigeria became the largest buyers of U.S. rice (table 14).

South Korea briefly returned as a strong market for U.S. rice in the late 1970's and early 1980's, but vanished after 1983 as domestic production expanded to meet domestic demand. The United States lost its Nigeria sales because the country banned rice imports due to foreign exchange shortages and increased reliance on smuggled Thai rice. The European Community and Canada remained stable but small markets for U.S. rice throughout the 1970's and 1980's. Together, they account for 15-20 percent of total shipments. Large sales of rough rice to Brazil in

Table 14--Market shares of major customers for U.S. rice, calendar years, 1979-88

Country	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
					Percent					
EC-12	13	8	14	16	16	22	16	15	19	13
Iraq	9	9	3	9	12	21	21	16	21	23
Saudi Arabia	8	8	8	13	12	13	10	8	8	9
Iran	13	6	4	1	0	0	0	0	0	0
South Africa	0	4	4	5	6	6	4	4	3	4
Indonesia	13*	6*	3*	1*	3*	3*	---	---	---	2
Nigeria	2	6	13	14	5	1	1	0	0	0
South Korea	6	22	36	9	9	0	0	0	0	0
Canada	3	3	3	4	4	5	5	3	3	4
Philippines	0	0	0	0	0	1*	7*	0	0	7*
Brazil	---	---	---	0	0	0	0	20	0	0
Senegal	---	1*	1*	1*	1*	---	7	2*	3	4
Liberia	2	2*	3*	3*	3*	4*	3*	3*	4*	3*
Haiti	1*	1*	---	---	---	---	---	1	4	2
Other	26	25	9	24	28	26	26	28	35	30
Total 1/	100	100	100	100	100	100	100	100	100	100

--- = Negligible.
* Denotes PL 480 customer. All others are commercial buyers.
1/ Totals may not add to 100 due to rounding.
Source: U.S. Dept. Agr., Foreign Agricultural Service.

response to a weather-related shortfall in production made that country the largest market for the United States in 1986. Concessional exports have made Liberia and Senegal important outlets for U.S. rice in the late 1980's. Less developed countries currently account for two-thirds to three-fourths of U.S. rice exports.

Although the U.S. rice export position deteriorated between 1982 and 1985 and is still below the 1981 level, there are some bright spots. When rice exports are classified by three types--regular milled, brown, and parboiled--an upward trend in parboiled rice exports is evident since 1966, with exports increasing from about 145,000 tons in 1966 to a peak of 1 million in 1981. Although parboiled exports have declined from the 1981 peak, they have still averaged over 650,000 tons since 1982 (table 15). Milled rice exports have fluctuated since 1966, with a moderate upward trend evident after 1985. Although brown rice exports increased during the late 1960's and 1970's, they have basically declined since 1980 and exports are currently less than the 1966 level.

The United States has lost market share in some countries, notably the regular milled and brown rice markets. This segment of growing import demand for rice has shifted to Thailand on the basis of more attractive prices for comparable quality rice. In 1984, the United States lost a premium market in Nigeria, a previously large buyer of U.S. long-grain parboiled rice, to Thailand. Thailand is also gaining market shares in Western Europe, South Africa, and Saudi Arabia through improved quality and more competitive pricing. Thailand exported over 100,000 metric tons to the United States in 1988/89.

The Role of PL 480 in U.S. Rice Exports

Government-assisted exports authorized under PL 480 have played an important role in expanding U.S. rice exports. The total volume of rice exports moving through Government programs peaked in the early 1970's and Government-assisted exports as a share of total exports have declined since. Government exports as a percentage of all rice exports ranged from almost 80 percent in 1957 to less than 20 percent in the 1980's (app. table 12). In the 1950's, Japan, Pakistan, India, and Indonesia were key markets for Government rice exports. In the 1960's, India and Indonesia were the major recipients. South Vietnam, Kampuchea, and South Korea received most of the PL 480 rice in the early 1970's. Although Indonesia was the largest recipient of PL 480 shipments in the late 1970's, most assistance was targeted to African countries after 1975.

Table 15--U.S. milled rice exports by type, selected years 1/

Crop year	Brown	Milled	Parboiled	Total 2/	PL 480 and AID share of total 3/
	- - - - - - - - 1,000 metric tons			- - - - - - - -	Percent
1966/67	217.7	1,347.2	145.1	1,719.0	46.6
1970/71	626.0	630.5	263.1	1,473.7	64.0
1974/75	546.5	1,388.3	242.5	2,194.4	27.9
1979/80	475.4	1,461.9	598.4	2,705.9	17.9
1980/81	1,202.7	957.7	781.7	3,027.6	17.8
1981/82	502.6	941.8	1,000.9	2,681.9	13.4
1982/83	354.3	954.1	846.5	2,218.7	16.8
1983/84	334.3	882.4	821.8	2,270.2	20.9
1984/85	166.2	927.7	630.8	1,954.2	23.7
1985/86	309.6	891.6	523.8	1,918.6	30.1
1986/87	278.5	1,484.0	596.4	2,679.8	16.3
1987/88	178.1	1,289.6	652.9	2,290.3	21.2

1/ All rice is reported on a milled-equivalent basis.
2/ Numbers may not not add due to rounding.
3/ PL 480 and AID shipments are on fiscal year of first year.
Source: U.S. Dept. Commerce, Bureau of the Census.

The largest recipient of PL 480 rice shipments in the 1980's has been Bangladesh. Other consistently large recipients in this decade have been Guinea, Liberia, Sierra Leone, Somalia, Madagascar, and Yemen. In addition, Peru received large PL 480 shipments in the late 1970's and early 1980's. The Philippines received over 150,000 tons of rice in 1985, making the country the largest recipient of PL 480 rice that year. In the 1980's, PL 480 rice shipments have been about evenly split between long and medium grain.

Future Developments in Rice Trade

There are three critical issues likely to shape the U.S. role in the world rice market ahead. The first is growth in total world demand. World rice production has been increasing at an annual average rate of 3 percent for the past decade while growth in use has been marginally slower. Although world exports increased rapidly from about 8.6 million tons in 1971 to 13.1 million in 1981, world trade has stagnated at 11-13 million tons since 1979. If world exports continue to stagnate at this level and production in exporting countries continues to increase, the distribution of world trade--the sources of supply and demand--will become more important. Competition among exporters could intensify.

The historical data suggest that growth in the market will depend heavily on developments in Africa and the Middle East. Their increased role has been a result of income growth, growth in urban population, policies which stimulate consumption and dampen production increases, and limited production capacity. As the cost of consumer subsidies in these nations rises, some governments may choose to raise consumer prices. And if self-sufficiency policies were adopted or if suitable high-yielding varieties are developed for nonirrigated rice, the growth in world import demand could weaken further. Finally, a slowdown in income growth in the Middle East as a result of lower oil prices could encourage these countries to consume less rice and more lower priced wheat.

The second issue is the U.S. policy response to developments in world rice markets and policies in the other exporters, notably Thailand. Thailand moved toward more competitive marketing practices by removing the last of its export taxes in 1986. When the gap between U.S. and Thai prices for milled rice widened in the mid-1980's, U.S. exports declined as buyers switched to Thailand's rice. Provisions of the Food Security Act of 1985, including declining loan rates and the marketing loan provision, restored some of the U.S. competitiveness in the world market.

Finally, any multilateral trade liberalization resulting from negotiations could substantially affect the world rice market and the U.S. position. Domestic support and trade policies in the United States, Japan, and, to a lesser extent, the EC depress world prices and reduce trade volumes. The removal of import barriers by Japan could open a huge japonica market for the United States and other suppliers. The world indica market could increase somewhat also if the EC eliminated its protection of domestic producers. The United States would likely gain market share in the japonica trade but could lose markets to lower cost indica producers such as Thailand in the long run. Much uncertainty surrounds this issue and depends on the pace and extent of liberalization and the extent of the countries participating.

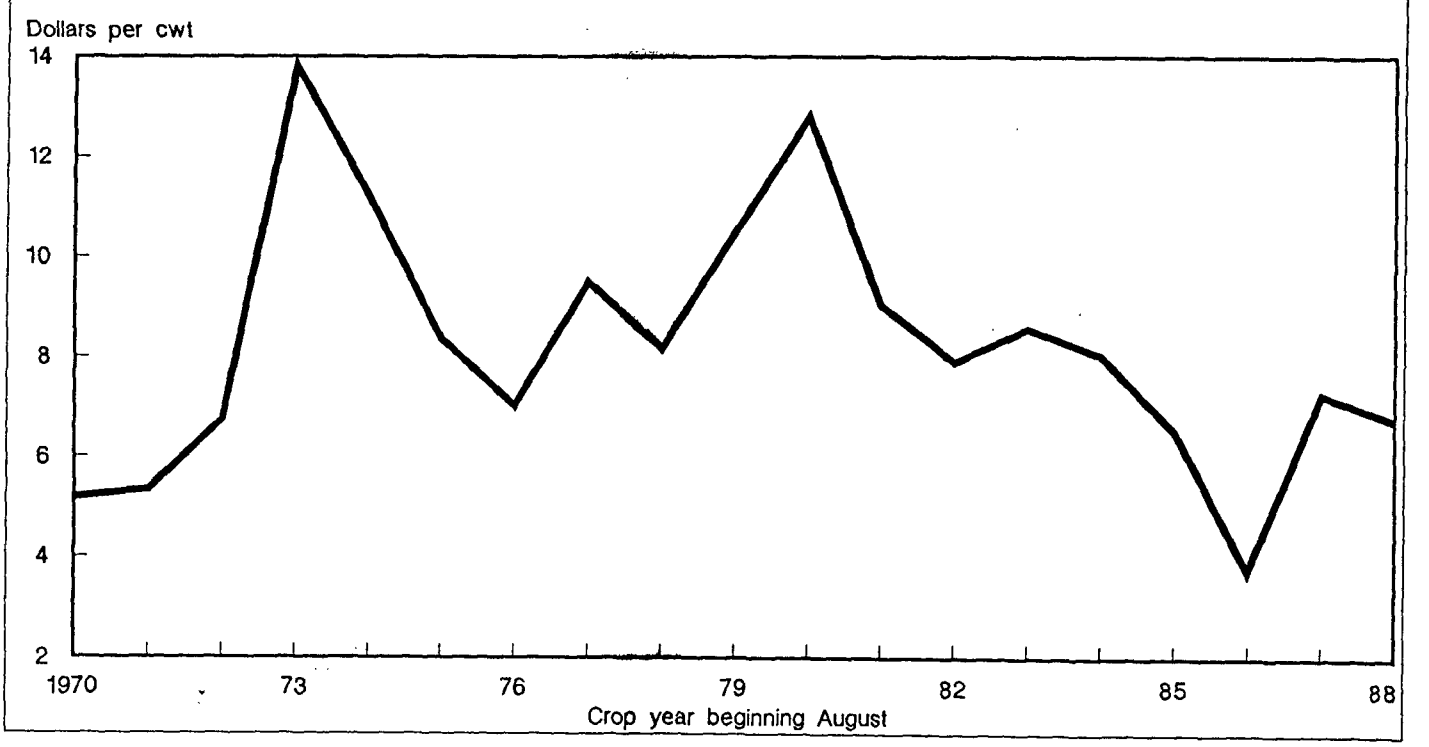
Prices and Returns

Historical movements in producer prices for rice were limited until the 1970's but have moved dramatically since. U.S. season average farm prices remained fairly stable until the 1970's due in large part to acreage and marketing restrictions that constrained production. Output tended to have the market near support prices with limited government intervention. Gross returns grew despite the stable prices because average yields per acre increased.

However, farm prices for rice hit an all-time high during the 1973/74 season, reaching $17.50 per cwt in June 1973, more than double current prices (fig. 2). Prices fell the next season, hitting $6.17 in March 1976. They then began an upward trend that continued through the early months of 1981, peaking at nearly $14 in April of that year. On an overall decline through marketing year 1986/87, prices fell below the loan rate by August 1982, and the 1982/83 season was ushered in with prices that remained below the loan rate for all but 3 months of the marketing year. The payment-in-kind program in 1983/84 allowed U.S. farm prices to remain above the loan rate throughout the marketing year, although prices began a steady decline after February 1984.

Without the continued powerful effect of the payment-in-kind program, farm prices continued to tumble in 1984/85 and were below the loan rate in 4 of the last 6 months of the marketing year. Although the loan rate declined each crop year after 1983/84, farm prices remained below the loan rate throughout 1985/86 and 1986/87. The marketing loan provision of the Food Security Act of 1985 allowed

Figure 2
U.S. farm prices of rough rice



U.S. farm prices to drop close to the world price after April 15, 1986. The 1987 drought, resulting in a poor harvest in much of Asia in 1988, began pushing prices up in August 1987 and the U.S. farm price finally exceeded the loan rate in November 1987. U.S. farm prices remained above the loan rate until December 1988. U.S. farm prices for April 1989 averaged the loan rate of $6.63 per cwt.

Focusing on these historical farm price trends above can result in misleading conclusions about producers' economic welfare. The effects of deficiency payments, participation rates, and cash expenses must also be included when analyzing producer welfare. For example, farm prices during August-December 1986 averaged $3.87 per cwt, $3.33 below the national average loan rate and substantially below the $11.90 target price. Yet, 95 percent of the 1986 rice base acreage was enrolled in the 1986 rice program, assuring producers an average price of $10.51 per cwt (including deficiency payments, marketing loan payment, and market sales) for virtually all their rice. Hence, although the market value of rice production and marketing loan payments in 1986/87 was $907 million, down from $1.12 billion in 1984/85, deficiency payments added $495 million to producer returns, bringing total returns to an estimated $1.4 billion. Yet, this is only 6 percent less than the total returns earned during 1984/85 when the season average market price was $8.04 per cwt, over twice the season average price in 1986/87 of $3.75. Thus, farm prices alone, particularly during years of acreage programs, do not provide an accurate assessment of producers' welfare (table 16).

History of Rice Programs

Programs of the 1920's

Proposals for government intervention in the rice market date back to the early 1900's but did not become law until the 1930's. The end of World War I brought a sharp drop in U.S. farm exports and began a period of sustained low returns to farming. Rice farm prices averaged $3.34 per cwt during 1914-20 and fell to $2.10 by 1922. Widespread support emerged for Government help in raising farm returns. A leading proposal was the McNary-Haugen Plan, which was debated in Congress during much of the 1920's. The plan proposed a two-price market: crops would be sold at a high enough price on the domestic market to support incomes and surpluses would be sold abroad at world prices. Rice was one of the eight commodities that the legislation would have covered. Vetoed by the President twice, the plan never became law.

