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Rice Backgrounder

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Approved by USDA's World Agricultural Outlook Board

Abstract

U.S. rice farming is a high-cost, large-scale production operation that depends on the global market for about half its annual sales. Government payments per acre are high compared with other program crops, as is the share of the sector's income accounted for by payments. While domestic disappearance of rice continues to increase, the outlook for rice farm incomes is tempered by higher production costs, modest increases in farm prices, and continued strong competition in many international markets from lower cost Asian exporters. Financial and operating characteristics of U.S. rice farms, based on the 2004 Agricultural Resource Management Survey (ARMS), are reported here.

Keywords: United States, rice, domestic disappearance, supply, trade, policy, income, expenses, government payments, trade agreements

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Introduction

The U.S. rice farming industry is a high-cost, high-yielding, large-scale production sector that depends on the global market for almost half its annual sales. While domestic disappearance of rice continues to increase and U.S. export prospects remain bright, the outlook for rice farm incomes is tempered by higher production costs and continued strong competition in many international markets from lower cost Asian exporters.

Government payments per acre for rice are high compared with most other program crops, as is the share of income accounted for by such payments. As a result, the health and viability of U.S. rice farming could be much affected by upcoming farm legislation and global trade policy. Under the 2002 Farm Act, the primary government programs affecting rice producers are direct payments, countercyclical payments, and the marketing loan program.

This report describes the structure and performance of the U.S. rice market, including pricing, marketing, and risk management issues. It also describes current farm legislation and global trade policy issues, emphasizing producer support programs, World Trade Organization commitments, and regional trade agreements. Appendices detail financial and operating characteristics of U.S. rice farms based on the 2004 Agricultural Resource Management Survey (ARMS).

The U.S. Rice Industry and Global Market—A Brief Description

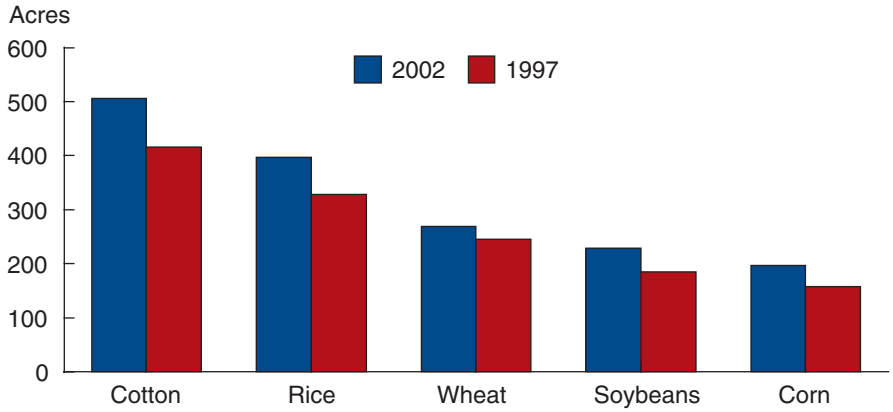
Rice accounted for just 2 percent of the total value of U.S. field crops from 2002 to 2004. Average crop value in those years was $1.44 billion. Rice is typically ranked eighth among U.S. field crops based on both value of production and planted area. In 2002, the Census of Agriculture reported that 8,046 farms (out of over 2.1 million total) produced rice. The 2002 crop was valued at about $980 million.[1]

The average size for rice farms was 397 acres according to the 2002 Census, much larger than corn (196 acres), soybean (228 acres), and wheat (269 acres) farms. Among major field crops, only cotton, with an average size of 506 acres in 2002, exceeded the average farm size for rice. Because of the large investments required for irrigation facilities, farm sizes and production levels for rice have to be large enough to justify such heavy fixed expenditures. In the United States, all rice is produced under controlled irrigation, a major factor behind the high yields achieved.

Arkansas Is the Largest Rice Growing State

Virtually the entire U.S. rice crop is produced in four regions: (1) the Arkansas Grand Prairie, (2) the Mississippi Delta (parts of Arkansas, Mississippi, Missouri, and Louisiana), (3) the Gulf Coast (Texas and Southwest Louisiana), and (4) the Sacramento Valley of California. The Delta is the largest producing region. Arkansas contains over 45 percent of U.S. rice acreage and is the largest producing State. California is the second largest producer, achieving the highest yields. Louisiana is the third largest producing State, typically planting the second or third largest area. Mississippi is typically the fourth largest rice producing State. Along with Missouri and Texas, these six States account for more than 99 percent of U.S. rice production. (Florida accounts for most of the rice grown outside these six States, but it is not included in USDA's area and production estimates.)

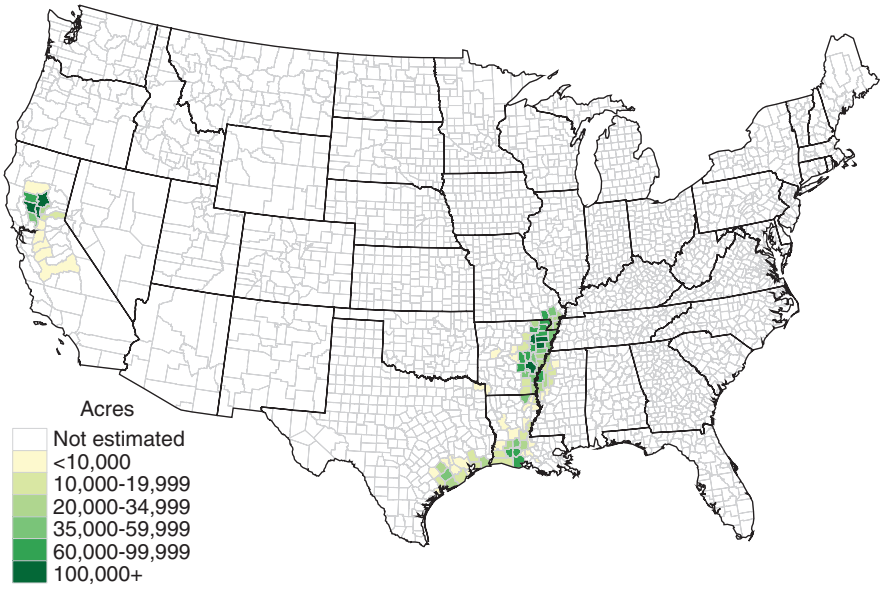
Figure 1
The average farm size for rice is substantially larger than for most other field crops



Source: U.S. Department of Agriculture, National Agricultural Statistics Service, 2002 Census of Agriculture.

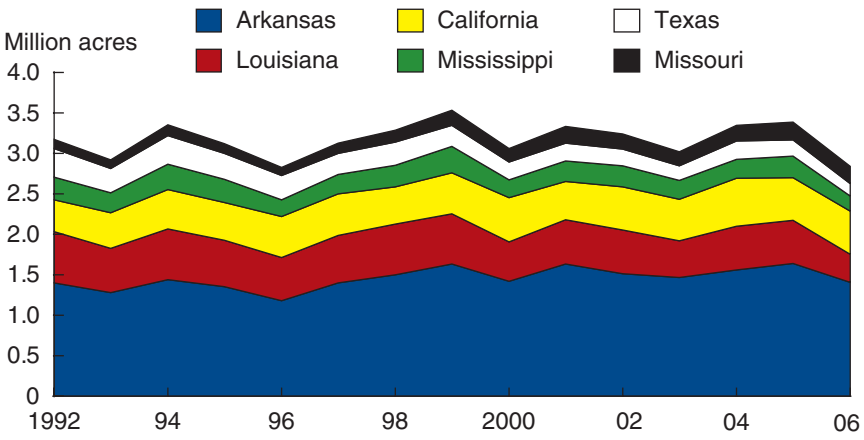
[1]In 1997, the Census of Agriculture reported 9,627 rice farms out of 2.215 million total U.S. farms. The average size for rice farms in 1997 was 328 acres.

Figure 2
All rice planted acres by county, 2004



U.S. Department of Agriculture, National Agricultural Statistics Service.

Figure 3
Arkansas accounts for almost half of U.S. rice planted acreage



Source: U.S. Department of Agriculture, National Agricultural Statistics Service, Quick Stats database.

Rice is a minor crop in the overall U.S. farm economy, but important regionally and locally. Rice—typically the most important crop produced in Arkansas—accounted for more than 28 percent of the State's field crop production value from 2002 to 2004. (Rice actually ranked slightly behind soybeans in 2002 and 2003 due to extremely low rice prices.) Rice is also important in Louisiana, accounting for 15 percent of the 2002-04 field crop value. Because virtually all of California's rice is produced in the Sacramento Valley, its importance in those producing counties is much greater than its 11-percent share of field crop production value. Statewide, rice accounted for 8 percent of the value of field crop production in Mississippi from 2002 to 2004, and less than 3 percent in the other reporting States.

Classes and Types of Rice

In the United States, rice is referred to by length of grain: long, medium, and short. *Long-grain* rice, grown almost exclusively in the South, accounts for more than 70 percent of U.S. production. *Medium-grain*, grown both in California and the South, accounts for more than one-fourth of total U.S. production and forms most of California's rice crop. California grows more than two-thirds of the U.S. medium-grain crop. Arkansas accounts for most of the southern medium-grain production. *Short-grain rice* accounts for 1-2 percent of total U.S. rice production and is grown almost exclusively in California. U.S. long-grain varieties typically cook dry and separate, while U.S. medium/short-grain varieties are typically moist and clingy.