Limited Government involvement was provided for in the Agricultural Marketing Act of 1929. This act set up a federally funded corporation to make loans to marketing cooperatives that would purchase surplus crops. However, the onset of the Depression and resulting buildup of surpluses led to the failure of the program by 1932. Rice prices fell to an all-time low of $0.93 per cwt in that season and added rice producer support to calls for large-scale government intervention.

Programs of the 1930's

The farm programs of the 1930's ultimately shaped the rice sector into the 1980's. The objective of the decade's first Agricultural Adjustment Act (AAA) of 1933 was to restore the purchasing power of farm commodities to their 1910-14 level, a concept referred to as parity. Rice was designated as one of the original seven

Table 16--Rice sector costs and returns, 1975-88

Crop year	Farm value 1/	Direct payments 2/	Total income	Total cash expenses 3/	Returns above cash expenses 4/ Total	Per cwt Nominal	Per cwt 1982$
	Million dollars					Dollars	
1975	1,072	0	1,072	758	314	2.45	4.12
1976	811	129	940	656	284	2.46	3.89
1977	941	4	945	565	380	3.83	5.69
1978	1,087	59	1,146	796	350	2.63	3.64
1979	1,384	1	1,385	849	536	4.06	5.17
1980	1,873	2	1,875	1,132	743	5.08	5.93
1981	1,654	22	1,676	1,360	316	1.73	1.84
1982	1,246	267	1,513	1,200	313	2.04	2.04
1983	876	618	1,494	769	725	7.27	7.00
1984	1,119	380	1,499	977	522	3.76	3.49
1985	1,203	468	1,671	912	759	5.63	5.07
1986	907	495	1,402	768	634	4.75	4.17
1987	1,038	545	1,583	735	848	6.54	5.56
1988 5/	1,137	570	1,707	941 6/	766	4.80	3.90

1/ Production times average farm price, including marketing loan gains: $322 million in 1985, $407 million in 1986, $96 million in 1987, and $60 million in 1988.

2/ The sum of deficiency, diversion, disaster payments, and in 1983, the value of payment-in-kind.

3/ Cash expenses per planted acre times acreage planted.

4/ The difference between total income and total cash expenses; this difference was divided by the quantity produced, and then deflated (1982 = 1.0).

5/ Preliminary.

6/ Calculated from a forecast cash expense of $321 per acre.

Sources: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service, and Costs of Production for Major U.S. Crops, 1975-87, U.S. Dept. Agr., Economic Research Service, May 1989.

commodities covered in the act. This was to be accomplished through a mix of supply controls and processing taxes.

Supply control was administered through contracts negotiated between the Government and rice millers. Contracts with producers were introduced with the DeRouen Rice Act of 1935 and were financed with a processing tax. The Supreme Court ruled against processing taxes and declared the AAA production control features unconstitutional in January 1936.

The Agricultural Adjustment Act of 1938 introduced many of the provisions found in today's programs. It provided nonrecourse loans for rice, referendums for

marketing quotas, acreage allotments, and direct payments to bring producer prices up to parity, if funds were appropriated. However, loans for rice were not offered until a subsequent act made them mandatory for farmers harvesting within their acreage allotment beginning with the 1941 crop. Marketing quotas, operating through rice acreage allotments, were to be proclaimed if total supply was estimated to exceed normal supply by 10 percent. Normal supply was defined as expected exports, plus the previous year's domestic use, plus 10 percent to allow for carryover stocks. With stocks beginning to build in the late 1930's, USDA proposed rice quotas for 1939/40. But less than the required two-thirds of the producers voting supported them in the referendum, so they were not put into effect.

Program Adjustments from World War II Through the 1960's

Rice was added to the list of basic commodities eligible for nonrecourse loans in 1941 and the first loan program for rice was initiated. Rice acreage allotments were removed during the war and most of the subsequent decade, but were put into effect in 1950. Marketing quotas and acreage allotments were in place during 1955-73.

Swing from Shortages to Surpluses

There was a sharp increase in rice exports during World War II--from 5.7 million cwt in 1940 to 11.5 million cwt by 1945--which lowered stocks and pulled rice prices well above support levels. Because of high prices and strong demand, rice acreage allotments were lifted entirely and in some years price support levels were not even announced.

The Agricultural Acts of 1948 and 1949 revised the method used to calculate parity in order to account for productivity and other changes since the base period of 1910-14. Mandatory price support at 90 percent of parity, a level first set during the war, was continued in the 1948 Act, but the 1949 Act introduced flexibility, allowing a range for parity prices. However, because of the Korean conflict, subsequent legislation retained parity at 90 percent. Provision for marketing quotas continued. The provisions of the 1949 Act had little immediate effect on the rice market, as prices averaged above support levels in every year from 1941 to 1953, except for 1951.

In 1954, rice production reached a record 64 million cwt--over twice the average during World War II. However, domestic and export demand weakened, and carryover stocks amounted to 27 million cwt, seven times greater than the average of the previous 3 years. Commodity Credit Corporation loan activity for rice was significant for the first time and the CCC wound up owning 60 percent of the total carryover.

The Agricultural Act of 1954 attempted to deal with these surpluses by moving to flexible support prices, 82.5-90 percent of parity for 1955 and 75-90 percent thereafter. In addition, marketing quotas were proclaimed and voted in for the 1955 crop.

Marketing Quotas and Allotments: 1955-73

Marketing quotas and acreage allotments were in effect every year from 1955 through 1973. They were effective in reducing CCC-owned rice stocks from 27

million cwt at the end of 1955/56 to near 300,000 cwt by the end of 1961/62 and in preventing stocks from rebuilding in the 1960's. The pace of the stock reduction was limited by a legislated minimum national acreage allotment of 1.65 million acres from 1956 through 1961.

Another method used to reduce rice acreage was the soil bank program provided for in the Agricultural Act of 1956. It had two components: an acreage reserve program that paid farmers to annually divert rice land and a conservation reserve that paid farmers to retire land under long-term contracts that lasted from 3 to 10 years. Neither program was considered very effective. As such, the acreage reserve program ended in 1958 and the conservation reserve ended in 1961.

Starting with the 1961 crop, marketing quotas were announced and voted on when total supply exceeded normal supply. Prior to that, quotas were announced only when total supply exceeded normal supply by 10 percent. Marketing quotas were operated through acreage allotments. Normal supply less beginning stocks determined needed production, which was then converted to a national allotment based on U.S. average yields. The allotments were then apportioned to farms. All production from allotted acreage was eligible for price support, but production from acreage in excess of the allotment was subject to a penalty.

With the 1962 crop, rice allotments gradually increased, reaching 2.8 million acres by 1968. But, stocks began to build that year, and allotments were reduced below the 1968 level during 1969-73. Much of the agricultural legislation passed during the mid-1960's through the early 1970's made major changes in programs for other grains, but had little effect on rice. For example, the following provisions did not apply to rice: the marketing certificate program for wheat, introduced in 1964; the set-aside provisions for wheat, feed grains, and cotton, introduced in 1970; and the separation of target prices from support prices for wheat, feed grains, and cotton, introduced in 1973. But throughout this period of change elsewhere in commodity programs, the rice program continued in essentially its 1961 form.

Legislation of the 1970's

Given a surge in export demand related to crop shortfalls abroad, rice marketing quotas were suspended for the 1974 and 1975 crops. Acreage allotments were set at 2.1 million acres in 1974 and at 1.8 million in 1975. Allotments through 1981 were used for payment purposes only. Producers were not restricted on the acreage planted. However, they could receive program benefits only on allotment acres.

Exports grew sharply in the early 1970's, raising prices well above support prices. In 1973, the average farm price was $13.80 per cwt, compared with a support level of $6.07. The Rice Production Act of 1975 reflected these changed conditions and shifted rice production control from quotas and allotments to greater market orientation along the lines of the programs in place for the other grains. Acreage allotments were set at 2.1 million acres in 1974 and at 1.8 million in 1975. Allotments through 1981 were used for payment purposes only. A target price was established and direct (deficiency) payments were provided based on the difference between the August-December average farm price and the target price. The allotments became the payment base. Farmers could now plant in excess of their allotment, but eligibility for loans and deficiency payments was restricted to producers planting within their allotted acres. Target prices and loan rates were to be adjusted annually on the basis of the index of prices paid

and changes in yields. The act provided for annual set asides and set a limit of $55,000 on the payments a person could receive under the rice program. Unlike programs for other grains, disaster payments counted against the payment limit for rice.

Disaster payments could be made to cover losses due to natural causes that either prevented the crop from being planted or resulted in abnormally low yields. An allotment carried with it eligibility for disaster protection and no premium was required. The payment rate was a percentage of the target price and covered allotment production. The disaster payment program was replaced by the all-risk crop insurance program provided by the Federal Crop Insurance Act of 1980. Growers have been reluctant to pay the premiums required for coverage under this program, even though the Government also pays a significant portion. In 1983, only 110,000 rice acres were insured at an average premium of $10.34 an acre. This coverage was only 5 percent of the potentially insurable rice acreage.

The first deficiency payments, $128 million, were paid on the 1976 crop, which was also the first crop produced under the 1975 Act. These were the first direct Government payments for rice since 1957, when payments were made under the soil bank act.

The Food and Agriculture Act of 1977 contained provisions very similar to the 1975 Act. Rice production costs, rather than the index of prices paid, became the basis for adjusting the target price, with the loan rate adjusted by the same percentage as the target price. The loan rate could be lowered, but not below $6.31 per cwt.

The set-aside provision was continued, although one has never been in effect for rice, and a cash payment for diverting land was authorized. The limit on rice program payments was $55,000 per person in 1977; this was lowered to $52,250 in 1978 and $50,000 in 1979. Beginning in 1980, payments were limited to a combined total of $50,000 from the wheat, feed grains, upland cotton, and rice programs. Disaster protection continued with a separate payment limit. Rice prices stayed well above the loan rate during the life of the 1977 Act. With exports running high, acreage passed the 3-million mark for the first time in 1980 and reached a record 3.8 million in 1981.

Legislation of the 1980's

<u>The Agricultural and Food Act of 1981</u>

The Agricultural and Food Act of 1981 eliminated acreage allotments and marketing quotas for rice and made the rice program analogous to those for other grains. Rice farmers previously received deficiency payments on allotment production, regardless of actual production. However, allotments no longer reflected actual planting patterns. In disposing of allotments, the 1981 Act based deficiency payments on production from permitted plantings. Target prices were no longer adjusted by the formula based on rice production costs, but minimum target levels were established. The loan rate was to be adjusted by the same percentage as the target price, but could be lowered to a minimum of $8.00 per cwt if rice stocks were excessive or exports discouraged.

The acreage reduction program was introduced as a more specific acreage control method than the set-aside provision. When in effect, an acreage reduction program

required land to be diverted from a farm's rice base acreage and put into approved conservation uses. Compliance was required for eligibility for loans and deficiency payments.

The large acreage expansion in 1981, along with a decline in exports, precipitated a sharp rise in carryover stocks. This resulted in a 15-percent acreage reduction program for the 1982 rice crop. Program compliance was high, 78 percent of the 4-million-acre U.S. rice base. But a continued plunge in U.S. rice exports during the 1982/83 crop year caused rice stocks to bulge further to almost 72 million cwt. In 1983, there was a 15-percent acreage reduction program, a 5-percent paid land diversion, and an additional 10- to 30-percent payment-in-kind program for rice. Prospects for a large deficiency payment rate and the attractive payment-in-kind program, under which payments did not count against the payment limit, helped boost program enrollment to 98 percent of the 4.1-million-acre rice base. U.S. production declined by 50 million cwt and stocks declined 25 million cwt. At the same time, world rice production increased. Without acreage control, supplies would likely return to excessive levels again in 1984/85, so a 25-percent acreage reduction program was announced for 1984 rice. Farm prices were substantially below the target price during 1983/84, encouraging a high program enrollment rate of 87 percent in the 1984 program, despite the large acreage reduction requirement and the lack of a paid diversion.

The Food Security Act of 1985

The Food Security Act of 1985 was enacted under the general feeling that farm programs cost too much, nearly $18 billion in fiscal year 1985, and must be brought under control. There was a consensus that the health of U.S. agriculture depended upon its ability to become more competitive in world markets and that price support levels should be set more in line with market-clearing prices, instead of being rigidly legislated by Congress as in the 1981 Act.

But, these considerations were tempered by concerns about the financial distress facing many farmers that would be compounded by the short-term price-depressing effects of a market-oriented farm policy in the short run. Many farmers expanded their farming operations in the late 1970's by obtaining large loans. The onset of declining commodity prices soon after 1980 when export markets weakened caused the value of farmland to fall. As a result, many farmers developed cash-flow problems and some even had their farms foreclosed. Farmers' net cash-flow reached a record low $30.2 billion in 1985, compared with $43.8 billion in 1979.

The 1985 Act was a compromise between a desire to make U.S. agriculture more competitive in world markets through lower loan rates in general--and the lower marketing loans for rice and cotton in particular--and an immediate need to continue farm income protection via frozen target prices and larger deficiency payments.

Unlike the 1981 Act in which minimum loan rates were rigidly legislated by Congress, the 1985 Act contained provisions for lowering the loan rate for rice to $7.20 per cwt, a 10-percent decline from $8.00 in 1985. For the 1987-90 rice crops, minimum loan rates were to be the higher of: (1) 85 percent of a 5-year moving average marketing prices, excluding the highest and lowest prices; or (2) $6.50 per cwt. However, loan rates could be reduced by no more than 5 percent from the preceding year.

A new marketing loan was also provided for in the 1985 Act. The Secretary was granted authority to implement marketing loans for grains, upland cotton, and soybeans but was required to implement them for rice and cotton if the world price were below the announced loan rate. For rice, the 1985 Act permitted producers to repay Commodity Credit Corporation loans at the lesser of the loan rate or world market price, but not less than a specified portion of the loan rate. For the 1986 and 1987 programs, rice producers were permitted to repay loans at the world market price, but not below 50 percent of the loan rate. The minimum loan repayment rate was set at 60 percent of the loan rate for 1988 and 70 percent for 1989 and 1990.

Section 1005 of the Food Security Act of 1985 authorized the Secretary of Agriculture to make in-kind payments in the form of generic certificates to farmers as payment for participation in numerous Government programs. These programs included the acreage reduction, paid land diversion, and conservation reserve programs as well as the rice marketing loans, disaster, and emergency feed programs. In addition, grain merchants and commodity groups have been issued certificates through the export enhancement program and the targeted export enhancement program. Generic certificates were also made available under the 1985 Act to producers selling rice or repaying price support loans when the world price for rice was below the current loan repayment rate. The payment rate was set equal to the difference between the loan repayment rate and the world price.

The 1985 Act also froze the 1986 minimum target price at the 1985 level, $11.90 per cwt, and set the minimum 1987 through 1990 target prices at declining levels. The target prices provide a basis from which direct payments are made to eligible producers if the national weighted average market price received by farmers for the first 5 months of the market year (August through December) falls below the target level.

A deficiency payment is a Government payment made to farmers who participate in wheat, feed grain, rice, or cotton programs. The payment rate for rice is per cwt and is based on the difference between the price level established by law (target price) and the higher of the market price during the first 5 months of the market year or the price per unit at which the Government will provide loans to farmers to enable them to hold their crops for later sale (loan rate). The total deficiency payment is equal to the payment rate multiplied by the acreage planted for harvest and then by the program yield established for the particular farm. The payment acreage is the acreage actually planted to rice, but it cannot exceed the permitted acreage. However, growers who underplant their permitted acreage by planting between 50 and 92 percent of the permitted acreage (the 50/92 provision) and devote the remaining permitted acres to a conserving use would receive payments on 92 percent of the permitted acreage.

Limited cross compliance was required for participants to be eligible for program benefits in the late 1970's and remains in effect under the Food Security Act of 1985. In a limited cross-compliance program, a producer participating in one commodity program must not plant in excess of the crop acreage base on that farm any of the other program commodities for which an acreage reduction program is in effect.

The Secretary of Agriculture could not reduce the loan rate for 1988 rice crop by more than 3 percent from the 1987 level according to the Budget Reconciliation Act

of 1987. The 1987 Act also slightly reduced minimum target prices for the 1988 rice crop to $11.15 per cwt and the 1989 crop to $10.80.

Program Costs

A summary of payments made directly to farmers for rice crops of recent years is shown in table 17. A longer and more detailed accounting of fiscal year costs is found in appendix table 6. As table 17 indicates, deficiency payments have made up the bulk of direct payments to rice producers since 1981. The marketing loan gains were also an important source of income in 1985 and 1986 when world prices were low. The marketing loan gain has been a less important source of income for rice producers after 1986 because U.S. and world prices converged.

The 1977 Act imposed payment limits on producers for the first time. Payment limits were initially set at $52,250 for one or more crops but, by 1980, payments could not exceed $50,000 per person for total payments received under the grain and cotton programs.

During the 1983/84 crop year, a program featuring acreage reduction, paid land diversion, and payment-in-kind was in effect. Payment limitations applied only to the acreage reduction and paid land diversion provisions. For program participants not in payment-in-kind, it would have taken a base acreage of approximately 450 acres and permitted plantings (payment acreage) would have to have been 360 acres (450 X .8) to reach the payment limit, based on the estimated national average program yield of 4,867 pounds per acre, a diversion payment rate of $2.70 per cwt, and a deficiency payment rate of $2.77 per cwt. A participant putting 30 percent of the base into the payment-in-kind program would need a base of 720 acres (and permitted plantings of 360 acres, or 50 percent of the base) to reach the payment limit. Thus, payment-in-kind permitted larger sized farms to participate fully in the 1983 program.

Table 17--Direct payments to rice producers, crop years 1981-88

Payments	1981	1982	1983	1984	1985	1986	1987	1988
				Million dollars				
Deficiency	21	267	233	380	375	495	545	570
Diversion	---	---	23	---	93	---	---	---
Disaster	---	---	---	---	---	---	---	---
Payment-in-kind	---	---	1/ 362	---	---	---	---	---
Marketing loan gains	---	---	---	---	322	407	96	60
Total	21	267	618	380	790	902	641	630

--- = No payment.

1/ 42.3 million cwt valued at the estimated average farm price of $8.65 per cwt for 1983/84.

Source: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service.

In 1978, under the allotment system, approximately $58 million was paid in deficiency payments and about 27 percent of the payments made were in excess of $52,250 at that time (prior to enactment of the payment limitation). During the 1987/88 crop year, deficiency payments totaled $545 million. Maximum permitted plantings by participants indicate total payments could have reached $583 million. The payment limit probably accounts for actual payments falling short of this level. Arkansas, Louisiana, and Texas received nearly three-quarters of the total payments issued through Government programs. In addition, marketing loan gains totaled $122 million. Government payments and marketing loan gains totaled $887 million in 1986/87 and $667 million in 1987/88.

Program Effects

The rice programs has both direct and indirect effects on farmers, consumers, and taxpayers. The rice program affects:

- Prices received by farmers and paid by domestic and foreign consumers of rice.
- Incomes of farmers.
- Resources (specifically, land and other inputs used to produce rice).
- Consumption. By affecting prices, the rice program also affects the quantity of rice demanded in the United States and abroad.
- Foreign production and exports.

Farmers

The U.S. rice program affects prices received by rice producers, their incomes, the costs and value of resources used in rice production, and rice growers' production planning processes. Rice producers have also benefited from Government-assisted exports (app. table 6). When rice is exported through Government programs such as PL 480, prices are supported by expanding export market demand. Between fiscal years 1980 and 1987, net Government expenditures on the rice price support program, including those for PL 480, have totaled over $5 billion. The total value of rice production over the crop years 1980-87 totaled $9.09 billion.

Since the inauguration of target prices, direct Government payments have made up an increasing share of producer incomes. Direct payments bolster farm income, contrasted to raising prices. During fiscal years 1982-87, rice producers received $1.91 billion in direct payments under deficiency, diversion, and disaster program provisions. In 1982, Government payments comprised 17 percent of rice growers' gross incomes. By 1987, Government payments rose to 40 percent of growers' gross incomes. The data in table 18 demonstrate the difference in returns above cash costs made by direct payments. The benefits of participating in the rice program are clearly evident in comparing returns in 1987 and 1988, even though producers were required to idle land in both years in order to receive program benefits.

When program benefits are tied to acreage reduction provisions, the net effect can be a gain to producers, and an equal cost to society, particularly taxpayers. A good example of this situation occurred in 1987. Farmers idled 1.32 million acres

Table 18--Rice returns above cash costs, with and without direct Government payments, 1980-88 1/

Crop year	Net returns, 1982$ 2/ Without direct payments		With direct payments		Direct payments as a share of-- Farm value	Net returns
	$/cwt	$/acre	$/cwt	$/acre	- - Percent - -	
1980	5.91	255.8	5.93	256.5	0.1	0.3
1981	1.71	81.7	1.84	87.8	1.3	7.0
1982	.30	14.0	2.04	95.0	21.4	85.3
1983	1.03	47.0	7.00	318.6	70.5	85.2
1984	.95	46.6	3.49	171.3	34.0	72.8
1985	1.95	104.5	5.07	272.5	38.9	61.7
1986	.91	51.3	4.17	233.8	54.6	78.1
1987	1.99	109.3	5.56	305.8	52.5	64.3
1988	1.00	54.4	3.90	212.4	50.1	74.4
Average 1986-88	1.30	71.6	4.54	250.7	52.4	72.3

1/ See table 16 for explanation of net returns.
2/ Net returns are deflated, where 1982 = 1.0.
Sources: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service and Costs of Production for Major U.S. Crops, 1975-87, U.S. Dept. Agr., Economic Research Service, May 1989.

in the acreage reduction program in order to be eligible for program benefits. Had those acres been in production, farmers would have harvested another 75-80 million cwt of rice. Valued at the prevailing loan rate, farmers would have received $523 million in additional gross revenue from production on the idled acres. Subtracting variable cash expense estimated at $254 per acre for 1.32 million acres, farmers could have realized a net revenue of $188 million on the idled acres. But Government deficiency payments for rice produced under the 1987 program totaled $545 million. Thus, producers received a gain of $357 million for participating in the rice program. Even if farmers expected a higher price at the time of sign-up for the program, they received added benefits from participation.

Farm program payments are based on an established payment rate per unit of commodity. Participants with higher output receive larger payments. Thus, farms with high yields per harvested acre or large farms are likely to receive the largest share of program payments, no matter what the price received for their crop or cost structure. As table 19 shows, less than 10 percent of producers had farms of more than 1,000 acres, yet they received 28 percent of the deficiency payments made in 1982. However, payment limitations affect large farms more than small farms.

Table 19--Percentage distribution of 1982/83 rice deficiency payments, by size of farm

Total cropland acres	Percent of: Participating acreage		Participating producers		Deficiency payments	
	Cumulative percent					
1-99	5.83	5.83	44.48	44.48	6.75	6.75
100-259	10.21	16.04	18.75	63.23	14.03	20.78
260-499	16.86	32.90	14.92	78.15	21.85	42.63
500-999	25.44	58.34	12.80	90.95	29.47	72.10
1,000-1,499	14.03	72.37	4.49	95.44	13.43	85.53
1,500-1,999	8.64	81.01	2.11	97.55	6.56	92.09
2,000-2,499	5.45	86.46	1.04	98.59	3.30	95.39
2,500 & over	13.54	100.00	1.42	100.00	4.62	100.00

Source: U.S. Senate Committee on the Budget. 1982 Farm Program Benefits: Participants Reap What They Sow, 1985.

Taxpayers

Rice program and related expenditures are, like other Government expenditures, an income transfer from taxpayers to the rice industry. In 1961, net price support and related expenditures for the rice program totaled $29.5 million, but expenditures for PL 480 contributed an additional $110 million to that. Expenditures for the rice program totaled $2.11 per taxpayer in 1961. In 1983, per-taxpayer rice program expenditures were $7.88. Not only did taxpayer expenditures nearly quadruple over 23 years, but the taxpayer base increased 53 percent. Between 1961 and 1987, average annual expenditures for the rice program were $176 million, excluding expenditures for PL 480. When PL 480 expenditures are included, the annual average over 27 years increases to $334 million. Total related expenditures for the rice program since 1961 have been $9.01 billion. And, $4.26 billion of these were for Government-assisted exports of rice.

Consumers

Domestic U.S. demand for rice is influenced more by tastes, preferences, geographic location, and cultural factors than by price. Thus, if the rice program alters the farm price of rice, domestic consumption is unlikely to change correspondingly. Retail prices for rice currently average $0.40-$0.50 per pound while farm prices for paddy (at loan) are $0.06-$0.07 per pound. Thus, farm prices for rice account for roughly 15 percent of the retail price paid by consumers, much higher than for other grains such as wheat. The higher farm share of rice price is explained by the large domestic consumption of rice as a whole grain. Wheat is consumed in processed forms, adding to the value of the final product (and hence, the price paid by consumers) and thus diminishing the farm share.

Statistical analysis indicates a very small response in food demand for rice based on changes in retail prices: about a 0.07-percent change in demand for a 1-percent change in the retail price. Thus, based on the above relationship between farm and retail prices, a 4-percent increase in farm prices would increase retail prices by perhaps 4 percent, but consumption might decline by only 1 percent. For consumers to decrease their consumption of rice by 10 percent, retail prices would have to nearly triple, reflecting a 36-percent increase in farm prices.

The effect of deficiency payments on consumer prices is less than certain. Although deficiency payments are a taxpayer burden, in essence consumers pay higher than market price for rice through tax liabilities. Without deficiency payments, farm prices may have to be raised to maintain supplies and consumer prices would therefore increase. However, when deficiency payments are tied to compliance with acreage reduction provisions, consumers lose most of the benefits of larger supplies and lower farm prices that might have occurred with a larger supply of rice if no acreage reduction had been required.

Consumer prices are also affected when the loan rate prevents farm prices from falling. When the world market price is below the U.S. market price or loan rate, then U.S. consumers pay more for rice than foreign consumers who can purchase rice for less elsewhere. However, under the marketing loan, the world price can be paid for domestic supplies and some of this price depressing effect is passed on to consumers, especially institutional and bulk buyers.

Domestic consumers are also affected by Government expenditures for exports of rice. When the Government disposes of rice through export programs (or removes rice from the market under a loan program), free stocks are reduced, supplies decline, and farm prices (hence, 15 percent of the retail price) for rice are supported above market-clearing levels.

The U.S. rice program has added inefficiency and higher cost to production. Smaller acreage, reduced farm size due to payment limitations, and support of inefficient producers have all raised average cost of production. However, although consumers pay the cost of subsidizing the rice industry during periods of weak prices, they can benefit from stable supplies and expansion of the industry due to technology and Government support.

Consumers (both domestic and foreign) and processors are the primary beneficiaries from the rice marketing loan. An ERS study shows that the program reduced the rough rice farm prices from $7.00 per cwt level without a marketing loan to $3.80 in 1986/87 (Lin, 1988). To the extent that this price drop might have been passed on, consumers stood to gain $224 million from the marketing loan.

Resources

Sustained, sizable Government program expenditures aimed at supporting or enhancing income often translate into rigid resource constraints. That is, dampening price signals through the use of price and income support can slow or prevent the resource adjustments that would take place in an unencumbered market free of supports. Those resource adjustments may be undesirable if the price signals are short term, largely disruptive in nature. But over the long run, muted price signals generally only prolong adjustments at taxpayers' cost. Inefficient use of resources occurs: marginal land is kept in production, average

costs rise, and barriers to entry and exit are erected. Overcapacity, stock accumulation, and low prices result, which increase the need for support.

Since rice production is relatively capital-intensive, resources would tend to be more fixed than for other crops even with absence of support programs. Irrigation systems, land leveling, the construction of levees in and around fields, and harvesting equipment are costly items with few alternative uses. This may explain the traditionally high program participation rates of rice producers. The sector's high, capital-intensive cost structure implies that price protection is needed during periods of weak demand. Producers, in effect, can find themselves locked-in to programs and continue to expand acreage and production despite the signal that demand has fallen. That signal is muted when the deficiency payment rate is equivalent to a third of the season average price for rice. Thus, as much as 5 to 10 percent more of the sector's resources are probably devoted to rice production than would be without a rice program.

Exports

When the loan rate is set high enough to become a price floor, U.S. competitors benefit. They increase production and export the surplus, or they undercut U.S. prices and increase market share, or both. The United States has lost a good portion of its market share to Thailand since 1980 due largely to this phenomenon. Thailand has abandoned many of its previous controls on exports and production has increased. Thailand's rice is comparable in quality to U.S. rice. This was not always the case. But the price gap between Thai and U.S. rice, once justified on quality differences, grew significantly in the early 1980's. And the effect on U.S. exports became very evident.