Five different products (or types of rice) can be produced from rough (or unmilled) rice: hulls, bran, brown rice, whole-kernel milled rice, and brokens (broken-kernel milled rice). The first stage of milling removes the hull, producing *brown rice* that can be cooked and consumed. The next stage of milling removes the bran layer, leaving *milled white rice*. Or, prior to milling, rough rice may be *parboiled*, a process of soaking the rice in water and steaming it under intense pressure. Parboiling makes the rice less likely to break during milling and pushes nutrients from the bran layer into the kernel. Parboiled rice typically sells at a premium to non-parboiled rice. Much of the *rice bran* is mixed with other feeds. *Brokens* are heavily used in pet foods and to make rice flour. Rice *hulls* can be used as fuel for rice milling and parboiling plants, as bedding for broilers, and in soil media for greenhouse plants. On average, for every 100 pounds of rough rice produced, about 55 pounds of whole-kernel milled rice, 15 pounds of brokens, 8-9 pounds of bran, and 20 pounds of hull are produced.

More Than Half of the U.S. Rice Crop Is Marketed Domestically

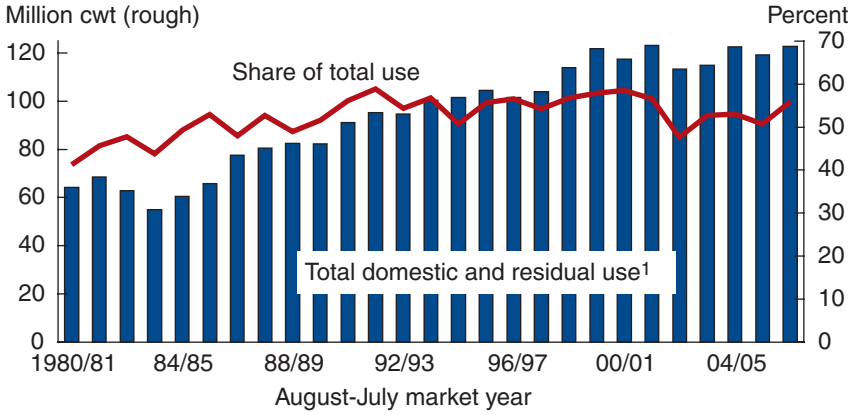
The domestic rice market (including the residual or unreported losses in marketing, processing, and transporting) accounts for more than 50 percent of total use. The domestic market has more than doubled in the past 25 years, with disappearance currently growing about 1 percent per year, slightly ahead of population growth.

Based on shipment data from the USA Rice Federation's annual milled rice distribution survey, food use (direct food use and processed foods) accounts for more than 75 percent of total reported domestic shipments (including imports but excluding seed and residual use).[2] Direct food use accounts for almost 60 percent of all reported shipments. Use of rice in processed foods—primarily package mixes, cereal, and rice cakes—was the fastest growing category of food use for more than two decades and accounted for nearly 16 percent of domestic shipments in 2003/04, the most current data available. Pet foods account for about 9 percent of reported domestic shipments and use brokens almost exclusively.

[2]The residual includes unreported loses in transporting, processing, and marketing rice as well as any statistical error in any other item in the supply and use table.

Figure 4

The domestic market accounts for more than half of total rice use



[1]Includes imports and seed use. 2006/07 projections.

Sources: 1980/81-2003/04, *2005 Rice Yearbook*, U.S. Department of Agriculture, Economic Research; 2004/05 and 2006/07, *World Agricultural Supply and Use Estimates*, U.S. Department of Agriculture, World Agricultural Outlook Board.

Beer use accounts for about 15 percent of total domestic disappearance, but the amount of rice used in making beer has been stagnant or declining for almost two decades. Monthly shipments of rice to brewers are reported by the Alcohol and Tobacco Tax and Trade Bureau of the U.S. Department of Treasury. Seed use—not included in the annual survey data—is the smallest use category and is directly proportional to area planted.

Although a major exporter, the United States regularly imports rice. Imports account for almost 15 percent of total domestic disappearance, and this share has been rising for 25 years. The bulk of U.S. rice imports are aromatic (or fragrant) rices, classified as long-grain varieties. While U.S. producers do grow and market aromatic varieties, they are currently not of the same quality as imports. Thailand typically supplies about three-fourths of U.S. rice imports, India and Pakistan most of the rest. Italy ships a small amount of rice to the United States, much of it *Arborio* rice often used in risotto.

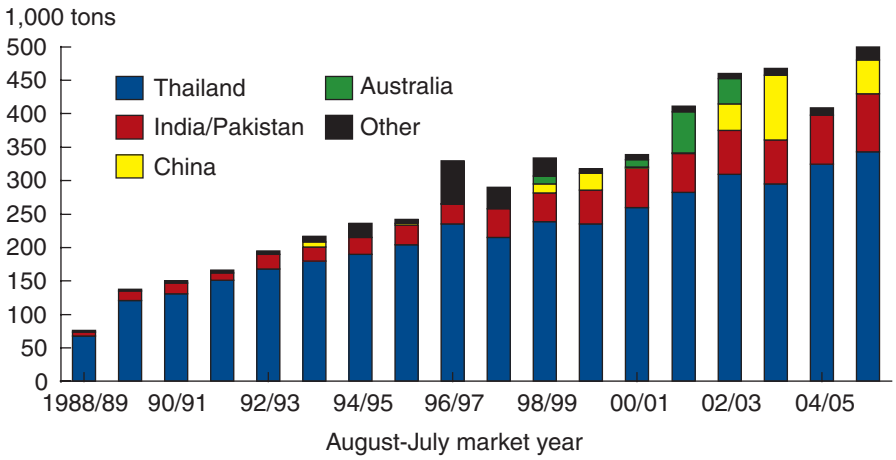
The United States also imports a small amount of specialty rice from Thailand that is classified by the U.S. Census Bureau as medium/short-grain rice. These specialty varieties are distinct from the medium/short-grain varieties grown in California. In addition, Thailand does not compete in the global medium/short-grain market. Like the imported long-grain varieties, the volume of these varieties imported from Thailand has been increasing each year. In recent years, Puerto Rico has been responsible for major fluctuations in the quantity of medium/short-grain rice imported by the United States. For the past half decade, when U.S. medium/short-grain supplies were tight, Puerto Rico imported medium/short-grain rice, mostly from Australia, China, and Egypt.

Rough Rice Accounts for About a Third of U.S. Rice Exports

Although the United States produces less than 2 percent of the world's rice, it is a major exporter, accounting for 12-14 percent of the annual volume of

Figure 5

Thailand accounts for the bulk of U.S. rice imports[1]



[1]Product-weight basis.

Source:, U.S. Department of Agriculture, Foreign Agricultural Service, FASonline, Foreign Agricultural Trade of the United States.

global rice trade. The United States is regarded as a consistent, reliable, and timely supplier of high-quality rice in both the long- and combined medium/short-grain global markets. By class, 75-80 percent of U.S. exports are typically long grain. The United States exports rough rice, parboiled rice, brown rice, and fully milled rice. Milled rice—including brown rice—typically accounts for around two-thirds of U.S. rice exports. Rough rice accounts for the remainder.

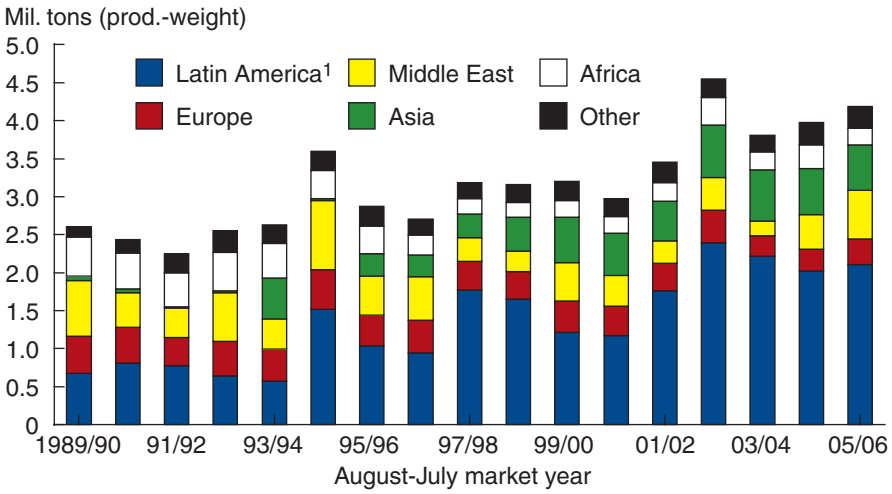
About half the U.S. crop is exported each year. Mexico, Central America, Northeast Asia, and the Middle East are the largest export markets for U.S. rice based on quantity shipped. The Caribbean, the European Union (EU)-25, and Sub-Saharan Africa typically make up the next largest tier of U.S. export markets. The highest valued single-country market for U.S. rice is Japan. Mexico is typically the second highest valued.

The rough rice share of U.S. rice exports has more than doubled since the mid-1990s. Mexico and Central America are the largest export markets for U.S. rough rice, purchasing almost exclusively southern long-grain. Both markets have exhibited considerable growth over the past decade. The United States supplies almost all rice imported by Mexico and Central America. Tariff rates are much lower on rough than milled rice in both markets. The only other sizable market for U.S. rough rice is Turkey, which typically purchases medium-grain rice from California. In some years, the Caribbean—primarily Cuba—imports smaller amounts of long-grain rough rice. Occasionally, South America will import U.S. rough rice—all long grain—if regional supplies are tight.

The United States is the only major exporter that ships rough rice. None of the major Asian exporters allow rough rice to be exported, preferring to keep the value added from milling the rice. Rough rice accounts for a very small share of global trade, typically around 4 percent of annual quantity shipped.