The implementation of the marketing loan, however, enhanced U.S. competitiveness in world rice markets by breaking the link between the loan rate and U.S. export price. The marketing loan program made more U.S. rice available for export and narrowed export price differentials between the United States and other exporters. As a result of the marketing loan, the export price differential between the United States and Thailand declined drastically from as high as $260 per metric ton in early 1985 between U.S. number 2 milled rice (4 percent broken) and Thailand 100 percent grade B rice to less than $105 by late April 1986, and below $53 by August 1986. However, as the world rice price approached the U.S. loan rate in late 1988, the marketing loan was not needed.

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Glossary

Acreage allotment -- An individual farm's share of the national acreage that the Secretary of Agriculture determines is needed to produce sufficient supplies of a particular crop. The farm's share is based on its previous production.

Acreage reduction program (ARP) -- A voluntary land retirement system in which participating farmers idle a prescribed portion of their crop acreage base of wheat, feed grains, cotton, or rice. The base is the average of the acreage planted for harvest and considered to be planted for harvest. Acreage considered to be planted includes any acreage not planted because of acreage reduction and diversion programs during a period specified by law. Farmers are not given a direct payment for ARP participation, although they must participate to be eligible for benefits such as Commodity Credit Corporation loans and deficiency payments. Participating producers are sometimes offered the option of idling additional land under a paid land diversion program, which gives them a specific payment for each idled acre.

Acreage slippage -- A measure of the effectiveness of acreage reduction programs. Slippage occurs when harvested acres change by less than the change in idled acres.

Advance deficiency payments -- The Secretary is required to make advance deficiency payments to producers of crops when an acreage limitation program is in effect and deficiency payments are expected to be paid. Advance deficiency payments can range from 30 to 50 percent of expected payments.

Advance recourse loans -- Price-support loans made early in a marketing year to enable farmers to hold their crops for later sale. Farmers must repay the recourse loan with interest and reclaim the crops used as collateral.

Basic commodities -- Six crops (corn, cotton, peanuts, rice, tobacco, and wheat) declared by legislation as price-supported commodities.

Blended credit -- A form of export subsidy which combines direct government export credit and credit guarantees to reduce the effective interest rate.

Carryover -- Existing supplies of a farm commodity at the beginning of a new harvest.

Cereals -- Generic name for certain grasses that produce edible seeds; includes wheat, oats, barley, rye, rice, millet, corn, and sorghum grain.

Coarse grains -- Includes corn, barley, oats, grain sorghum, and rye. Millet is also included in the statistics of some foreign nations.

Commodity Credit Corporation (CCC) -- A federally owned and operated corporation within the U.S. Department of Agriculture created to stabilize, support, and protect farm income and prices through loans, purchases, payments, and other operations. All money transactions for agricultural price and income support and related programs are handled through the CCC; the CCC also helps maintain balanced, adequate supplies of agricultural commodities and helps in their orderly distribution.

Common Agricultural Policy (CAP) -- A set of regulations by which member states of the European Community (EC) seek to merge their individual agricultural programs into a unified effort to promote regional agricultural development and achieve other goals. The variable levy and export subsidies are the two main elements of the CAP.

Concessional sales -- Credit sales of a commodity in which the buyer is allowed more favorable payment terms than those on the open market (such as low-interest, long-term credit).

Cost of production -- An amount, measured in dollars, of all purchased inputs, allowances for management, and rent, that is necessary to produce farm products.

Crop acreage base -- A farm's average acreage of wheat, feed grains, cotton, or rice planted for harvest, plus land not planted because of acreage reduction or diversion programs during a period specified by law. Crop acreage bases are permanently reduced by the portion of land placed in the conservation reserve program.

Crop year -- The year in which a crop is planted; used interchangeably with marketing year.

Cross compliance (full or strict) -- A requirement that a farmer participating in a program for one crop must also meet the program provisions for other major program crops which the farmer grows. Strict cross-compliance provisions have not been enforced since the 1960's.

Cross compliance (limited) -- A producer participating in one commodity program must not plant in excess of the crop acreage base on that farm for any of the other program commodities for which an acreage reduction program is in effect. Limited cross-compliance authority was implemented in the late 1970's and remains in effect under the Food Security Act of 1985.

Decoupling -- A farm policy concept which, by separating farm program payments from the amount of production, would represent an alternative to current policies. Farmers would make planting decisions based on market prices but receive income-support payments independent of production and marketing decisions.

Deficiency payment -- A Government payment made to farmers who participate in wheat, feed grain, rice, or cotton programs. The payment rate is per bushel, pound, or hundredweight, based on the difference between the price level established by law (target price) and the higher of the market price during a period specified by law or the price per unit at which the Government will provide loans to farmers to enable them to hold their crops for later sale (loan rate). The payment is equal to the payment rate multiplied by the acreage planted for harvest and then by the program yield established for the particular farm.

Developing countries -- Countries whose economies are mostly dependent on agriculture and primary resources and do not have a strong industrial base.

Direct payments -- Payments in the form of cash or commodity certificates made directly to producers for such purposes as deficiency payments, annual land diversion, or conservation reserve payments.

Disaster payments -- Federal aid provided to farmers for feed grain, wheat, rice, and upland cotton who have crop insurance (when available), when either planting is prevented or crop yields are abnormally low because of adverse weather and related conditions. Payments also may be made under special legislation enacted after an extensive natural disaster.

European Community (EC) -- Established by the Treaty of Rome in 1957, also known as the European Economic Community and the Common Market. Originally composed of six European nations, it has expanded to 12. The EC attempts to unify and integrate member economies by establishing a customs union and common economic policies, including the Common Agricultural Policy (CAP).

Export Credit Guarantee Program (GSM-102) -- The largest U.S. agricultural export promotion program, functioning since 1982; guarantees repayment of private, short-term credit for up to 3 years.

Export enhancement program (EEP) -- Begun in May 1985 under a Commodity Credit Corporation charter to help U.S. exporters meet competitors' prices in subsidized markets. Under the EEP, exporters are awarded bonus certificates which are redeemable for CCC-owned commodities, enabling them to sell certain commodities to specified countries at prices below those of the U.S. market.

Export subsidies -- Special incentives, such as cash payments, tax exemptions, preferential exchange rates, and special contracts, extended by governments to encourage increased foreign sales; often used when a nation's domestic price for a good is artificially raised above world market prices.

Farm acreage base -- The annual total of the crop acreage bases (wheat, feed grains, upland cotton, and rice) on a farm, the average acreage planted to soybeans, peanuts, and other approved nonprogram crops, and the average acreage devoted to conserving uses. Conserving uses include all uses of cropland except crop acreage bases, acreage devoted to nonprogram crops, acreage enrolled in annual acreage reduction or limitation programs, and acreage in the conservation reserve program.

Farm value -- A measure of the return or payment received by farmers calculated by multiplying farm prices by the quantities of farm products equivalent to food sold at retail.

Food grains -- Cereal seeds used for human food, chiefly wheat and rice.

Food Security Act of 1985 (PL 99-198) -- The omnibus food and agriculture legislation signed into law on December 23, 1985, that provides a 5-year framework for the Secretary of Agriculture to administer various agricultural and food programs.

Free market -- The reliance on the market forces of supply and demand to determine prices and allocate available supplies.

Free trade -- Exchange of goods between countries with no trade barriers or restrictions such as tariffs or import quotas.

General Agreement on Tariffs and Trade (GATT) -- An agreement originally negotiated in Geneva, Switzerland, in 1947 among 23 countries, including the United States, to increase international trade by reducing tariffs and other trade barriers. The agreement provides a code of conduct for international commerce and a framework for periodic multilateral negotiations on trade liberalization and expansion.

Generic commodity certificates -- Negotiable certificates, which do not specify a certain commodity, that are issued by USDA in lieu of cash payments to commodity program participants and sellers of agricultural products. The certificates, frequently referred to as payment-in-kind (PIK) certificates, can be used to acquire stocks held as collateral on Government loans or owned by the Commodity Credit Corporation.

Gramm-Rudman-Hollings Deficit Reduction Act -- Common name for The Balanced Budget and Emergency Deficit Control Act of 1985 (PL 99-177). The law mandates annual reductions in the Federal budget deficit to eliminate it by 1991. If Congress and the President cannot agree on a targeted budget package for any specific fiscal year, automatic cuts occur for almost all Federal programs.

Gross farm income -- Income which farm operators realize from farming; includes cash receipts from the sale of farm products, Government payments, value of food and fuel produced and consumed on farms where grown, and other items.

Harvested acres -- Acres actually harvested for a particular crop. Usually somewhat smaller at the national level than planted acres because of abandonment due to weather damage or other disasters or market prices too low to cover harvesting costs.

Import barriers -- Quotas, tariffs, embargoes, and restrictive licensing used by a country to restrict the quantity or value of a good that may enter that country.

Import quota -- The maximum quantity or value of a commodity allowed to enter a country during a specified time period.

Intermediate Export Credit Guarantee Program (GSM-103) -- Established by the Food Security Act of 1985, this program complements GSM (General Sales Manager)-102 but guarantees repayment of private credit for 3-10 years.

International commodity agreements -- Agreements by a group of countries that contain substantive economic provisions aimed at stabilizing world trade, supplies, and prices, such as quotas, buffer stocks, and so forth.

International trade barriers -- Regulations imposed by governments to restrict imports from, and exports to, other countries, including tariffs, embargoes, and import quotas.

Inventory (CCC) -- The quantity of a commodity owned by the Commodity Credit Corporation (CCC) at any specified time.

Inventory reduction program -- Introduced in the Food Security Act of 1985, these discretionary programs provide producers with payments-in-kind (PIK) if they reduce acreage by half the required reduction and agree to forego loans and

deficiency payments. Inventory reduction programs have not been implemented to date.

Loan deficiency payments -- A provision of the Food Security Act of 1985 giving the Secretary of Agriculture the discretion to provide producers who, although eligible to obtain loans, agree not to obtain loans for 1986-90 crops of wheat, feed grains, upland cotton, and rice. This program has not been implemented to date.

Loan rate -- The price per unit (bushel, bale, or pound) at which the Government will provide loans to farmers to enable them to hold their crops for later sale.

Marketing certificate -- A certificate which may be redeemed for a specified amount of Commodity Credit Corporation commodities. Such certificates may be generic or for a specific commodity.

Marketing loan program -- A program authorized by the Food Security Act of 1985 that allows producers to repay nonrecourse price support loans at less than the announced loan rates whenever the world price for the commodity is less than the loan rate. Under the act, the programs are mandatory for upland cotton and rice, and discretionary for wheat, feed grains, and soybeans. To date, the discretionary programs have not been implemented.

Marketing quota -- Marketing quotas are used to regulate the marketing of some commodities when supplies are excessive. When marketing quotas are in effect, growers who produce more of a commodity than their farm acreage allotments should yield are subject to marketing penalties on the "excess" production and are ineligible for Government price-support loans.

Marketing year -- Generally, the period from the beginning of a new harvest through marketing the following year.

Multilateral trade negotiations -- Discussions of trade issues involving three or more countries.

National farm program acreage -- The number of harvested acres of feed grains, wheat, upland cotton, and rice needed nationally to meet domestic and export use and to accomplish any desired increase or decrease in carryover levels.

Net cash-flow -- A financial indicator that measures cash available to farm operators and landlords in a given year; indicates the ability to meet current obligations and provide for family living expenses, and to undertake investments.
Net cash income -- An income measure based on actual receipts and expenses in a given year, regardless of the year in which the marketed output was produced; indicates the availability of funds to cover cash operating costs, finance capital investment and savings, service debts, maintain living standards, and pay taxes.

Net farm income -- Measures the profit or loss associated with a given year's production; approximates the net value of agricultural production regardless of whether the commodities were sold, fed, or placed in inventory during the year.

Nonfarm income -- Includes all income from nonfarm sources (excluding money earned from working for other farmers) received by owner-operator families residing on a farm and by hired farm labor residing on a farm.

Nonprogram crop -- Crops, such as potatoes, vegetables, fruits, and hay that are not included in Federal price support programs.

Nonrecourse loans -- The major price support instrument used by the Commodity Credit Corporation (CCC) to support the price of wheat, rice, feed grains, cotton, peanuts, and tobacco. Farmers who agree to comply with all commodity program provisions may pledge a quantity of a commodity as collateral and obtain a loan from the CCC. The borrower may elect either to repay the loan with interest within a specified period and regain control of the collateral commodity or default on the loan. In case of a default, the borrower forfeits without penalty the collateral commodity to the CCC.

Nontariff trade barriers -- Regulations used by governments to restrict imports from, and exports to, other countries, including embargoes and import quotas.

Normal crop acreage -- The acreage on a farm normally devoted to a group of designated crops. When a set-aside program is in effect, the total of the planted acreage of the designated crops and the set-aside acreage cannot exceed the normal crop acreage. Producers must comply to be eligible for commodity loan programs or deficiency payments.

Normal yield -- A term designating the average historical yield established for a particular farm or area.

Offsetting compliance -- Requires that a producer participating in a diversion or acreage reduction program must not offset that reduction by planting more than the acreage base for that crop on another farm under the same management control.

Paid land diversion -- If the Secretary of Agriculture determines that planted acres for a program crop should be reduced, producers may be offered a paid voluntary land diversion. Farmers are given a specific payment per acre to idle a percentage of their crop acreage base. The idled acreage is in addition to an acreage reduction program.

Parity price -- Originally defined as the price which gives a unit of a commodity the same purchasing power today as it had in the 1910-14 base period. In 1948, the base prices used in the calculation were made dependent on the most recent 10-year average price for commodities.

Parity ratio -- A measure of the relative purchasing power of farm products; the ratio between the index of prices received by farmers for all farm products and the index of prices paid by farmers for commodities and services used in farm production and family living.

Payment-in-kind (PIK) -- A payment made to eligible producers in the form of an equivalent amount of commodities owned by the Commodity Credit Corporation.

Payment limitation -- The maximum amount of commodity program benefits a person can receive. A $50,000 per person payment limitation was established in 1981 and applies to direct subsidy payments to wheat, feed grain, cotton, and rice producers. The law was amended in 1987 for the 1987 through 1990 crops to place a $250,000 limit on total program payments.