Figure 6

Latin America is the largest market for U.S. rice exports

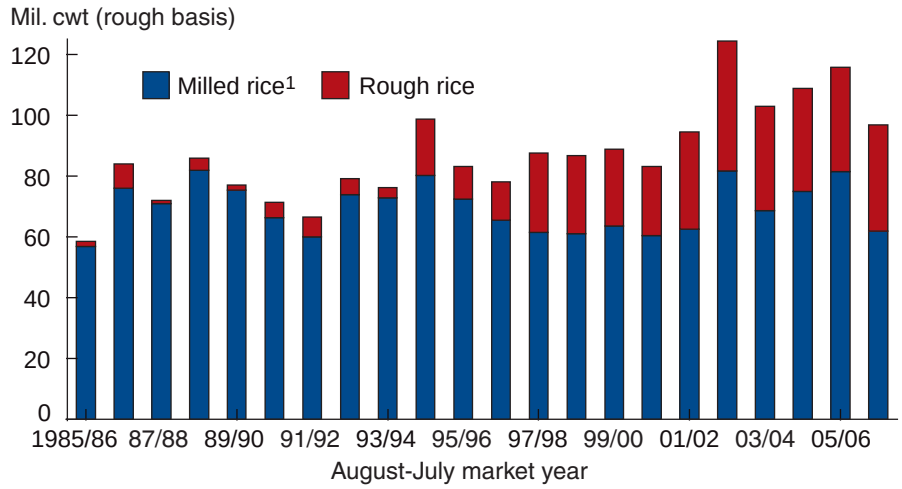


[1]Includes Mexico.

Source:, U.S. Department of Agriculture, Foreign Agricultural Service, FASonline, Foreign Agricultural Trade of the United States.

Figure 7

U.S. rough rice exports have increased sharply over the past decade



[1]Reported milled rice exports are converted to a rough-equivalent basis using annual milling rates. 2006/07 forecasts.

Sources: 1985/86-2003/04, *2005 Rice Yearbook*, Economic Research Service/USDA; 2004/05-2006/07, *World Agricultural Supply and Demand Estimates*, World Agricultural Outlook Board, USDA.

Northeast Asia Is the Largest Market for U.S. Medium/Short-Grain Exports

The major export markets for U.S. milled rice are Northeast Asia, the Middle East (including the Eastern Mediterranean), the Caribbean, the EU-25, Sub-Saharan Africa, and Canada. Northeast Asia and the Eastern Mediterranean are primarily medium/short-grain markets, the rest are nearly all long-grain markets. Medium/short-grain rice (including rough, brown, and milled shipments) accounts for about 12 percent of the total annual volume of global rice traded. Egypt, Australia, and China are major competitors in the medium/short-grain rice market.

Genetically Engineered Rice Found in U.S. Long-Grain Supplies

In August 2006, USDA and the U.S. Food and Drug Administration (FDA) were notified by Bayer CropScience (BCS) that the company detected trace amounts of the regulated genetically engineered (GE) rice, LLRICE601, in the U.S. rice supply. FDA and USDA reviewed the scientific data submitted by BCS and concluded that this GE rice causes no identifiable concerns related to human health, food safety, or the environment. USDA's Animal and Plant Health Inspection Service (APHIS) is conducting an investigation to determine the circumstances surrounding the release and whether any regulatory violations occurred. On November 24, 2006, APHIS granted BCS's petition to deregulate LLRICE601, thus allowing its environmental release, importation, and interstate movement in the United States. USDA has no indication that BCS intends to commercialize LLRICE601.

It is too early to gauge the full impact of the GE issue on U.S. rice exports in 2006/07 or in any future years.

For more information on the GE rice issue, please go to the following USDA URLs.

For Secretary of Agriculture Mike Johanns' August 18, 2006 news release, go to: http://www.usda.gov/wps/portal/usdahome

For USDA's Animal and Plant and Health Inspection Service November 24, 2006, announcement, go to: http://www.aphis.usda.gov/newsroom/content/2006/11/index.shtml

Japan, South Korea, and Taiwan import rice as part of their World Trade Organization (WTO) commitments, with California providing nearly all U.S. shipments. These three importers rarely—if ever—import beyond their minimum WTO commitments, limiting the year-to-year volatility in their import levels. The United States supplies about half of Japan's annual rice imports and is a major supplier to Taiwan and South Korea. Northeast Asia typically accounts for more than two-thirds of the volume of U.S. medium/short-grain exports, and has been a stable export market for the United States.

The Eastern Mediterranean—primarily Jordan, Israel, and Syria—import much smaller amounts of U.S. medium-grain milled rice than do Asian countries. Oceania—a small global rice market—purchased U.S. medium-grain milled rice in 2004/05 due to drought-induced shortfalls in Australia, the region's traditional supplier. Australia's production rebounded strongly in 2005/06, regaining much of the Oceania market. Australia also competes in the Northeast Asian market.

China exports both long- and medium/short-grain rice, with Northeast Asia accounting for most of China's medium/short-grain exports. Although China's supply has tightened over the past several years, its medium/short-grain exports have remained nearly steady. Like Australia, Egypt produces

and exports almost exclusively medium/short-grain rice, with the Middle East and Mediterranean primary markets. Egypt has harvested bumper crops and exported record amounts of rice in recent years. However, water constraints make it unlikely that Egypt will be able to expand area, and Egypt's yields are already the highest in the world.

Iraq and Haiti Are Top U.S. Markets for Long-Grain Milled Rice

Long-grain milled rice (including brown rice) accounts for about half of all U.S. rice exports. The Middle East, the EU-25, the Caribbean, Sub-Saharan Africa, and Canada have been the major markets in recent years. Iraq and Saudi Arabia are the largest U.S. markets in the Middle East. Haiti is the largest market in the Caribbean, followed by the Dominican Republic and Jamaica.

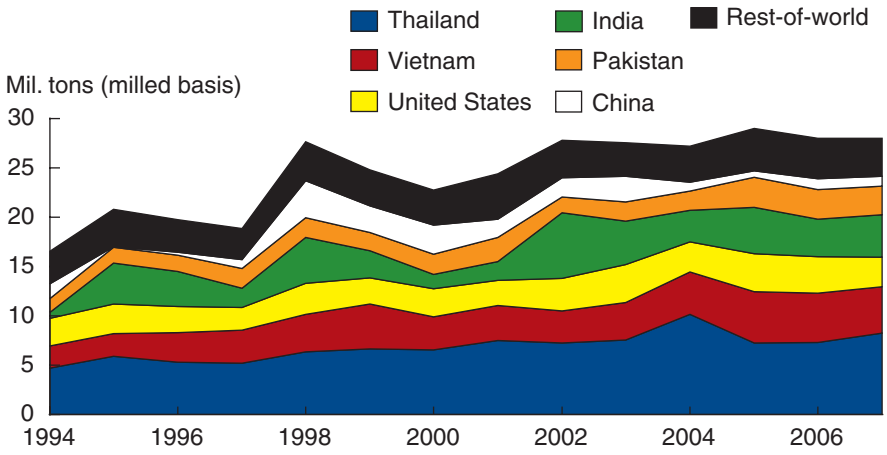
The EU-25 imports mostly long-grain brown rice from the United States that is fully milled in the EU-25, then typically shipped within the region. The EU-25 tariff on brown rice is substantially lower than the EU-25 tariff on milled rice. U.S. milled rice is typically not competitive in the EU-25, a result of the much higher EU-25 tariff on milled rice and a significant U.S. price difference over major Asian competitors. The U.S. faces competition in the EU-25 from Asian milled rice and from basmati brown rice from India and Pakistan. Both India and Pakistan receive tariff preferences in the EU-25 due to their former colonial status. The United States has supplied about a third of EU-25 rice imports in recent years.

Ghana is the largest market for U.S. rice in Sub-Saharan Africa and typically the only major commercial market for U.S. rice in the region. Food aid typically accounts for the bulk of U.S. shipments to other markets in the region. The United States is not price competitive in Sub-Saharan Africa, and Asian exporters supply most of the region's rice imports. U.S. commercial sales in the global market are almost exclusively high-quality rice, while Sub-Saharan Africa purchases mostly low- or medium-quality rice. In recent years, the South American exporters—Uruguay, Argentina, and Brazil—have shipped rice to Sub-Saharan Africa, with low-priced brokens accounting for a large share of the shipments.

Canada is typically the smallest major market for U.S. long-grain milled rice. The United States is the largest supplier of rice to Canada and supplies most of Canada's nonaromatic rice imports. Canada also imports a small amount of U.S. medium/short-grain rice. Although Mexico and Central America are mostly rough rice markets, the United States ships a very small amount of long-grain milled rice to each market.

The long-grain milled rice market typically accounts for most of the year-to-year volatility in the volume of U.S. rice exports. This volatility is primarily due to fluctuations in U.S. crop sizes and to strong competition from low-priced Asian exporters, primarily Thailand—the world's largest rice-exporting country. Vietnam, India, and Pakistan—also major rice exporters—compete with the United States in certain long-grain milled rice markets as well. These five countries—including the United States—typically account for more than

Figure 8
Thailand is the largest rice exporting country



2006 and 2007 forecasts.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, PS&D Online.

80 percent of the total volume of rice exported annually. If the U.S. price difference over Asian competitors becomes too wide, the United States can rapidly lose market share in the long-grain milled rice market.

China, Argentina, Uruguay, Guyana, and Burma export smaller amounts of long-grain milled rice. Argentina and Uruguay compete with the United States in some Western Hemisphere markets. China, Burma, and Guyana rarely compete with the United States in the long-grain milled market due to quality issues. Although a net importer, Brazil exports a small amount of long-grain milled rice within Latin America and, since 2005, has shipped larger amounts of rice to Sub-Saharan Africa. Argentina, Uruguay, and Brazil have recently competed with the United States in the Haitian market. Excluding aromatic rice and a few other minor specialty rices, long-grain milled rice accounts for about 70 percent of global rice trade.

U.S. Rice Faces Stiff Competition in South Africa and the Middle East

Sub-Saharan Africa is the largest rice-importing region in the world, with Asian exporters supplying the bulk of its rice imports and the Western Hemisphere most of the remainder. The Middle East is the second or third largest global import market, with Iran, Iraq, and Saudi Arabia the largest importers in the region. Over the past decade, the United States has steadily lost market share in the long-grain milled rice market in the two regions, primarily due to strong competition from India and Thailand. Loss of markets in South Africa and Saudi Arabia, where the U.S. was a major supplier, accounts for most of the decline. The quality of Thailand's rice has improved sharply over the past few decades, with its high-quality 100 percent Grade B comparable to U.S. southern long grain (No. 2, 4-percent brokens). In recent years, India has improved the quality of its parboiled exports. The re-emergence in 2004/05 of Iraq as a major—albeit a very

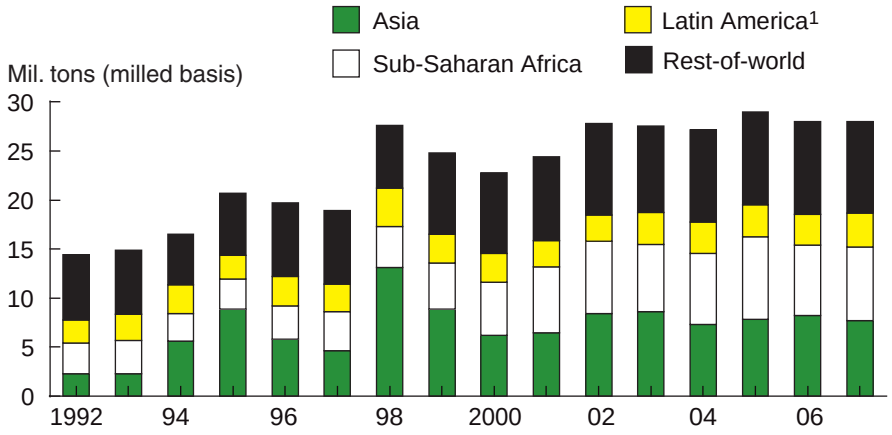
price-sensitive—buyer of U.S. rice has boosted the U.S. market share in the Middle East and reversed a long-term decline in that region.

Amid declining U.S. market share, Sub-Saharan Africa's rice imports have grown sharply in recent years, with Nigeria the largest market. Stagnant or declining production and strong population growth are behind the steady growth in Sub-Saharan Africa's rice imports. Breeders in the region are developing and releasing higher yielding rice varieties suitable to the climate and soils of Sub-Saharan Africa. These varieties have helped farmers in Nigeria to boost yields.

The United States ships very little rice to the huge Southeast Asian or large South Asian import markets. Both regions import mostly low- or medium-quality rice, while U.S. commercial sales are almost all high-quality. Indonesia, the Philippines, Bangladesh, and Malaysia are the largest rice importers in these two regions. The United States is not price competitive in these two regions and ships only a little rice to either region, mostly under food aid programs, with the Philippines typically the largest recipient. Despite a locational advantage, the United States also faces some competition from Asian suppliers in the Western Hemisphere. Vietnam supplies the bulk of the rice imported by Cuba, the largest rice market in the Caribbean. About a fourth of Canada's rice imports are aromatic rices from Asia.

Aromatic rice—primarily jasmine from Thailand and basmati from India and Pakistan—accounts for about 14 percent of global rice trade. Aromatic rice typically trades at prices much higher than prices for non-aromatic rice. Thailand exports most of its jasmine rice to higher income Asian markets and the United States. Jasmine accounts for 20-25 percent of Thailand's rice exports. The Middle East and EU-25 are the top markets for basmati rice. Basmati rice has replaced U.S. long-grain sales in some markets, primarily in the Middle East and EU-25.

Figure 9
Asia and Sub-Saharan Africa are the largest rice-importing regions



2006 and 2007 forecasts.
[1]Mexico, Central America, the Caribbean, and South America.
Source: U.S. Department of Agriculture, Foreign Agricultural Service, PS&D Online.

Glutinous rice, grown primarily in Southeast Asia, accounts for the remaining 1-3 percent of global rice trade. The major production areas for glutinous rice—also referred to as sweet rice or waxy rice—are the upper northern and northeastern regions of Thailand. Glutinous rice is most widely consumed in the areas where it is grown, as well as by certain communities in Laos and Cambodia. In addition to direct consumption, it is often used as an ingredient in sweet dishes and snacks, and by the brewing industry. Thailand supplies most of the glutinous rice exported globally, with most of it shipped within Asia. The United States grows and exports a very small amount of glutinous rice, with Japan the primary market.

U.S. Rice Industry: Market Trends, Challenges, and Opportunities

The U.S. rice market is currently facing several challenges, some the result of recent market changes and others due to long-term trends. These challenges include higher fuel and fertilizer costs, a long-term geographic shift in rice acreage, steady growth in imports, and continued reliance on the global market for sales. The impacts of these challenges are partially offset by stronger annual yield growth and increasing domestic disappearance. In addition, the U.S. rice market will likely face several new challenges in the near term. The most critical challenges will be potential changes in the global trade policy environment and slower growth in global rice trade.

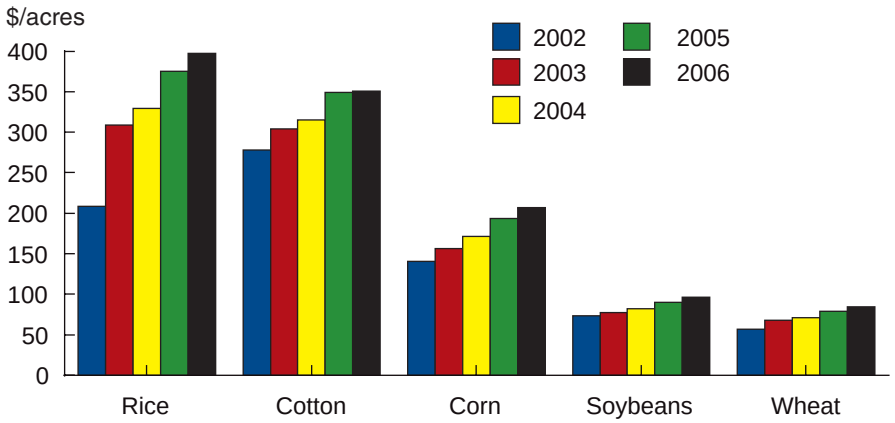
U.S. Rice Farmers Face Higher Fuel and Fertilizer Costs

Compared with other major row crops, rice is a high-cost crop to grow in the United States. Total operating costs for rice in 2005 averaged $375 per acre, compared with $193 for corn, $90 for soybeans, and $79 for wheat. Only cotton, with operating expenses in 2005 estimated at $349 per acre, came close to rice. For 2006, total operating costs for rice are forecast at $397 per acre, compared with $351 for cotton, $207 for corn, $97 for soybeans, and $84 for wheat.

Fuel, fertilizer, and irrigation expenses account for the bulk of the higher operating costs for rice. Thus, the substantial increase in fuel prices since 2003 has had a much larger impact on the economic viability of rice farming than on other major field crops. For 2005, costs for fuel, lubricants, and electricity for rice production are an estimated $110 per acre, compared with $38 for corn, $37 for cotton, $17 for wheat, and $14 for soybeans. These expenses are up sharply from a year earlier, when they averaged $78

Figure 10

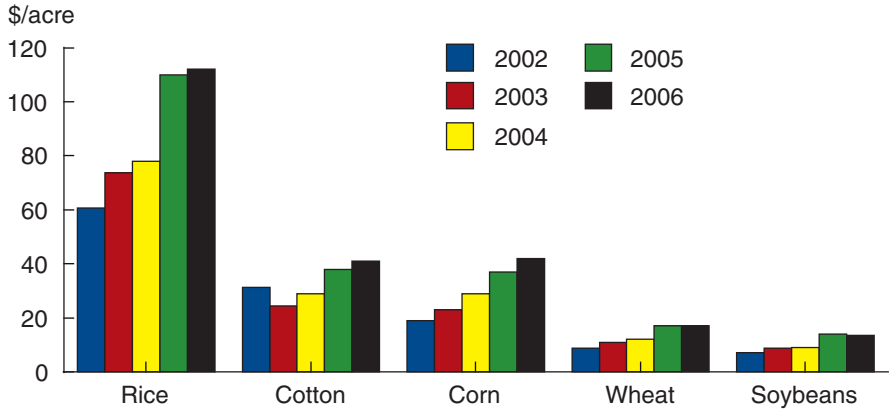
Rice and cotton have the highest per acre operating costs among major field crops



2006 forecasts.

Sources: 2004-2005 estimates, U.S. Department of Agriculture, Economic Research Service, Farm Income and Costs Briefing Room, Commodity Costs and Returns: U.S. and Regional Cost and Return Data. 2006 forecasts, USDA, ERS, Farm Income and Costs Briefing Room, Cost of Production Forecasts.

Figure 11
Rice has the highest per acre expenses for fuel among major field crops[1]



2006 forecasts. [1]Includes fuel, lubricants, and electricity.

Sources: 2002-2005 estimates, U.S. Department of Agriculture, Economic Research Service, Farm Income and Costs Briefing Room, Commodity Costs and Returns: U.S. and Regional Cost and Return Data. 2006 forecasts, USDA, ERS, Farm Income and Costs Briefing Room, Cost of Production Forecasts.

per acre for rice, $29 for cotton and corn, $12 for wheat, and $9 for soybeans. Fuel, lubricant, and electricity costs for rice are forecast to be even higher in 2006 than in 2005. The cost of running pumps and conducting other operations required for flood irrigation account for the much higher fuel and energy costs for rice than for other field crops.