Permanent legislation -- Legislation that would be in force in the absence of all temporary amendments and temporarily suspended provisions. The Agricultural Adjustment Act of 1938 and the Agricultural Act of 1949 serve as the principal laws authorizing the major commodity programs.

Permitted acreage -- The maximum acreage of a crop which may be planted for harvest. The permitted acreage is computed by multiplying the crop acreage base by the acreage reduction program requirement (announced by the Commodity Credit Corporation each year) minus the diversion acreage (if applicable). For example, if a farm has a crop acreage base of 100 acres and a 10-percent acreage reduction (ARP) is required, the permitted acreage is 90 acres.

PIK and roll -- A procedure by which producers attempt to profit from situations where certificate exchange values (posted county prices) are below nonrecourse loan rates. With this procedure, a producer places the eligible commodity under nonrecourse loan at the loan rate, and uses generic certificates to exchange the commodity out from under loan. If the posted county price is below the nonrecourse loan rate, then the producer is able to acquire the quantity placed under loan for less than the proceeds of the nonrecourse loan, in addition to saving interest and storage charges.

Price-support programs -- Government programs that aim to keep farm prices received by participating producers from falling below specific minimum prices.

Prices-paid index -- An indicator of changes in the prices farmers pay for goods and services (including interest, taxes, and farm wage rates) used for producing farm products and those needed for farm family living.

Prices-received index -- A measure computed on the basis of prices farmers received for their products at the point of the first sale.

Producer -- A person who, as owner, landlord, tenant, or sharecropper, is entitled to a share of the crops available for marketing from the farm or a share of the proceeds from the sale of those commodities.

Production expenses -- Total cash outlays for production. Capital expenses are figured on annual depreciation rather than on yearly cash outlays for capital items.

Production controls -- Any Government program or policy intended to limit production. These have included acreage allotments, acreage reduction, set aside, and diverted acreage.

Program costs -- No single definition is applicable to all uses. Program costs may be (1) gross or net CCC expenditures on a commodity or all commodities during a fiscal year or other period; (2) the realized loss on disposition of a commodity, plus other related net costs during a fiscal year or other period; or (3) the net costs attributed to a particular year's crop of a commodity during the marketing year for that commodity.

Program crops -- Federal support programs are available to producers of wheat, corn, barley, grain sorghum, oats, rye, extra long staple and upland cotton, rice, soybeans, tobacco, peanuts, and sugar.

Program yield -- The farm commodity yield of record determined by averaging the yield for the 1981-85 crops, dropping the high and low years. Program yields are constant for the 1986-90 crops. The farm program yield applied to eligible acreage determines the level of production eligible for direct payments to producers.

Protectionism -- A tariff or quota, for example, imposed by a country in response to foreign competition in order to protect domestic producers.

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

Section 32 -- A section of the Agricultural Act of 1935 (PL 320) which authorizes use of customs receipts funds to encourage increased consumption of agricultural commodities by means of purchase, export, and diversion programs.

Section 301 -- A provision of the U.S. Trade Act of 1974 that allows the President to take appropriate action to get a foreign government to remove any act, policy, or practice that violates an international agreement or that is unjustified, unreasonable, or discriminatory, and which burdens or restricts U.S. commerce.

Section 416 -- A section of the Agricultural Act of 1949 that permits donations of agricultural products through public and private nonprofit humanitarian organizations, foreign governments, and international organizations.

Set aside -- A voluntary program to limit production by restricting the use of land. When offered, producers must participate to be eligible for Federal loans, purchases, and other payments.

Subsidy -- A direct or indirect benefit granted by a government for the production or distribution of a good.

Supply control -- The policy of changing the amount of acreage permitted to be planted to a commodity or the quantity of a commodity allowed to be sold by a program participant; used to maintain a desired carryover or price level.

Target price -- A price level established by law for wheat, feed grains, rice, and cotton. Farmers participating in the Federal commodity programs receive the difference between the target price and the higher of the market price during a period prescribed by law or the unit price at which the Government will provide loans to farmers to enable them to hold their crops for later sale (the loan rate).

Targeted export assistance program (TEA) -- Authorized by the Food Security Act of 1985, the program assists U.S. producer groups or regional organizations whose exports have been adversely affected by a foreign government's policies. TEA promotes exports of a specific American commodity in specified markets. Eligible participants receive generic certificates in payment for promotional activities.

Tariffs -- Taxes imposed on commodity imports by a government; may be either a fixed charge per unit of product imported (specific tariff) or a fixed percentage of value (ad valorem tariff).

Trade barriers -- Regulations used by governments to restrict imports from, and exports to, other countries including tariffs, embargoes, and import quotas.

Variable levies -- The difference between the price of a foreign product at the port and the official price at which competitive imports can be sold; levies are effectively a variable tax on imports or a variable subsidy to exports.

World price -- Often refers to the cost, insurance, and freight (c.i.f.) price of a commodity at the principal port of a major importing country or area.

0/92 -- An optional acreage diversion program that allows wheat and feed grain producers to devote all or a portion of their permitted acreage to conserving uses and receive deficiency payments on the acreage. The program will make deficiency payments for a maximum of 92 percent of a farm's permitted acreage.

50/92 -- Allows cotton and rice growers who plant at least 50 percent of their permitted acreage to receive 92 percent of their deficiency payments under certain conditions. The Farm Disaster Assistance Act of 1987 also authorized 50/92 for wheat, feed grain, cotton, and rice producers who were affected by a natural disaster in 1987 and met certain criteria stated in the law.

Appendix table 1--U.S. rice acreage, yield, and production, 1958-88

Crop year 1/	Planted	Harvested	Reduced	Yield	Production
	- - - - - 1,000 acres	- - - - -		Pounds	1,000 cwt
1958	1,440	1,415	---	3,164	44,760
1959	1,608	1,586	---	3,382	53,647
1960	1,614	1,595	---	3,423	54,591
1961	1,618	1,589	---	3,411	54,198
1962	1,796	1,773	---	3,726	66,045
1963	1,785	1,771	---	3,968	70,269
1964	1,797	1,786	---	4,098	73,166
1965	1,804	1,793	---	4,255	76,281
1966	1,980	1,967	---	4,326	85,020
1967	1,982	1,970	---	4,538	89,379
1968	2,367	2,353	---	4,424	104,075
1969	2,141	2,128	---	4,272	90,838
1970	1,826	1,815	---	4,617	83,754
1971	1,826	1,818	---	4,719	85,768
1972	1,824	1,818	---	4,697	85,439
1973	2,181	2,170	---	4,276	92,765
1974	2,550	2,531	---	4,440	112,394
1975	2,833	2,818	---	4,558	128,437
1976	2,489	2,480	---	4,663	115,648
1977	2,261	2,249	---	4,412	99,223
1978	2,993	2,970	---	4,484	133,170
1979	2,890	2,869	---	4,599	131,947
1980	3,380	3,312	---	4,413	146,150
1981	3,827	3,792	---	4,819	182,742
1982	3,295	3,262	422	4,710	153,588
1983	2,190	2,169	1,739	4,598	99,720
1984	2,830	2,802	785	4,954	138,810
1985	2,512	2,492	1,241	5,414	134,913
1986	2,381	2,360	1,479	5,651	133,356
1987	2,360	2,333	1,566	5,555	129,598
1988 2/	2,928	2,895	1,088	5,511	159,543

--- = Not applicable.
1/ The crop year for rice begins on August 1 and extends through July 31.
2/ Projected.
Source: U.S. Dept. of Agr., National Agricultural Statistics Service.

Appendix table 2--U.S. and State average rice yields per harvested acre, 1953-88

Crop year	United States	Arkansas	Louisiana	Mississippi	Texas	California
			Pounds			
1953	2,447	2,300	2,075	2,550	2,625	2,900
1954	2,517	2,500	2,350	2,625	2,675	2,550
1955	3,061	3,125	2,800	2,850	3,050	3,450
1956	3,151	3,200	2,700	2,850	2,900	4,200
1957	3,204	3,100	2,675	3,200	3,200	4,300
1958	3,164	2,950	2,650	2,800	3,100	4,450
1959	3,382	3,400	2,850	2,700	3,150	4,650
1960	3,423	3,525	2,850	2,950	3,075	4,775
1961	3,411	3,500	2,925	3,300	2,900	4,800
1962	3,726	3,850	3,050	3,200	3,550	4,950
1963	3,968	4,300	3,325	3,900	4,125	4,325
1964	4,098	4,300	4,300	3,800	4,150	5,050
1965	4,255	4,300	3,550	3,700	4,600	4,900
1966	4,326	4,300	3,700	4,300	4,200	5,500
1967	4,538	4,550	3,900	4,300	5,000	4,900
1968	4,424	4,350	3,900	4,300	4,600	5,325
1969	4,272	3,950	3,400	4,200	3,950	5,525
1970	4,617	4,900	3,900	4,400	4,450	5,700
1971	4,719	5,050	3,800	4,600	5,100	5,200
1972	4,697	4,975	3,825	4,559	4,727	5,614
1973	4,276	4,770	3,451	4,306	3,740	5,616
1974	4,440	4,535	3,650	4,180	4,494	5,380
1975	4,558	4,770	3,810	3,900	4,560	5,750
1976	4,663	4,230	3,910	4,200	4,810	5,520
1977	4,412	4,230	3,670	4,000	4,670	5,810
1978	4,484	4,450	3,820	4,250	4,700	5,220
1979	4,599	4,320	3,910	4,050	4,220	6,520
1980	4,413	4,110	3,550	3,840	4,230	6,440
1981	4,819	4,520	4,060	4,390	4,700	6,900
1982	4,710	4,290	4,160	4,120	4,690	6,700
1983	4,598	4,280	3,820	4,000	4,340	7,040
1984	4,954	4,600	4,150	4,350	4,940	7,120
1985	5,414	5,200	4,370	5,350	5,490	7,300
1986	5,651	5,300	4,550	5,400	6,250	7,700
1987	5,555	5,250	4,550	5,100	5,900	7,550
1988 1/	5,511	5,350	4,500	5,300	6,000	7,000

1/ Projected.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

Appendix table 3--Proportional distribution of rice production, by type of grain, United States, 1953-88

Crop year	Long grain	Medium grain	Short grain	Total production
	- - - - - - - Percent - - - - - - -			1,000 cwt
1953	43.5	33.0	23.5	52,834
1954	45.5	35.6	18.9	64,193
1955	50.4	27.7	21.9	55,902
1956	57.1	20.5	23.1	49,459
1957	56.4	20.5	23.1	42,935
1958	55.7	21.2	23.1	44,760
1959	50.5	29.1	20.4	53,647
1960	48.2	35.2	16.6	54,591
1961	45.3	38.4	16.3	54,198
1962	43.7	41.8	14.5	66,045
1963	36.8	48.7	14.5	70,269
1964	37.5	50.2	12.3	73,166
1965	43.0	45.6	11.4	76,281
1966	41.6	46.5	11.9	85,020
1967	48.5	42.3	9.2	89,379
1968	46.8	42.1	11.1	104,075
1969	49.0	40.3	10.7	90,838
1970	49.3	40.4	10.3	83,754
1971	52.6	37.2	10.2	85,768
1972	50.2	39.7	10.1	85,439
1973	46.2	42.9	10.9	92,765
1974	49.8	41.0	9.2	112,394
1975	52.9	38.4	8.7	128,437
1976	60.6	31.8	7.6	115,648
1977	62.7	26.5	10.8	99,223
1978	63.7	27.4	8.9	133,170
1979	61.2	30.6	8.2	131,947
1980	59.4	35.2	5.4	146,150
1981	60.4	33.7	5.9	182,742
1982	60.8	33.4	5.8	153,637
1983	65.2	26.7	8.1	99,720
1984	69.2	25.4	5.4	138,810
1985	74.4	21.1	4.5	134,913
1986	72.8	24.0	3.2	133,356
1987	68.7	29.1	2.2	127,725
1988 1/	74.4	23.6	2.0	159,543

1/ Projected.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

Appendix table 4--Use and ending stocks for rice, 1953-88

Crop year	Food 1/	Seed	Brewer	Exports	Total use 2/	Ending stocks	Stocks-to-use ratio
	- - - - - - - - - - -			1,000 cwt	- - - - - - - - - -		Percent
1953	17.3	3.1	4.6	22.7	47.2	7.5	16.0
1954	18.7	2.2	5.6	14.3	45.1	26.7	59.2
1955	19.1	2.0	6.0	18.7	48.2	34.7	71.9
1956	19.2	1.7	5.1	37.5	64.5	20.0	30.9
1957	19.0	1.8	4.8	18.3	45.0	18.2	40.4
1958	18.8	2.1	4.7	19.8	47.4	15.7	33.0
1959	20.7	2.1	5.0	29.2	58.0	12.1	21.0
1960	19.9	2.1	4.9	29.5	56.9	10.1	17.7
1961	22.6	2.4	4.7	29.2	59.3	5.3	9.0
1962	21.5	2.4	4.1	35.5	63.7	7.7	12.1
1963	22.5	2.5	3.8	41.8	70.5	7.5	10.7
1964	24.3	2.5	4.3	42.5	73.5	7.7	10.4
1965	23.4	2.7	4.7	43.3	76.4	8.2	10.8
1966	24.0	2.7	5.3	51.6	84.8	8.5	10.0
1967	25.0	3.2	5.4	56.9	91.1	6.8	7.4
1968	27.0	2.9	5.8	56.1	94.7	16.2	17.1
1969	23.5	2.5	7.1	56.9	90.8	16.4	18.1
1970	25.1	2.5	6.8	46.5	83.1	18.6	22.4
1971	25.5	2.5	7.4	56.9	94.1	11.4	12.2
1972	25.1	3.0	7.7	54.0	92.3	5.1	5.6
1973	26.1	3.6	8.1	49.7	90.2	7.8	8.7
1974	28.6	4.0	8.4	69.5	113.2	7.1	6.2
1975	27.7	3.5	9.1	56.5	98.7	36.9	37.4
1976	29.2	3.2	10.3	65.6	112.1	40.5	36.1
1977	23.5	4.3	9.9	72.8	112.4	27.4	24.4
1978	33.7	4.3	11.2	75.7	129.1	31.6	24.5
1979	33.2	4.8	11.2	82.6	137.9	25.7	18.6
1980	38.4	5.1	11.0	91.4	155.6	16.5	10.6
1981	42.5	4.4	12.7	82.0	150.6	49.0	32.5
1982	37.2	3.2	13.5	68.9	131.8	71.5	54.0
1983	33.2	3.3	12.8	70.3	125.2	46.9	37.5
1984	35.8	2.8	13.9	62.1	122.6	64.7	52.8
1985	45.6	2.6	14.1	58.7	124.5	77.3	62.1
1986	53.1	2.6	14.8	84.2	161.9	51.4	31.7
1987	55.3	3.2	15.4	72.2	152.6	31.4	20.6
1988 3/	58.0	3.2	16.0	76.0	162.2	32.4	20.0

1/ Food use includes shipments to U.S. territories.
2/ Includes residual.
3/ Estimated.
Source: U.S. Dept. Agr., National Agricultural Statistics Service.