Most commercial fertilizer is derived from natural gas, so fertilizer prices are also inflated by rising fuel prices. Like fuel and electricity expenses, rice has the highest per acre fertilizer expense among major field crops, estimated at $70 per acre in 2005, versus $56 for corn, $40 for cotton, $29 for wheat, and $10 for soybeans. In 2004, fertilizer expenses were an estimated $58 for rice, $47 for corn, $34 for cotton, $26 for wheat, and $8 for soybeans. The University of Arkansas estimated that higher energy prices in 2005 added about $80 per acre to Arkansas rice farmers' operating costs, a much larger increase than for most other crops.[3]

Energy price increases have historically been short term and largely driven by supply shocks, often instigated by political developments in the Middle East. In contrast, the current high energy prices are primarily due to stronger global demand, mostly from the fast-growing economies of China and India, which are likely to continue to increase their demand. The higher fuel prices may cause many U.S. rice farmers—especially in the Delta—to shift acreage to lower cost crops like soybeans. Areas without a viable alternative crop will likely convert to pasture or biomass crops for biofuels.

Rice Acreage Continues To Shift From the Gulf Coast to the Mississippi Delta

Despite a relatively high level of U.S. rice acreage from 1997 to 2005, rice acreage has continued to shift from the Texas Gulf Coast to the Mississippi Delta. U.S. rice acreage averaged 3.26 million acres per year from 1997 to

[3]Eric Wailes, Brad Watkins, Jayson Hill, and Eddie Chavez, "Impacts of Higher Energy Prices, Drought, and Hurricanes on Arkansas Rice Production in 2005," Department of Agricultural Economics and Agribusiness and the Arkansas Rice Research and Extension Center, March 2006.

2005, compared with 2.84 million acres from 1985 to 1995. A big boost in yields since 2000 (which increased the profitability of rice production), substantial payments under the marketing loan program from 1999 to 2003, and lack of any supply control measures are behind the high level of U.S. rice acreage from 1997 to 2005.

In contrast, Texas rice area dropped from almost 600,000 acres in 1980 to nearly half that by 1995 and to 181,000 acres by 2003. Texas rice area in 2006 is an estimated 150,000 acres. The decline in Texas acreage has been offset by increased rice plantings in the Delta, with Missouri and Arkansas accounting for most of the expansion. Rice plantings in Arkansas expanded from 1.35 million acres in 1995 to a record 1.65 million acres in 2005. Missouri rice acreage expanded from 119,000 acres in 1995 to a record 216,000 acres in 2005 and 2006. The Delta has much lower production costs—mostly due to lower water costs—and less competition for land from urban centers than does Texas.

The Texas rice-growing area and much of southwest Louisiana have an additional disadvantage. In most other rice-growing areas of the South—especially the Delta—rice is grown in 1- or 2-year rotations, with soybeans, the typical rotation crop. However, Texas growers have a difficult time finding a viable rotation crop, mostly due to the climate—too much rain in the spring and severe heat in the summer. Thus, in non-rice growing years, Texas growers typically idle the land or, in some areas, use it for pasture. This reduces the profitability of rice production in Texas compared with the Delta. Growers in southwest Louisiana face a similar situation, although rice acreage has not dropped nearly as sharply as in Texas.

The shift in rice acreage began in the early 1980s, a little more than 5 years after acreage allotments had been removed. Planting flexibility under the 1996 Farm Act further supported the shift. Contract holders were not required to grow rice or any program crop to receive direct payments or market loss assistance payments (replaced by countercyclical payments in the 2002 Farm Act). Much of the Texas rice crop is produced by tenant farmers. In years of low market prices, many contract holders found it more profitable to keep the payments and idle the land than to sign a cash lease with a tenant, share the payments, and produce rice or another commodity.

The economic impact of this shift has been a major concern for the Texas rice-growing community. In addition to the decline in farming operations, much of the input and processing infrastructure reduced operations in the Texas rice-growing area as well. Many of these communities are dependent on agriculture and related industries for their economic well-being. Finding an alternative crop for Texas rice growers has been difficult, primarily due to the climate.

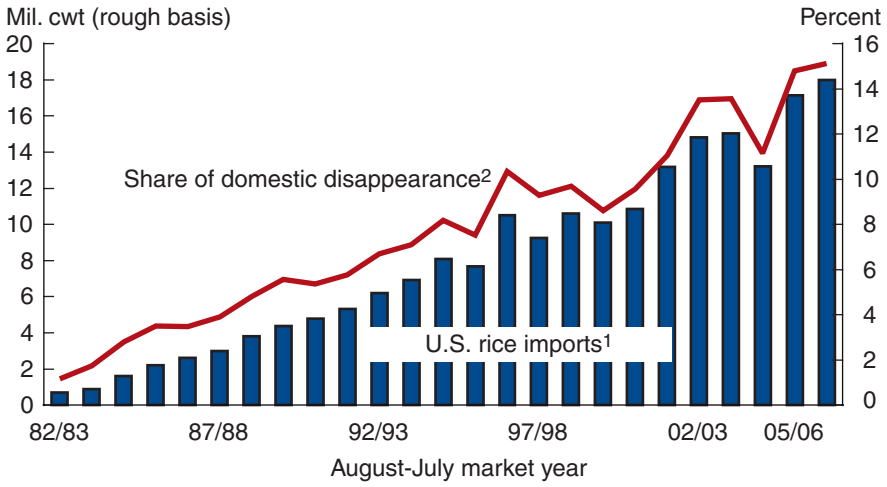
Imports Account for a Growing Share of the Domestic Market

U.S. rice imports have risen sharply over the past 20-plus years and now account for about 15 percent of total domestic disappearance, up from less than 4 percent in 1985/86. Until 2001/02, aromatic rice from Asia—jasmine

from Thailand and basmati from India and Pakistan—accounted for about 90 percent of U.S. rice imports. Aromatic varieties of the same quality are not currently grown in the United States. These imported aromatics are classified as long-grain rice. Imports of aromatic rice have expanded almost every year since 1980/81. Much of the initial increase in U.S. consumption of aromatic rice is attributed to a big increase in the share of the U.S. population from Asia. However, aromatic rice is served today in a variety of restaurants and sold in grocery stores across much of the country. Until the United States develops varieties of sufficient quality that can successfully compete with Asian aromatic rices, imports and the import share of domestic disappearance will continue to expand. U.S. plant breeders are focusing research efforts on developing varieties that can successfully compete with the Asian aromatic rices in the U.S. market.

In some years, Puerto Rico—the largest U.S. territory—has imported medium-grain rice instead of purchasing the rice from U.S. suppliers, mainly in California. (Puerto Rico is included in the domestic and residual component of the U.S. supply and use tables.) Relative prices, supply, freight rates, and institutional relationships determine whether purchasers in Puerto Rico buy rice from the United States or abroad. In 2001/02, Puerto Rico began importing medium-grain rice from Australia. In 2002/03, China also sold medium-grain rice to Puerto Rico. In 2003/04, only China had the medium-grain rice market, as Australia's supplies were extremely tight. There were no significant international sales of medium-grain rice to Puerto Rico in 2004/05, primarily due to tight supplies in both exporting countries and a record California harvest. In early 2006, Puerto Rico began importing medium-grain rice from Egypt and again from China because California prices were up sharply due to a weak harvest in 2005/06.

Figure 12
U.S. rice imports have increased sharply over the past 2 decades



2006/07 forecasts.
[1]Includes imports by Puerto Rico and the U.S. Virgin Islands. [2]Does not include seed use.
Sources: 1982/83-2003/04, *2005 Rice Yearbook*, U.S. Department of Agriculture, Economic Research Service. 2004/05-2006/07, *World Agricultural Supply and Use Estimates*, U.S. Department of Agriculture, World Agricultural Outlook Board.

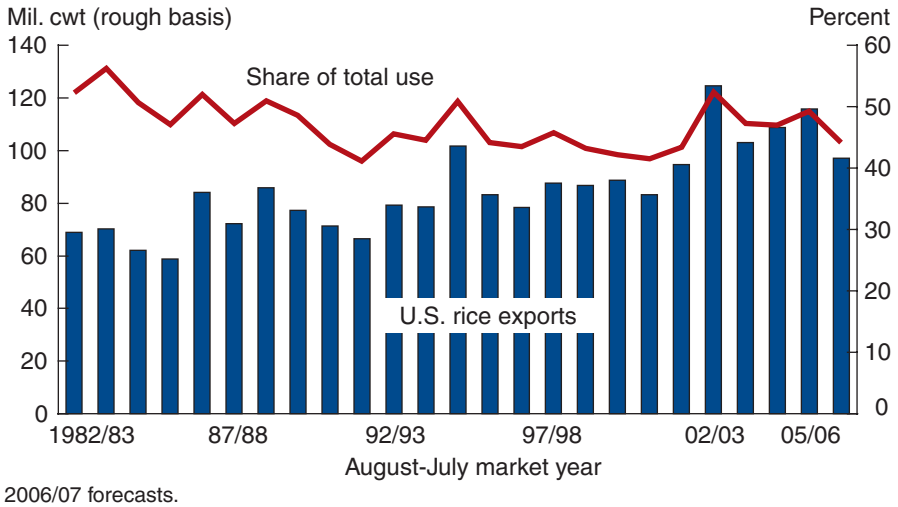
Over the next decade, U.S. rice imports are projected to increase faster than domestic disappearance and account for a rising share of the total domestic and residual use. Most of this growth is expected to come from greater sales of Asian aromatic rice to the United States.

Exports Remain Critical to the Health of the U.S. Rice Industry

The U.S. rice industry is more dependent on exports than are producers of corn or soybeans. The United States currently exports about half its rice crop, up from about 45 percent during the 1990s. Stronger exports and a slower expansion of the domestic market account for the increase in the share of the crop exported. Competitive prices, bumper crops, and tight supplies in other exporting countries are behind the growth of U.S. exports in recent years. The re-emergence of Cuba in 2001/02 and—to a greater degree—Iraq in 2004/05 as major markets for U.S. rice have been critical to supporting higher export levels as well. With rising yields and only a modest expansion in the domestic market expected over the next decade, exports will remain critical to the economic viability of the U.S. rice sector.