Appendix table 5--Prices and ending stocks for rice, 1953-88

Crop year	Ending stocks CCC 1/	Ending stocks Free	Ending stocks Total	Farm price	Loan rate	Target price	Direct payment
	- - - 1,000 cwt - - -			- - - - Dollars per cwt - - - -			
1953	1.2	6.3	7.5	4.93	4.84	---	---
1954	18.4	8.3	26.7	4.25	4.92	---	---
1955	27.4	7.2	34.6	5.00	4.66	---	---
1956	12.6	7.4	20.0	4.93	4.57	---	---
1957	12.0	6.2	18.2	5.16	4.72	---	---
1958	9.5	6.2	15.7	4.96	4.48	---	---
1959	6.9	5.3	12.1	4.60	4.38	---	---
1960	4.1	5.9	10.1	4.41	4.42	---	---
1961	.3	5.0	5.3	5.20	4.71	---	---
1962	1.9	5.9	7.7	5.10	4.71	---	---
1963	1.4	6.1	7.5	4.92	4.71	---	---
1964	1.0	6.6	7.7	4.87	4.71	---	---
1965	.6	7.6	8.2	4.98	4.50	---	---
1966	.2	8.3	8.5	4.80	4.50	---	---
1967	0	6.7	6.8	5.12	4.55	---	---
1968	6.3	9.9	16.2	4.90	4.60	---	---
1969	6.4	10.0	16.4	5.32	4.72	---	---
1970	9.5	9.2	18.6	5.41	4.86	---	---
1971	2.7	8.7	11.4	5.62	5.07	---	---
1972	.1	5.0	5.1	7.20	5.27	---	---
1973	0	7.8	7.8	15.30	6.07	---	---
1974	0	7.1	7.1	11.40	7.54	---	---
1975	19.2	17.1	36.9	8.35	8.52	---	---
1976	18.7	21.8	40.5	7.02	6.19	8.25	0
1977	10.8	16.6	27.4	9.49	6.19	8.25	0
1978	8.3	23.2	31.6	8.16	6.40	8.53	0.78
1979	1.7	24.0	25.7	10.50	6.79	9.05	0
1980	0	16.5	16.5	12.80	7.12	9.49	0
1981	17.5	31.5	49.0	9.05	8.01	10.68	.28
1982	22.3	49.2	71.5	7.91	8.14	10.85	2.71
1983	25.0	21.9	46.9	8.57	8.14	11.40	2.77
1984	44.3	20.4	64.7	8.04	8.00	11.90	3.76
1985	43.6	33.7	77.3	6.53	8.00	11.90	3.90
1986	8.7	42.7	51.4	3.75	7.20	11.90	4.70
1987	.1	31.3	31.4	7.27	6.84	11.66	4.82
1988 2/	0	32.4	32.4	6.75	6.63	11.15	4.31

--- = Not applicable.
1/ Commodity Credit Corporation.
2/ Estimated.
Sources: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service.

Appendix table 6--Farm-related program costs for rice, 1961-88

Fiscal year	Direct income payments and price support	Disaster	Commodity export payments	Loan operations: Outlays	Loan operations: Repayments	Miscellaneous outlays and receipts	Net price support and related outlays 1/	PL 480 outlays	Total
				Million dollars					
1961	---	---	18.6	67.0	26.7	-29.4	29.5	109.8	139.3
1962	---	---	30.1	42.3	21.8	-22.9	27.7	88.8	116.5
1963	---	---	24.1	39.8	20.5	-.7	44.1	123.4	167.5
1964	---	---	38.8	43.3	25.9	-3.8	52.4	116.7	169.1
1965	---	---	38.3	51.2	34.7	-39.8	49.7	95.2	144.9
1966	---	---	42.4	61.6	47.4	-5.0	51.6	112.0	163.6
1967	---	---	22.0	79.9	69.7	-2.7	29.5	140.2	169.8
1968	---	---	1.9	90.0	80.6	-.1	11.2	133.8	145.0
1969	---	---	3.2	128.4	85.6	-.2	45.8	170.9	216.7
1970	---	---	13.7	132.5	107.2	-.4	38.6	167.6	206.2
1971	---	---	17.8	110.0	90.7	4.5	41.6	167.8	209.4
1972	---	---	24.8	190.3	159.4	-50.3	5.4	214.5	219.9
1973	---	---	21.8	138.3	127.2	-11.3	21.6	244.4	266.0
1974	---	---	3/	136.8	122.0	-.1	14.7	317.3	332.0
1975	---	---	---	75.6	73.0	-2.6	3/	285.3	285.3
1976 2/	---	3/	---	225.9	35.7	15.5	205.7	242.2	447.9
1977	128.3	0.7	---	156.6	146.0	5.0	144.6	164.2	308.8
1978	.1	3.7	---	127.6	122.2	-75.3	-66.1	148.8	82.7
1979	58.0	.7	---	177.0	171.6	-14.4	49.5	136.0	185.5
1980	0	1.4	---	169.4	180.0	-66.6	-75.8	193.7	117.9
1981	0	2.4	---	253.3	174.6	-57.1	24.0	168.9	192.9
1982	21.5	.1	---	360.3	210.1	-8.3	163.5	116.5	280.0
1983	397.1	12.0	---	538.6	302.8	19.5	664.4	130.0	794.4
1984	102.9	10.9	---	563.3	325.9	18.3	332.9	128.9	461.8
1985	571.9	78.1	---	546.0	204.7	-1.7	989.6	172.0	1,161.5
1986	324.1	13.7	---	806.6	449.0	251.6	947.0	85.7	1,032.7
1987	375.7	-.3	---	961.0	834.0	403.5	905.9	84.0	989.9
1988 4/	57.9	3/	---	803.8	848.5	175.8	189.0	48.7	237.7

--- = Not applicable.

1 / Direct price support or deficiency, disaster, and export payments plus Government expenditures for storage and handling, transportation, processing, and packaging, loan collateral settlements, loan purchases, and other expenses less sales proceeds, loan repayments, and other receipts. A negative sign indicates net receipts.

2/ Includes July-September 1976 to allow for shift from July/June to October/September fiscal year.

3/ Less than $50,000.

4/ Estimated.

Source: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service.

Appendix table 7--Value comparisons for rice, 1953-88

Crop year	Loan value per acre		Market value per acre		Gross value of production	
	Nominal 1/	Real 2/	Nominal 1/	Real 2/	Nominal 1/	Real 2/
	Dollars				Million dollars	
1953	118	456	127	490	274	1,058
1954	124	471	115	437	294	1,118
1955	143	526	147	540	269	989
1956	144	512	153	544	240	854
1957	151	519	164	564	220	756
1958	140	471	148	498	209	704
1959	148	487	155	510	246	809
1960	153	495	156	505	248	803
1961	161	516	175	561	279	894
1962	175	549	188	589	333	1,044
1963	187	577	199	614	352	1,086
1964	193	587	201	611	359	1,091
1965	191	565	210	621	376	1,112
1966	194	555	214	611	421	1,203
1967	206	574	225	627	444	1,237
1968	203	538	221	586	521	1,382
1969	201	505	211	530	447	1,123
1970	224	533	239	569	433	1,031
1971	235	529	248	559	458	1,032
1972	248	533	316	680	575	1,237
1973	259	523	290	586	1,280	2,586
1974	334	619	496	919	1,261	2,335
1975	388	654	381	642	1,072	1,808
1976	289	458	327	518	811	1,285
1977	273	406	419	623	941	1,398
1978	287	398	366	507	1,087	1,506
1979	312	398	483	615	1,384	1,761
1980	314	366	565	659	1,873	2,186
1981	386	411	436	464	1,654	1,760
1982	383	383	373	373	1,246	1,246
1983	374	360	394	379	876	843
1984	394	368	398	370	1,119	1,039
1985	433	390	354	319	881	794
1986	407	357	212	186	500	439
1987	380	323	404	343	942	800
1988 3/	365	294	372	300	1,037	869

1/ Loan rate or average farm price times yield per harvested acre.
2/ Gross national product implicit price deflator, 1982 = 1.0, was used.
3/ Estimated.
Source: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service.

Appendix table 8--World milled rice production, consumption, exports, and ending stocks, 1960-89

Crop year 1/	Production	Total use	Exports 2/	Ending stocks	Stocks-to-use ratio
	- - - 1,000 metric tons - - -			- - Percent - -	
1960/61	159.8	159.2	6.3	7.5	4.7
1961/62	147.3	149.2	6.3	8.5	5.7
1962/63	155.2	151.3	7.3	12.4	8.2
1963/64	169.1	165.2	7.7	16.2	9.8
1964/65	180.8	179.8	8.2	17.3	9.6
1965/66	173.3	172.6	7.9	18.0	10.4
1966/67	179.3	178.7	7.8	18.6	10.4
1967/68	189.4	187.1	7.2	20.9	11.2
1968/69	195.6	191.8	7.5	24.7	12.9
1969/70	201.6	200.2	8.2	26.1	13.1
1970/71	213.6	211.0	8.6	28.8	13.6
1971/72	216.4	216.8	8.7	28.4	13.1
1972/73	209.6	214.6	8.4	23.4	10.9
1973/74	228.0	222.9	7.7	28.5	12.8
1974/75	226.3	226.7	7.3	28.2	12.4
1975/76	244.0	233.3	8.4	38.9	16.7
1976/77	237.0	238.1	10.6	37.8	15.9
1977/78	251.7	245.6	9.6	43.9	17.9
1978/79	264.7	253.7	12.0	53.9	21.2
1979/80	258.0	259.4	12.7	52.4	20.2
1980/81	270.9	276.2	13.2	47.1	17.1
1981/82	280.3	285.9	11.8	43.3	15.2
1982/83	285.5	304.5	11.9	43.3	15.1
1983/84	307.9	310.6	12.4	46.6	15.3
1984/85	318.8	319.7	11.4	54.9	17.7
1985/86	318.8	323.1	12.6	54.0	16.9
1986/87	318.3	320.5	12.8	49.2	15.2
1987/88	313.2	319.4	11.8	44.0	13.8
1988/89 3/	328.7	326.3	13.4	46.4	14.2
1989/90 4/	329.9	330.5	12.7	46.0	13.9

1/ Based on aggregate of differing local marketing years.
2/ Calendar year of second year.
3/ Estimated.
4/ Projected.
Source: World Grain Situation and Outlook, U.S. Dept. Agr., Foreign Agricultural Service.

Appendix table 9--U.S. share of world production, exports, and ending stocks of rice, 1960-89

Crop year 1/	U.S. share of world: Production	Exports 2/	Ending stocks
		Percent	
1960/61	1.2	14.5	3.2
1961/62	1.2	15.1	2.0
1962/63	1.4	15.6	2.0
1963/64	1.4	17.7	1.5
1964/65	1.3	17.3	1.5
1965/66	1.4	18.0	1.5
1966/67	1.6	22.3	1.5
1967/68	1.6	25.3	1.1
1968/69	1.8	23.5	2.1
1969/70	1.5	22.8	2.0
1970/71	1.3	17.3	2.1
1971/72	1.3	21.4	1.3
1972/73	1.3	20.1	.7
1973/74	1.3	20.5	.9
1974/75	1.6	29.2	.8
1975/76	1.7	20.6	3.1
1976/77	1.6	19.8	3.4
1977/78	1.2	23.6	2.0
1978/79	1.6	20.3	1.9
1979/80	1.7	21.3	1.6
1980/81	1.8	23.1	1.2
1981/82	2.1	22.7	3.7
1982/83	1.7	18.6	5.3
1983/84	1.0	18.0	3.2
1984/85	1.4	17.0	3.8
1985/86	1.4	14.7	4.6
1986/87	1.3	21.4	3.5
1987/88	1.3	18.8	2.4
1988/89 3/	1.5	18.4	2.3
1989/90 4/	1.4	18.6	1.9

1/ Based on aggregate of differing local marketing years.
2/ Calendar year of second year.
3/ Estimated.
4/ Projected.
Source: World Grain Situation and Outlook, U.S. Dept. Agr., Foreign Agricultural Service.

Appendix table 10--Ratio of world trade and ending stocks to consumption; U.S. exports as share of foreign consumption, 1960-89

Calendar year	World trade to world consumption 1/	World ending stocks to world consumption 1/	U.S. exports to foreign consumption
		Percent	
1960	4.1	6.7	0.6
1961	4.1	5.7	.6
1962	4.7	8.2	.7
1963	4.7	9.9	.8
1964	4.5	9.6	.8
1965	4.6	10.4	.8
1966	4.3	10.4	1.0
1967	3.8	11.2	1.0
1968	3.8	12.9	.9
1969	3.9	13.1	.9
1970	4.0	13.6	.7
1971	3.9	13.1	.8
1972	4.0	10.9	.8
1973	3.5	12.8	.7
1974	3.3	12.4	1.0
1975	3.6	16.7	.7
1976	4.5	15.9	.9
1977	3.9	17.9	.9
1978	4.7	21.2	1.0
1979	4.9	20.1	1.0
1980	4.7	17.1	1.1
1981	4.1	15.2	.9
1982	4.2	15.1	.8
1983	4.1	15.3	.7
1984	3.7	17.7	.6
1985	4.0	16.9	.6
1986	4.0	15.5	.8
1987	3.7	12.9	.7
1988 2/	4.2	13.3	.8
1989 3/	3.9	12.9	.7

1/ Consumption and stock data are based on an aggregate of differing local marketing years.
2/ Estimated.
3/ Projected.
Source: World Grain Situation and Outlook. U.S. Dept. Agr., Foreign Agricultural Service, various issues.