The U.S. rice industry faces several challenges over the next decade in the global rice market. First, can the United States maintain its market share of the long-grain milled rice market? The United States had lost market share—especially in the Middle East and Sub-Saharan Africa—over the past 15 years, primarily due to more competitive prices from Asian suppliers. The re-emergence of Iraq as a major buyer of U.S. rice has partially offset the U.S. decline in the global long-grain milled market. However, Iraq is a very price-sensitive buyer and has historically shifted sources based on relative prices. Thailand, Vietnam, and Pakistan typically sell long-grain milled rice at lower prices than the United States.

Figure 13
Exports typically account for slightly less than one-half of total use



2006/07 forecasts.

Sources: 1982/83-2003/04, *2005 Rice Yearbook*, U.S. Department of Agriculture, Economic Research Service. 2004/05-2006/07, *World Agricultural Supply and Use Estimates*, U.S. Department of Agriculture, World Agricultural Outlook Board.

Second, will the Latin American rough rice markets—primarily Mexico and Central America—continue to expand and will the United States continue to supply nearly all of these sales? To date, the United States has faced little competition in either market from Asian milled-rice exporters or from South American exporters of milled or rough rice. Argentina and Uruguay—Latin America's largest rice exporters—have historically shipped the bulk of their rice to Brazil and other South American buyers. However, both Argentina and Uruguay, as well as Brazil, can compete with the United States in Mexico and Central America.

Several factors point to continued expansion of U.S. sales to these markets. Mexico has one of the lowest per capita rice consumption levels in the Western Hemisphere, indicating potential for continued market expansion. Mexico has little ability to expand domestic production. U.S. rice-marketing efforts continue to promote increased rice consumption in much of Central America. In both markets, higher incomes are typically associated with higher per capita rice consumption.

U.S. Rice Growers Have Benefited from Stronger Yield Growth Since 2000

Annual U.S. yield growth averaged more than 2 percent from 2000/01 to 2005/06, after being virtually stagnant from 1988/89 to 1999/2000. The recent boost in rice yields has been due to the commercial release of several higher yielding long-grain varieties in the South. These new varieties include *Cocodrie, Wells, Banks, Francis, Cheniere*, *Priscilla, Lagrue, Arhent, Trenasse,* several conventional *Clearfield* varieties, and several hybrid varieties. *Clearfield* varieties are both conventional (CL131 and CL 161) and hybrid (RiceTec's *Clearfield* XL8).

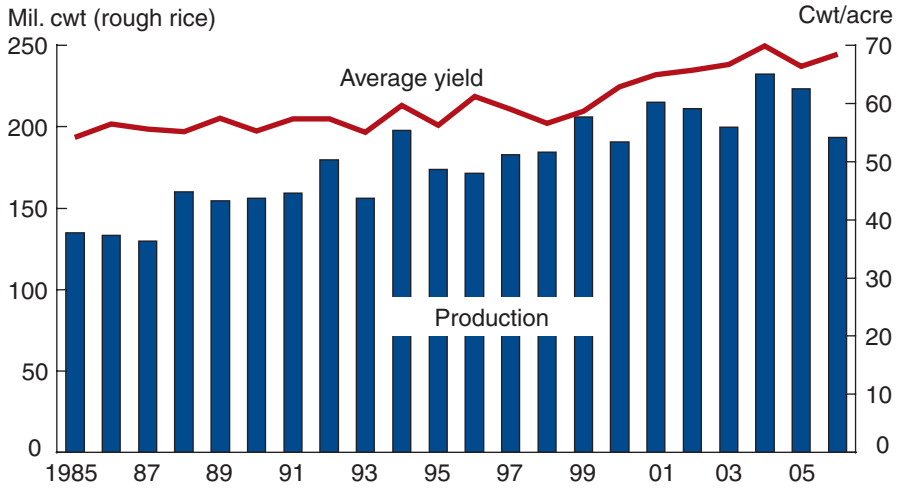
With much higher input costs—especially for fuel and fertilizer—higher yields will be critical to the economic viability of the U.S. rice sector. Operating costs per acre are estimated to have increased 33 percent from 2002/02-2005/06, mostly due to higher fuel and fertilizer costs. Total operating costs are forecast to have risen 41 percent from 2002/03 to 2006/07. To deal with rising costs, many rice producers have adopted a high-input, high-yield approach to farming.

Several herbicide-resistant *Clearfield* varieties have been released in the South since 2001 to fight red rice, a weed that competes with rice for sunshine and nutrients. Farmers can use the herbicide *Newpath* for red rice control since *Clearfield* rice is resistant to *Newpath*. Except for the *Clearfield* varieties, most herbicides that kill red rice will kill the commercially planted rice as well.

In addition to planting more conventional high-yielding rice varieties like *Wells* and *Trenasse,* farmers are also increasing their acreage of hybrid rice. Although hybrids cost more than conventional varieties, they have higher yield potential and several cost-saving attributes, including a much lower seeding rate.

Figure 14

Average U.S. yield growth has been stronger since 1999 than during the previous decade



2006 projections.

Sources: 1985-2005 estimates, U.S. Department of Agriculture, National Agricultural Statistics Service, Quick Stats database; 2004/05-2006/07, *World Agricultural Supply and Demand Estimates*, U.S. Department of Agriculture, World Agricultural Outlook Board.

Domestic Disappearance Continues To Increase

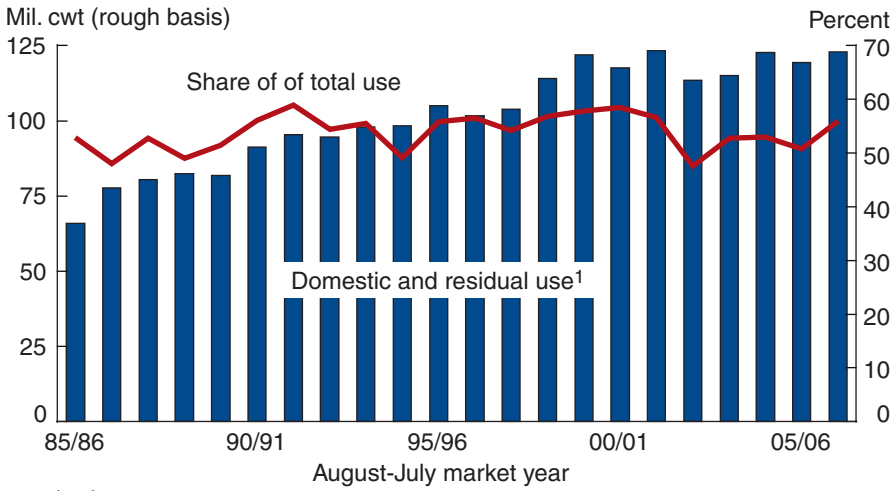
Total domestic disappearance (total domestic and residual use) is currently growing about 1 percent per year, slightly faster than of U.S. population growth. Over the next decade, both total and per capita rice disappearance are expected to continue rising, with food use accounting for nearly all of the growth. Population growth, ethnic composition, healthy lifestyles, convenience, and continued introduction of new products using rice are behind expectations of steady growth. Imports' share of domestic use is expected to increase. In contrast, little, if any, expansion in beer use is expected.

Although total domestic disappearance (including the residual) of rice continues to increase, the rate of growth has slowed since the 1980s and 1990s. During much of the 1980s, domestic disappearance rose about 5 percent per year. By the early 1990s, the growth rate slowed to 4 percent and was about 3 percent by the end of the decade. Since 2000/01, total domestic and residual use of rice has increased about 1 percent a year. The slower growth rate since 2000/01 may be partly due to a shift away from carbohydrates to a more protein-based diet, a trend that many argue has run its course.

Even with the recent slower growth, domestic disapearrance has doubled in the past 20 years. The domestic market (including the residual or unreported losses in processing, marketing, and transportation) is the primary outlet for U.S. rice, accounting for 51-53 percent of total use from 2003/04 to 2005/06. The domestic market's share was just 48 percent in 2002/03, a year of record U.S. rice exports. From 1990/91 to 2001/02, the domestic market's share of annual total use ranged from 55 percent to 59 percent. The recent decline in the domestic market's share of total use has been due to

Figure 15

Total domestic and residual use of rice continues to increase



2006/07 forecasts.

[1]Includes shipments to U.S. territories and seed use.

Sources: 1980/81 to 2003/04 domestic and residual use estimates, *2005 Rice Yearbook*, U.S. Department of Agriculture, Economic Research Service; 2004/05-2006/07, *World Agricultural Supply and Demand Estimates*, U.S. Department of Agriculture, World Agricultural Outlook Board.

stronger exports and slower growth in domestic use. Bumper crops and competitive prices have boosted U.S. export levels in recent years.

Global Policy Changes, Slower Trade Growth Will Likely Impact Export Levels

Over the next decade, U.S. rice exporters will likely be challenged by policy changes in key importing countries and slower growth in global trade. Of potential concern to U.S. exporters is the adoption of the "Every Thing But Arms" (EBA) policy by the EU-25 whereby rice imports from the 49 least developed countries will eventually be able to enter the EU-25 tariff free. The policy will be phased in for rice starting September 1, 2006, with duty-free status achieved by September 1, 2009.

It is not clear how or if this program will affect U.S. rice exports to the EU-25. First, none of the major Asian exporters—Thailand, Vietnam, India, Pakistan, and China—are classified as "least developed countries," so they cannot benefit from the tariff elimination. Second, while Burma and Cambodia qualify, quality issues and reliability are major factors limiting the ability of either country to export rice to the EU-25. Both countries are currently minor exporters, with most of their production consumed domestically. While Burma and Cambodia have the potential to expand production, it is not clear whether either country could improve quality sufficiently to export to the EU-25. Burma's export potential is severely limited by its policies and political environment.