Appendix table 11--Milled-equivalent rice production and exports of major foreign exporters, 1960-88 1/

Market year 2/	Thailand		Pakistan		Burma		China	
	Production	Exports	Production	Exports	Production	Exports	Production	Exports
	Million metric tons							
1960/61	6.28	1.58	1.03	0.12	4.28	1.59	41.81	0.43
1961/62	6.53	1.27	1.13	.13	4.05	1.74	37.55	.46
1962/63	7.26	1.42	1.10	.10	4.79	1.71	44.09	.68
1963/64	7.65	1.90	1.19	.16	4.87	1.41	51.64	.76
1964/65	7.50	1.90	1.35	.14	5.32	1.34	58.10	.99
1965/66	7.25	1.51	1.32	.21	5.16	1.13	61.46	1.49
1966/67	7.89	1.48	1.37	.14	3.93	.55	66.77	1.58
1967/68	6.35	1.07	1.50	.08	4.96	.33	65.58	1.30
1968/69	6.89	1.02	2.03	.14	5.13	.56	66.17	1.18
1969/70	8.85	1.06	2.40	.13	4.99	.68	66.55	1.28
1970/71	8.95	1.58	2.20	.20	5.11	.84	76.99	1.29
1971/72	9.07	2.11	2.23	.30	5.12	.57	80.64	1.43
1972/73	8.19	.85	2.29	.77	4.61	.16	79.35	2.63
1973/74	9.83	1.05	2.46	.48	5.38	.21	85.22	2.06
1974/75	8.84	.93	2.31	.50	5.37	.31	86.73	1.63
1975/76	10.10	1.87	2.62	.86	5.76	.66	87.89	.88
1976/77	9.94	2.92	2.74	.86	5.83	.69	88.06	1.03
1977/78	9.19	1.57	2.95	.70	5.91	.38	89.10	1.44
1978/79	11.53	2.70	3.27	1.37	6.58	.59	95.85	1.05
1979/80	10.40	2.70	3.22	.97	6.53	.68	100.63	1.11
1980/81	11.46	3.05	3.12	1.13	8.33	.67	97.93	.58
1981/82	11.73	3.62	3.43	.79	8.84	.70	100.77	.47
1982/83	11.14	3.70	3.45	1.30	8.98	.75	113.12	.58
1983/84	12.90	4.53	3.34	1.05	8.93	.73	118.21	1.16
1984/85	13.14	3.99	3.32	.96	8.91	.45	124.78	1.01
1985/86	13.37	4.32	2.92	1.15	6.98	.66	118.00	.95
1986/87	12.43	4.36	3.49	1.20	7.13	.58	120.56	1.02
1987/88	11.72	4.79	3.24	.97	6.48	.35	122.09	.70
1988/89 3/	13.53	5.50	3.10	.90	7.32	.40	119.70	.30

1/ Production data are based on local 12-month marketing years. Exports are on calendar year of second year.
2/ Based on aggregate of differing local marketing year.
3/ Estimated.
Source: U.S. Dept. of Agr., Foreign Agricultural Service.

Appendix table 12--U.S. commercial and Government milled rice exports, 1957-88

Fiscal year	Commercial	Government programs 1/ Title I	Title II	Aid	Total	Total exports	Proportion Government
	Million cwt						Percent
1957	5.8	18.0	.7	2.8	21.5	27.3	78.8
1958	5.9	5.0	2/	1.1	6.1	12.0	50.8
1959	7.8	3.8	2.0	.6	6.4	14.2	45.1
1960	7.6	9.9	.8	2.2	12.9	20.5	62.9
1961	7.1	11.9	.3	2.2	14.4	21.5	67.0
1962	11.2	8.2	---	1.0	9.2	20.4	45.1
1963	10.4	13.5	---	.3	13.8	24.2	57.0
1964	15.6	14.9	---	.7	15.6	31.2	50.0
1965	16.0	12.5	---	---	12.5	28.5	43.8
1966	20.4	7.9	---	2.0	9.9	30.3	32.7
1967	21.0	18.3	---	---	18.3	39.3	46.6
1968	24.4	16.2	---	.5	16.7	41.1	40.6
1969	16.5	21.7	.2	.1	22.0	38.5	57.1
1970	18.7	20.7	.1	.1	20.9	39.6	52.8
1971	13.3	20.3	---	3.4	23.7	37.0	64.0
1972	11.0	17.9	5.5	3.1	26.5	37.5	70.7
1973	18.1	21.3	.7	2.7	24.7	42.8	57.7
1974	21.4	13.4	---	.1	13.5	34.9	38.7
1975	32.3	16.3	.1	2/	16.5	48.9	33.7
1976 3/	31.8	11.2	---	.1	11.2	43.1	26.1
1977	35.9	14.6	.6	2/	15.2	51.1	29.8
1978	38.5	10.3	1.4	---	11.7	50.2	23.3
1979	42.1	9.2	1.5	---	10.7	52.8	20.3
1980	53.2	8.9	3.0	---	11.9	65.1	18.3
1981	62.0	5.4	2.5	---	7.9	69.9	11.3
1982	55.9	6.6	1.6	---	8.2	64.2	12.8
1983	39.7	8.8	1.7	---	10.5	50.2	20.9
1984	39.2	6.4	3.8	---	10.2	50.6	20.2
1985	26.8	9.6	3.1	---	12.7	43.5	29.3
1986	45.1	8.4	1.3	---	9.7	52.5	18.5
1987	42.8	6.3	3.1	---	10.7 4/	54.1	19.8
1988 5/	36.7	N/A	N/A	---	8.6 4/	47.9	17.9

--- = Not applicable. N/A = Not available.

1/ Title I includes concessional sales for long-term credit repayable in dollars, or in convertible currencies. Title II are donations by U.S. Government and voluntary relief agencies. 2/ Less than 50,000 cwt.
3/ Includes transitional quarter, July-September 1976; fiscal year changed from July-June to October-September. 4/ Includes 59,595 metric tons of rice shipped under Section 416 in 1987 and 22,000 metric tons shipped in 1988.
5/ Preliminary.

Source: U.S. Dept. Agr., Agricultural Stabilization and Conservation Service.

Appendix table 13--Rice conversion factors and regional categories

Weight conversions:

1 bushel = 45 pounds
1 metric ton = 2,204.622 pounds
1 cwt = 100 pounds

To convert from cwt to bushels, divide by 0.45
(1 cwt/0.45 = 2.22 bushels).

To convert from cwt to metric tons, multiply by 0.0454
(500 cwt x 0.0454 = 22.7 metric tons)

To convert from bushels to metric tons, multiply by 0.0204
(100 bushels x 0.0204 = 2.04 metric tons)

Milling factor and converting to rough-equivalent:

Although the milling factor varies slightly from year to year, milled rice (including brown rice) is generally equivalent to 72 percent of the rough rice weight. Thus, to convert the farm product to regular milled rice, multiply by 0.72. To convert brown rice to a milled-equivalent, multiply by 0.88.

100 pounds milled rice / 0.72 = 139 pounds rough-equivalent
100 pounds brown rice x 0.88 = 88 pounds milled-rice equivalent

Regional breakdowns:

East Asia	South Asia	Southeast Asia
China	Afghanistan	Burma
Hong Kong	Bangladesh	Indonesia
Japan	India	Kampuchea (Cambodia)
North Korea	Nepal	Laos
South Korea	Pakistan	Malaysia
Taiwan	Sri Lanka	Philippines
	Singapore	
	Thailand	
	Vietnam	

Appendix table 14--Provisions of rice programs, 1961-90

Provision	1961	1962	1963	1964
Parity price ($/cwt) 1/	6.00	6.22	6.46	6.33
Target price ($/cwt)	--	--	--	--
Deficiency payment: 2/				
Advance payment ($/cwt)	--	--	--	--
Final payment ($/cwt)	--	--	--	--
Allocation factor (%) 3/	--	--	--	--
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	4.71	4.71	4.71	4.71
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	8/ Market price	Not announced	Not announced	Not announced
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Set-aside (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	--	--	--	--
Offsetting compliance 11/	--	--	--	--
Normal crop acreage 12/	--	--	--	--
National marketing quota (mil cwt) 13/	Yes	Yes	Yes	Yes
Marketing quota penalty ($/cwt)	65% of parity	65% of parity	65% of parity	65% of parity
National allotment acres (1,000)	1,653	1,818	1,818	1,818
National program acres (1,000)	--	--	--	--
National base acres (1,000)	--	--	--	--
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	--	--	--	--
Disaster program: 14/				
Prevented plantings payment ($/cwt)	--	--	--	--
Low yield criterion (%)	--	--	--	--
Low yield payment ($/cwt)	--	--	--	--
Payment limitation ($)	--	--	--	--
Advanced payment (%)	--	--	--	--
Support payment limitation ($)	--	--	--	--

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1965	1966	1967	1968
Parity price ($/cwt) 1/	6.62	6.85	6.87	6.92
Target price ($/cwt)	--	--	--	--
Deficiency payment: 2/				
Advance payment ($/cwt)	--	--	--	--
Final payment ($/cwt)	--	--	--	--
Allocation factor (%) 3/	--	--	--	--
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	4.50	4.50	4.55	4.60
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	Not announced	Not announced	Not announced	Not announced
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Set-aside (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	--	--	--	--
Offsetting compliance 11/	--	--	--	--
Normal crop acreage 12/	--	--	--	--
National marketing quota (mil cwt) 13/	Yes	Yes	Yes	Yes
Marketing quota penalty ($/cwt)	65% of parity	65% of parity	65% of parity	65% of parity
National allotment acres (1,000)	1,819	2,000	2,000	2,401
National program acres (1,000)	--	--	--	--
National base acres (1,000)	--	--	--	--
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	--	--	--	--
Disaster program: 14/				
Prevented plantings payment ($/cwt)	--	--	--	--
Low yield criterion (%)	--	--	--	--
Low yield payment ($/cwt)	--	--	--	--
Payment limitation ($)	--	--	--	--
Advanced payment (%)	--	--	--	--
Support payment limitation ($)	--	--	--	--

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1969	1970	1971	1972
Parity price ($/cwt) 1/	7.26	7.47	7.79	8.10
Target price ($/cwt)	--	--	--	--
Deficiency payment: 2/				
Advance payment ($/cwt)	--	--	--	--
Final payment ($/cwt)	--	--	--	--
Allocation factor (%) 3/	--	--	--	--
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	4.72	4.86	5.07	5.27
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	Not announced	Not announced	5.83	6.06
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Set-aside (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	--	--	--	--
Offsetting compliance 11/	--	--	--	--
Normal crop acreage 12/	--	--	--	--
National marketing quota (mil cwt) 13/	Yes	Yes	Yes	Yes
Marketing quota penalty ($/cwt)	65% of parity	65% of parity	65% of parity	65% of parity
National allotment acres (1,000)	2,160	1,837	1,837	1,837
National program acres (1,000)	--	--	--	--
National base acres (1,000)	--	--	--	--
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	--	--	--	--
Disaster program: 14/				
Prevented plantings payment ($/cwt)	--	--	--	--
Low yield criterion (%)	--	--	--	--
Low yield payment ($/cwt)	--	--	--	--
Payment limitation ($)	--	--	--	--
Advanced payment (%)	--	--	--	--
Support payment limitation ($)	--	--	--	--

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1973	1974	1975	1976
Parity price ($/cwt) 1/	9.33	11.60	13.10	13.60
Target price ($/cwt)	--	--	--	8.25
Deficiency payment: 2/				
Advance payment ($/cwt)	--	--	--	--
Final payment ($/cwt)	--	--	--	1.70
Allocation factor (%) 3/	--	--	--	--
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	6.07	7.54	8.52	6.19
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	6.98	8.67	9.80	9.49
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Set-aside (%)	--	--	--	None
Payment rate ($/cwt)	--	--	--	Def
Payment ($)	--	--	--	1.70*Yld*Alt
Acreage reduction (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	--	--	--	Yes
Offsetting compliance 11/	--	Yes	--	--
Normal crop acreage 12/	--	--	--	--
National marketing quota (mil cwt) 13/	Yes	15/ NA	Suspended	Suspended
Marketing quota penalty ($/cwt)	65% of parity	NA	Suspended	Suspended
National allotment acres (1,000)	2,222	2,100	16/ 1,803	17/ 16/ 1,800
National program acres (1,000)	--	--	--	--
National base acres (1,000)	--	--	--	--
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	--	--	--	4,489
Disaster program: 14/				
Prevented plantings payment ($/cwt)	--	--	--	2.75
Low yield criterion (%)	--	--	--	66.7 % of normal
Low yield payment ($/cwt)	--	--	--	2.75 on the short fall
Payment limitation ($)	--	--	--	--
Advanced payment (%)	--	--	--	--
Support payment limitation ($)	--	--	--	19/ 55,000

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1977	1978	1979	1980
Parity price ($/cwt) 1/	14.00	15.40	17.10	19.00
Target price ($/cwt)	8.25	8.53	9.05	9.49
Deficiency payment: 2/				
Advance payment ($/cwt)	--	--	--	--
Final payment ($/cwt)	0.00	0.78	0.00	0.00
Allocation factor (%) 3/	--	--	--	--
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	6.19	6.40	6.79	7.12
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	9.49	9.81	10.41	10.91
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Set-aside (%)	None	None	None	None
Payment rate ($/cwt)	Def	Def	Def	Def
Payment ($)	0.00*Yld*Alt	0.78*Yld*Alt	0.00*Yld*Alt	0.00*Yld*Alt
Acreage reduction (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	Yes	Yes	Yes	Yes
Offsetting compliance 11/	--	--	--	--
Normal crop acreage 12/	--	Yes	Yes	Yes
National marketing quota (mil cwt) 13/	Suspended	Suspended	Suspended	Suspended
Marketing quota penalty ($/cwt)	Suspended	Suspended	Suspended	Suspended
National allotment acres (1,000)	17/ 16/ 1,800	16/ 1,800	16/ 1,800	16/ 1,800
National program acres (1,000)	--	--	--	--
National base acres (1,000)	--	--	--	--
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	4,533	4,589	4,591	4,586
Disaster program: 14/				
Prevented plantings payment ($/cwt)	2.75	0.284	0.302	0.316
Low yield criterion (%)	66.7 % of normal	75 % of normal	75 % of normal	75 % of normal
Low yield payment ($/cwt)	2.75 on the short fall	2.84 on the short fall	3.02 on the short fall	3.16 on the short fall
Payment limitation ($)	--	--	--	18/ 100,000
Advanced payment (%)	--	--	--	--
Support payment limitation ($)	19/ 55,000	20/ 52,500	20/ 50,000	21/ 50,000