In late 2005, the EU-25 reached an agreement with Thailand to lower its tariffs on imports of milled rice and brokens. The lower EU-25 tariffs apply to exporters based on a Most Favored Nation status. Tariffs on brown rice were unchanged. The previous tariff structure made brown-rice imports more

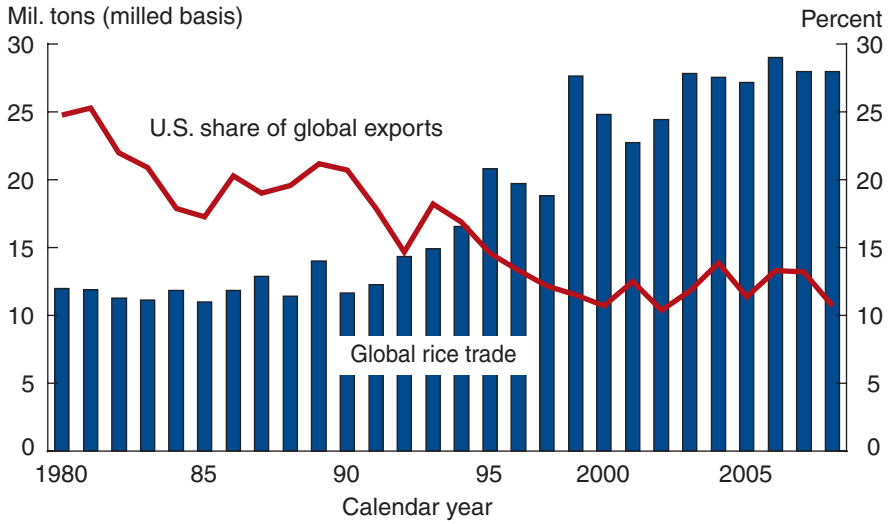
competitive than milled-rice imports in the EU-25. The narrowing of this tariff difference between milled and brown rice could hurt U.S. market share as the bulk of U.S. exports to the EU-25 are brown rice. Thailand exports mostly milled rice to the EU-25 and exports very little brown rice to any market. Thailand's milled rice typically sells at a discount to similar grades of U.S. rice. The smaller the tariff difference between brown and milled rice, the more competitive Thailand's milled rice becomes in the EU-25.

Slower growth in global rice trade will likely dampen U.S. rice export levels over the next decade. Global rice trade has expanded about 1 percent since 2002, the smallest increase since 1980-86 when global rice trade was nearly flat. In contrast, global rice trade expanded about 8 percent per year from 1995 to 2002. The recent slowdown is primarily due to weaker imports from several major buyers, primarily Indonesia, Bangladesh, and Brazil. These three top buyers—as well as the Philippines, another major importer—have produced bumper rice crops in recent years. Generally favorable weather in major producing areas, improved seeds, and a greater share of production from irrigated fields account for much of the gain in rice production.

A continued high degree of protection limits growth in world rice trade. Despite the partial opening by the WTO of Northeast Asian markets, rice still remains one of the most protected crops globally. High tariffs and import quotas are the main policy tools used to limit rice imports. Over the next decade, global rice trade is projected to expand at about 2 percent per year, up from recent rates but still well below the 1987-2006 average of more than 5 percent. Normal weather is assumed each year in USDA's 10-year baseline forecasts.

Expectations of modest trade expansion over the next decade are based on projections indicating slower global population growth and declining per capita rice consumption in most major Asian importing countries—a result of income-driven diet diversification. Weaker global trade growth reduces

Figure 16
Global rice trade growth has slowed since the 1990s



2006 and 2007 projections.
Sources: *PS&D Online*, U.S. Department of Agriculture, Foreign Agricultural Service.

upward price pressure in the international market. This affects U.S. farm prices and export levels, reducing the competitiveness of rice compared with other planting options for U.S. growers.

U.S. rice producers would benefit from increased price transparency, additional marketing outlets, and more risk management options. Rice producers have become more market oriented over the past decade in seeking the highest price for their rice. Still, increased market efficiency would further improve the economic well-being of most U.S. rice farmers.

Rice Market Characterized by Lack of Actual Price Information

In both the global and domestic rice markets, price data from actual transactions—as opposed to reported price quotes—are often hard to find. The lack of actual price information raises marketing costs for farmers. In fact, there is no location- or quality-specific daily reported price for rice that can act as a proxy for the U.S. average price. The rough rice futures contracts are for long-grain rice only. There is no futures market for medium- or short-grain rice or for milled rice of any class.

In California, which produces almost exclusively medium- and short-grain rice, most of the crop is sold under a pooling method whereby the rough rice price is determined by the price of the milled rice. Thus, actual rough rice prices are not determined until well after the end of the market year when all of the milled rice from that crop has been sold. For California rice growers, the lack of price information and marketing options rules out some of the marketing strategies available to producers of major commodities, such as timing sales based on cash or futures prices. In contrast, Southern long-grain growers have access to both futures and options, which expand their marketing opportunities.

Except for beer and certain processed foods and products, there is little substitution among the three classes of U.S. rice—long, medium, and short—in the U.S. consumer market. And price differences by class have to be rather large to cause substitution even in the processed food and industrial markets. Because of the limited substitution by consumers between types and classes of rice, price movements for medium-grain rice (grown mostly in California) and long-grain rice (grown almost exclusively in the South) can be in opposite directions. The large distance separating the two growing areas—California and the South—further reduces the likelihood of substitution based on a modest price difference by class. The export market is sharply stratified by class, type, and quality as well. This severe level of market segmentation makes price discovery even more costly and amplifies price movements and the risks producers face in marketing their crops.

Because the United States is only a minor producer of rice—accounting for less than 2 percent of global production—it has very little impact on global

trading prices. This is in sharp contrast to the U.S. role in the global wheat, corn, and soybean markets where the U.S. price can act as a virtual global trading price.

Because nearly half the U.S. crop is exported annually, the global rice market has profound impacts on U.S. price levels. Thus, the United States is essentially a price-taker in a global market that is sharply segmented by class, type, and quality. In addition, the prevalence of trade policies that restrict imports push domestic price instability in the global market, increasing price volatility. Thus, U.S. rice growers can face rapid price changes and economic losses initiated by unexpected international events, such as a major buyer's instituting an import ban or an exporter's—such as India in 2002—dumping excessive stocks in the global market. The small size of the global rice market—less than 7 percent of annual production—makes it susceptible to large price swings as well. Because of substantial government intervention in the global rice market—and the strong degree of market segmentation—knowledge of actual trading prices is scant and costly, making optimal marketing even more difficult for U.S. growers and millers.

Cooperatives Account for Bulk of Purchases in California and Arkansas

Several marketing outlets exist for U.S. rice producers, with marketing methods varying among individuals and by producing regions. Producer cooperatives are an important element. Cooperatives within the rice industry are more vertically integrated than most other farm cooperatives. Such cooperatives typically market 70-90 percent of the rice produced in Arkansas and California, the two largest producing States. In Louisiana, Texas, and Mississippi, rice producers primarily use direct sales or bidding to market their rice. In addition, the Louisiana Farm Bureau Marketing Association has a rice sales desk for marketing its members' rice.

Private rice mills in all rice-producing States buy rice directly from farmers using pricing methods that include pooling contracts, bidding, direct contracting, and hedging. Across producing regions, the movement (number of middle persons) from farm to retail is shorter for rice than for most other agricultural commodities.[4] In fact, many rice mills—including the large producer-owned cooperatives—package and label their rice in boxes and bags for consumer purchases at retail outlets.

California growers have fewer marketing options than Southern producers due to the State's remoteness from other producing areas and the large share of the California crop sold to cooperatives (or sold under similar "pooling" contracts). This type of marketing makes price discovery very difficult. In Arkansas, where both Southern rice-producing cooperatives are located, members can market through their cooperative or sell to independent mills in Arkansas or in a nearby State.

Futures Could Play a Larger Role

[4]Gail L. Cramer, Kenneth B. Young, and Eric J. Wailes, "Rice Marketing" Chapter 3.8 of *Rice: Origin, History, Technology, and Production*. C. Wayne Smith, and Robert H. Dilday, Editors, John Wiley & Sons, Inc. 2004.

in Price Discovery and Risk Management

The futures market is an important hedging tool for many U.S. farmers and could be an important risk management tool for all U.S. rice market participants, including producers, elevator operators, millers, and processors. However, less than 10 percent of the U.S. rice crop is traded in the futures and options market annually, compared with about 70 percent of corn and nearly 80 percent of soybeans.[5] Because of the small size of the rough rice futures market, daily futures price movements can be too volatile to allow prices to reflect market-clearing prices for actual physical sales.

Unlike other U.S. grains, much of the U.S. rice crop is marketed through cooperative pools and not hedged in the futures market. The cooperative system has created an informational void with the use of pool prices—whereby final prices to producers are not determined until after the end of the market year—and forward contracting in place of competitive auction-type markets. In recent years, rice cooperatives have increased their use of the futures market.

In addition to being small, rice futures contracts on the Chicago Board of Trade are quite narrow in scope. Rough rice futures contracts are only available for No. 2 or better grade of long-grain rough rice delivered to warehouses in eastern Arkansas. There are no futures contracts for medium- or short-grain rice or for milled rice of any class.

Despite these limitations, a 2002 joint University of Arkansas/USDA study found rice futures to be supporting the important marketing function of price discovery for long-grain rough rice and reducing the informational void created by the unique structure of the U.S. rice industry (Mckenzie, et al., 2002). The futures market could provide substantial price protection to the industry if utilized more widely.

Nearly 75 Percent of U.S. Rice Acreage Is Covered by Federal Crop Insurance

Government-subsidized crop insurance—covering 70-75 percent of rice planted area since 1999—is another risk-management tool available to rice producers. The Government currently subsidizes 60-65 percent of the total cost of insurance premiums for rice growers. Producers of rice purchase crop insurance policies at a subsidized rate under Federal crop insurance programs. These insurance policies make indemnity payments to rice producers when current yields fall below historic yields or revenue is below a predetermined target. Between 1995 and 2004, net indemnities (indemnity minus producer premium) ranged from $1 million in 1996 to $41.7 million in 1999.