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1981	1982	1983	1984
Parity price ($/cwt) 1/	20.80	21.10	21.00	20.50
Target price ($/cwt)	10.68	10.85	11.40	11.90
Deficiency payment: 2/				
Advance payment ($/cwt)	--	1.90	1.63	--
Final payment ($/cwt)	0.28	2.71	2.77	3.76
Allocation factor (%) 3/	--	22/ NA	22/ NA	22/ NA
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	8.01	8.14	8.14	8.00
Repayment level ($/cwt) 5/	--	--	--	--
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	12.28	12.48	13.11	13.68
Actual ($/cwt) 9/	No sales	No sales	--	--
Acreage diversion optional (%)	--	--	5	--
Payment rate ($/cwt)	--	--	2.70	--
Payment ($)	--	--	2.70*Yld*Div	--
Set-aside (%)	None	--	--	--
Payment rate ($/cwt)	Def	--	--	--
Payment ($)	0.28*Yld*Alt	--	--	--
Acreage reduction (%)	--	15	15	25
Payment rate ($/cwt)	--	Def	Def	Def
Payment ($)	--	2.71*Yld*Plt	2.77*Yld*Plt	3.76*Yld*Plt
Acreage reduction voluntary (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
PIK acreage diversion (%)	--	--	10-30	--
Payment rate (cwt)	--	--	.80*Yld	--
Payment (cwt)	--	--	.80*Yld*PIK	--
Compliance restrictions:				
Cross compliance 10/	No	No	No	No
Offsetting compliance 11/	Yes	No	No	No
Normal crop acreage 12/	Yes	22/ NA	22/ NA	22/ NA
National marketing quota (mil cwt) 13/	Suspended	--	--	--
Marketing quota penalty ($/cwt)	Suspended	--	--	--
National allotment acres (1,000)	16/ 1,800	--	--	--
National program acres (1,000)	--	22/ NA	22/ NA	22/ NA
National base acres (1,000)	--	3,969	3,946	4,160
Base acres in CRP (1,000)	--	--	--	--
National program yield (lbs/acre)	4,589	4,824	4,889	5,001
Disaster program: 14/				
Prevented plantings payment ($/cwt)	23/ 0.356	24/ 3.62 on 75% normal yield	24/ 3.76 on 75% normal yield	24/ 3.97 on 75% normal yield
Low yield criterion (%)	75 % of normal	75 % of normal	75 % of normal	75 % of normal
Low yield payment ($/cwt)	23/ 0.356 the short fall	24/ 3.62 on the short fall	24/ 3.76 on the short fall	24/ 3.97 on the short fall
Payment limitation ($)	18/ 100,000	18/ 100,000	18/ 100,000	18/ 100,000
Advanced payment (%)	--	No	25/ 50/50	No
Support payment limitation ($)	21/ 50,000	21/ 50,000	26/ 50,000	27/ 50,000

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1985	1986 29/	1987	1988
Parity price ($/cwt) 1/	19.60	19.30	19.20	20.00
Target price ($/cwt)	11.90	11.90	11.66	11.15
Deficiency payment: 2/				
Advance payment ($/cwt)	1.90	1.41	1.446	1.65
Final payment ($/cwt)	3.90	4.70	4.82	1.65
Allocation factor (%) 3/	22/ NA	22/ NA	22/ NA	22/ NA
Nonrecourse loan rate:				
Basic rate ($/cwt) 4/	8.00	7.20	6.84	6.63
Repayment level ($/cwt) 5/	--	30/ World price	30/ World price	30/ World price
CCC domestic sales price: 6/				
Legislated minimum ($/cwt) 7/	13.68	13.68	13.41	12.82
Actual ($/cwt) 9/	--	--	--	--
Acreage diversion optional (%)	15	--	--	--
Payment rate ($/cwt)	3.50	--	--	--
Payment ($)	3.50*Yld*Div	--	--	--
Set-aside (%)	--	--	--	--
Payment rate ($/cwt)	--	--	--	--
Payment ($)	--	--	--	--
Acreage reduction (%)	20	35	35	25
Payment rate ($/cwt)	Def	Def	Def	Def
Payment ($)	3.90*Yld*Plt	4.70*Yld*Plt	4.82*Yld*Plt	1.65*Yld*Plt
Acreage reduction voluntary (%)	--	31/ 50-92	31/ 50-92	31/ 50-92
Payment rate ($/cwt)	--	Def	Def	Def
Payment ($)	--	4.324*Yld*Bas	4.434*Yld*Bas	1.518*Yld*Bas
PIK acreage diversion (%)	--	--	--	--
Payment rate (cwt)	--	--	--	--
Payment (cwt)	--	--	--	--
Compliance restrictions:				
Cross compliance 10/	No	--	32/ Limited	32/ Limited
Offsetting compliance 11/	No	--	--	--
Normal crop acreage 12/	22/ NA	22/ NA	22/ NA	22/ NA
National marketing quota (mil cwt) 13/	--	--	--	--
Marketing quota penalty ($/cwt)	--	--	--	--
National allotment acres (1,000)	--	--	--	--
National program acres (1,000)	22/ NA	22/ NA	22/ NA	22/ NA
National base acres (1,000)	4,234	4,199	4,183	4,155
Base acres in CRP (1,000)	--	1	3	5
National program yield (lbs/acre)	5,036	4,713	4,683	4,700
Disaster program: 14/				
Prevented plantings payment ($/cwt)	24/ 3.97 on 75% normal yield	24/	24/	24/
Low yield criterion (%)	75 % of normal	--	--	--
Low yield payment ($/cwt)	24/ 3.97 on the short fall	24/	24/	24/
Payment limitation ($)	18/ 100,000	18/ 100,000	33/ Yes	33/ Yes
Advanced payment (%)	25/ 50/50	34/ 30/10	35/ 30	36/ 40
Support payment limitation ($)	28/ 50,000	38/ 50,000	39/ 50,000	39/ 50,000

See footnotes at end of table.

Continued--

Appendix table 14--Provisions of rice programs, 1961-90--Continued

Provision	1989	1990
Parity price ($/cwt) 1/	--	--
Target price ($/cwt)	10.80	--
Deficiency payment: 2/		
Advance payment ($/cwt)	1.29	--
Final payment ($/cwt)	1.29	--
Allocation factor (%) 3/	22/ NA	22/ NA
Nonrecourse loan rate:		
Basic rate ($/cwt) 4/	6.50	--
Repayment level ($/cwt) 5/	30/ World price	30/ World price
CCC domestic sales price: 6/		
Legislated minimum ($/cwt) 7/	--	--
Actual ($/cwt) 9/	--	--
Acreage diversion optional (%)	--	--
Payment rate ($/cwt)	--	--
Payment ($)	--	--
Set-aside (%)	--	--
Payment rate ($/cwt)	--	--
Payment ($)	--	--
Acreage reduction (%)	25	--
Payment rate ($/cwt)	Def	--
Payment ($)	1.29*Yld*Plt	--
Acreage reduction voluntary (%)	31/ 50-92	--
Payment rate ($/cwt)	Def	
Payment ($)	1.187*Yld*Bas	--
PIK acreage diversion (%)	--	--
Payment rate (cwt)	--	--
Payment (cwt)	--	--
Compliance restrictions:		
Cross compliance 10/	32/ Limited	32/ Limited
Offsetting compliance 11/	--	--
Normal crop acreage 12/	22/ NA	22/ NA
National marketing quota (mil cwt) 13/	--	--
Marketing quota penalty ($/cwt)	--	--
National allotment acres (1,000)	--	--
National program acres (1,000)	22/ NA	22/ NA
National base acres (1,000)	4,116	--
Base acres in CRP (1,000)	7	--
National program yield (lbs/acre)	--	--
Disaster program: 14/		
Prevented plantings payment ($/cwt)	24/	24/
Low yield criterion (%)	--	--
Low yield payment ($/cwt)	24/	24/
Payment limitation ($)	33/ Yes	33/ Yes
Advanced payment (%)	37/ 40	40
Support payment limitation ($)	39/ 50,000	39/ 50,000

Footnotes for Appendix table 14--Provisions of rice programs, 1961-90

1/ Average parity price of rice for July.

2/ Deficiency payment is the difference between the target price and the higher of the 5-month national weighted average market price received by farmers or the loan rate. Up to 5 percent of the payment could be made as payment-in-kind. Starting in 1986, a supplementary (loan) deficiency payment was authorized as the difference between the basic loan rate and the higher of the repayment rate or the national weighted average market price received by farmers for the entire marketing year. At least half the payment must have been made in marketing certificates.

3/ The allocation factor, ranging from 80 to 100, is determined by dividing national program acres by number of acres harvested.

4/ Prior to 1985 legislation, this is the national average loan rate. Under the 1985 Act, this is the basic loan rate as determined by the legislated formula.

5/ Under 1985 legislation, producers may repay their loans at the prevailing world market price, as determined by the Secretary, or 50 percent of the loan rate for 1986-87 crops, 60 percent of the loan rate for 1988 crop, and 70 percent of the loan rate for 1989-90 crops, which ever is higher.

6/ Sales made at fixed prices or through competitive bids.

7/ In any event, the CCC can not sell stock holdings for less than the going market price.

8/ But not less than the loan rate by variety and grade plus 5 percent, plus 11 cents basis in store for milled rice or 13 cents basis in store for rough rice.

9/ Simple average of actual sales.

10/ Producers must be compliance with programs for all program crops planted to the farm.

11/ Producers must be in compliance with rice program requirements on other farms they own or have an interest in.

12/ The total acres of crops in the normal crop acreage (NCA) -- barley, corn, dry edible beans, flax, oats, rice, rye, sorghum, soybeans, sugarbeets, sugar cane, sunflowers, upland cotton, and wheat -- planted on a farm plus acres set-aside cannot exceed a farm's NCA.

13/ Growers who exceed their farm allotments are subject to marketing quota penalties if quotas are in effect. The penalty is paid on the excess production, also none of their production would be eligible for price support.

14/ Bad weather or unavoidable hazard.

15/ Marketing quotas are not applicable if the normal supply for the previous year was equal to or exceeded the total supply. This was the first year since 1954 that marketing quotas have not been in effect. However, growers still must have planted within their established allotment to be eligible for price support.

16/ Do not have to plant rice to qualify for program benefits. Failure to plant at least 90 percent of farm allotment to an authorized crop may result in as much as a 20 percent reduction in the allotment for the following year. If no rice is planted for 2 consecutive years, the entire allotment is lost.

17/ Producers may substitute any nonconserving crop (except marketing quota crops) or any conserving crop (including approved volunteer cover) used for haying or grazing in order to preserve their rice allotment. Producers who plant any portion of their allotment to a substitute crop are still eligible for any target price payments made based on 100 percent of their allotment.

18/ Limit to disaster payments per person for all programs.

19/ Total payments a person can receive during a crop year under the rice program. The limitation does not include loans or purchases or any part of the payment which is determined by the Secretary to represent compensation for resource adjustment or public access for recreation.

20/ The total amount of payments a person can receive during a crop year under the rice program. This limitation does not apply to loans, purchases, or disaster payments.

21/ The total amount of payments a person can receive under a combination of the rice, feed grain, wheat, and upland cotton programs. This limitation does not apply to loans or purchases, or to payments for either prevented planting or low yield disaster loss.

22/ Normal crop acres, national program acres, allocation factors, and voluntary reduction programs are not applicable when acreage reduction programs are in effect.

23/ A producer on a farm who elects to obtain federally subsidized crop insurance on rice waives disaster payments on that crop.

24/ Available only to whom Federal crop insurance is not available.

25/ At signup, participate may request 50 percent of their projected deficiency payments and 50 percent of their diversion payments.

26/ Total amount of payments a person can receive under a combination of rice, wheat, feed grain, and upland cotton programs. The limitation does not apply to loans, purchases, or PIK.

27/ Total amount of payments, including PIK, a person can receive under a combination of rice, wheat, feed grain, upland cotton, and extra-long staple cotton programs. The limitation does not apply to loans, purchases.

28/ Total amount of payments a person can receive under a combination of rice, wheat, feed grain, upland cotton, and extra-long staple cotton programs. The limitation does not apply to loans, purchases.

29/ All cash payments subject to reductions of 4.3 percent, Gramm-Rudman-Hollings Act.

30/ Repayment level cannot be less than 50 percent of the loan level.

31/ Under the 50-92 rule, growers that plant between 50 and 92 percent of the permitted acreage to rice and devote the remaining permitted acres to a conserving use, are eligible to receive deficiency payments on 92 percent of the permitted acreage.

32/ To be eligible for benefits for a participating wheat, feed grain, upland cotton, or rice crop, the acreage planted for harvest (or approved as prevented plantings) on a farm in other nonparticipating program crops, excluding extra-long staple cotton and oats, may not exceed the crop acreage bases of these crops. Oats and extra-long staple cotton are not subject to limited cross compliance requirements.

33/ The total of the following payments, combined with the total deficiency and diversion payments, is limited to $250,000 per person: (1) disaster payments; (2) any gain realized by repayment of a loan at a lower level than the original loan level; any deficiency payment for wheat or feed grains attributed to a reduction in the statutory loan rate; (4) any loan deficiency payment; (5) any inventory reduction payment; and (6) any payment representing compensation for resource adjustment or public access for recreation. Excluded from the limitation are price support loans (except honey), upland cotton first handler certificates, and rice marketing certificate payments.

34/ Advanced deficiency payments based on 30 percent of the projected deficiency payments are available in cash to producers enrolled in the program. An additional 10 percent in advance payment is available in the form of generic certificates.

35/ Advanced payments based on 30 percent of the projected deficiency payment, 50 percent in cash and 50 percent in the form of generic certificates.

36/ At signup, participants may request 40 percent (50 percent in cash and 50 percent in generic certificates) of their projected 1988 deficiency payments.

37/ At signup, participants may request 40 percent of their projected 1989 deficiency payments.

38/ Total deficiency and diversion payments a person can receive under a combination of rice, wheat, feed grain, upland cotton, and extra-long staple cotton programs. The limitation does not apply to loans, purchases, loan deficiency payments, first handler certificates, inventory protection certificates, or deficiency payments resulting from lowering the basic (statutory) loan rate.

39/ Total deficiency and diversion payments a person can receive under the rice, wheat, feed grain, upland cotton, and extra-long staple cotton programs.

Source: Green, Robert C. A Database for Support Programs of Program Crops, 1961-90. Staff Report (forthcoming). U.S. Dept. Agr., Econ. Res. Serv.

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