Insurance plans now include revenue insurance as well as farm-level yield protection. The Federal Crop Insurance Corporation offers farmers two types of yield-risk management programs: (1) multiple-peril crop insurance—coverage based on farm-level yields (*Actual Planting History*), or (2) a group risk plan with coverage based on county-level yields (not available to rice growers). The *Actual Planting History (*APH) plans insure producers

[5]Based on open interest for rice futures and options contracts at the Chicago Board of Trade, September 30, 2005, and October 31, 2005, for rice, corn, and soybean futures and options contracts.

against yield losses due to natural causes such as drought, excessive moisture, hail, wind, frost, insects, and disease. The farmer selects the amount of average yield he or she wishes to insure, from 50 to 75 percent (in some areas up to 85 percent).

Two types of APH plans are used by rice producers. C*atastrophic Risk Protection* (CAT) policies provide a low level of yield protection—no payment unless yields are less than 50 percent of expected levels—but at a very low premium. Various *Buy-Up* (BUP) policies offer higher levels of yield protection with rising payments. About 60 percent of rice insured acres are at the CAT level, versus about 10 percent for corn and soybeans. Although subsidies for coverage levels above CAT have been increased since the late 1990s (premium subsidy for "Buy Up" coverage is now about 60 percent), insurance participation for rice has remained largely at the CAT level.

Subsidized revenue insurance was introduced for several major field crops in the mid- and late 1990s, partly to offset the reduced support (or to give farmers an additional tool to manage risk) following the 1996 Farm Act. One type of revenue insurance (*Crop Revenue Coverage*) was introduced for rice in 1999, another (*Revenue Assurance*) in 2003. The most widely used revenue insurance plan by rice producers is the *Crop Revenue Coverage* (CRC) plan. CRC plans provide revenue protection based on price and yield expectations by paying for losses below the guarantee at the higher of an early-season price or the harvest price. Crop revenue insurance plans provide protection from sharp drops in prices within a growing season, but provide little protection against price declines over different seasons. The *Revenue Assurance* (RA) plan provides dollar-denominated coverage by the producer selecting a dollar amount of target revenue equal to 65-75 percent of expected revenue.

Since 2000, about 85-95 percent of the rice acreage covered by Federal crop insurance has been under APH yield protection plan. Since 1995, when CAT policies were first offered, they have accounted for 65-82 percent of rice area covered by APH plans. From 2000 to 2004, CRC plans accounted for 7-14 percent of rice acreage covered by Federal crop insurance. In 2005, just 3,000 rice acres were covered by CRC plans. RA policies have only been used by U.S. rice producers since 2003, accounting for just 1-2 percent of covered acreage in 2003 and 2004. However, the share tripled to 6 percent in 2005.

Current Policy Overview

Commodity Program Provisions of the 2002 Farm Act

The 2002 Farm Act (http://www.ers.usda.gov/features/farmbill/) governs Federal farm programs over a 6-year period (2002-07). The only major difference from the previous act for rice producers was the inclusion of countercyclical payments, which replaced the ad hoc market loss assistance (MLA) payments authorized in the 1996 FAIR Act for the 1998-2001 rice crops. This section describes the programs that affect rice. The next section, analyzes selected issues related to the Farm Bill and rice production.

The 2002 Farm Act includes the following provisions for the rice sector:

Direct payments—Farmers who have established rice base acres are eligible to receive fixed direct (or contract) payments. Direct payments are decoupled from current production and prices, providing farmers with a predetermined annual payment. The direct payment equals 85 percent of the farm's complying rice base acreage times the farm's program yield times the direct payment rate. The program yield is determined by a procedure outlined in legislation; it has not been changed since 1985. The direct payment rate for rice is fixed at $2.35 per hundredweight (cwt). In the first 3 years of the 2002 Farm Act, direct payments to rice contract holders averaged $426 million annually.

Countercyclical payments—Rice contract holders are eligible for countercyclical payments when the season-average farm price for rice is below $8.15 per cwt (the target price of $10.50 per cwt minus the contract payment rate of $2.35). The countercyclical payment rate increases as the season-average price declines. The maximum countercyclical payment rate of $1.65 per cwt is reached when the season-average farm price is $6.50 per cwt or less. Like the direct payments, the countercyclical payments go to the contract holder. Countercyclical payments are decoupled from current production, but are linked inversely to current prices.

The quantity of rice eligible for countercyclical payments is equal to 85 percent of the base acreage times the farm's program yield for rice. The 2002 Act allows producers who updated their base acreage to update their program yield using 1998-2001 yield data. This opportunity was not extended to direct payments. The countercyclical payment is equal to the payment rate times the quantity eligible for payment. From 2002 to 2004, countercyclical payments averaged $156 million annually. This compares with average annual market loss assistance payments of $391 million for 1998-2001.

Marketing assistance loans—Rice producers are eligible for marketing loans averaging $6.50 per cwt for current production. Marketing loans provide short-term liquidity until the farmer's crop is marketed, and also provide a guaranteed minimum level of revenue from production. Producers can repay the marketing loan at the loan rate (plus interest) or at a loan repayment rate—the adjusted world price—if it is less than the loan rate. They can also keep the loan and forfeit to the Government the rice

used as collateral. Or producers can forgo the loan and accept a loan deficiency payment (LDP) if the repayment rate is below the marketing loan rate. If the producer receives an LDP, or repays the loan at a repayment rate lower than the loan rate, the government-operated Commodity Credit Corporation (CCC) absorbs these costs.

The marketing loan program for rice is different than for most other program commodities in that the repayment rate is based on the difference between the loan rate and *adjusted world price* instead of county posted prices. This affects farm program payment levels. In the U.S. rice market, domestic and global prices do not necessarily move in the same direction, primarily due to quality differences that allow U.S. rice to sell at a higher price than rice of a similar grade from most major competitors, especially Vietnam, India, Pakistan, and China. Of the major rice exporters, only Thailand ships top-quality nonaromatic or other non-specialty rice that is comparable to U.S. quality. Thailand exports medium- and low-quality rice as well.

For market years 2002-2004, total payments under the marketing loan program averaged $446 million annually. Total payments under the marketing loan program have declined each year since 2002 due to rising world prices. In May 2006, the adjusted world price exceeded the loan rate for all three classes of rice, making U.S. producers ineligible for marketing loan benefits. USDA's 2005/06 baseline forecasts project the adjusted world price to exceed the loan rate over the 10-year projection period.

Export assistance—In addition to these direct income supports, U.S. rice farmers benefit from several programs that promote U.S. agricultural exports. Three types of government programs account for the bulk of government assistance available to U.S. rice exporters.

First, the United States sells rice on *concessional credit terms* and *donates* rice to needy countries either bilaterally or through the World Food Program. USDA currently provides food aid abroad through four channels: the Public Law 480 (P.L. 480) program, the Section 416(b) program, the Food for Education program, and the Food for Progress program. In fiscal year 2005, about 150,000 tons of rice—or 3.5 percent of total U.S. rice exports—were purchased under U.S. food aid programs, down from 214,100 tons in fiscal 2004 and 309,600 tons in fiscal 2003. The P.L. 480 program—Titles I and II—accounts for the largest share of annual U.S. food aid shipments—about 60 percent U.S. rice under food aid programs in fiscal 2004. Food for Progress accounted for 26 percent and Food for Education accounted for the remainder. There has been no rice purchased under Section (416)b since fiscal 2002. In fiscal 2005, the P.L. 480 program (Titles I and II) accounted for more than 80 percent of the U.S. rice purchased for donation.

Second, USDA provides *export credit guarantees* for commercial financing of U.S. agricultural exports administered by the Commodity Credit Corporation (CCC). The Export Credit Guarantee program (GSM-102) covers credit terms for up to 3 years. It underwrites credit extended by private banks in the United States (or, less commonly, by the U.S. exporter) to approved

foreign banks using dollar-denominated, irrevocable letters of credit to pay for food and agricultural products sold to foreign buyers.

The CCC must qualify exporters for participation before accepting guarantee applications. Financial institutions must also meet established criteria and be approved by the CCC before they can participate. The exporter negotiates the terms of the export credit sale with the importer. Once a firm sale exists, the qualified U.S. exporter must apply for a payment guarantee before the date of export. The exporter pays a fee calculated on the dollar amount guaranteed, based on a schedule of rates. Since July 1, 2005, fee rates have been based on the country-specific risk that the CCC is undertaking, as well as the repayment terms and repayment frequency under the guarantee. The new structure is in response to rulings by the World Trade Organization (WTO) that export credit programs must be risk based and that fees charged for participation must be sufficient to cover long-term program operating costs and losses.

Since July 1, 2005, the CCC has no longer accepted applications for payment guarantees under the Intermediate Export Credit Guarantee program (GSM-103), in response to the WTO decision that export credit programs must be risk based. In addition, under the *Supplier Credit Guarantee program*, the CCC guarantees a portion of payments due from importers under short-term financing (up to 180 days) that exporters have extended directly to the importers for the purchase of U.S. agricultural commodities and products. In fiscal 2004, nearly $119 million of U.S. rice exports was shipped under credit guarantee programs.

Third, USDA funds the creation, expansion, and maintenance of foreign markets for U.S. agricultural products through *marketing programs* that help U.S. agricultural exporters finance the marketing and distribution of their products abroad. Included in this category are the Market Access Program (MAP) and Foreign Market Development Program (FMD). These marketing promotion programs provide exporters greater access to credit and credit risk protection. Other programs that promote exports of U.S. rice include the Emerging Market Program, the Qualities Samples Pilot Program, the Cochran Fellowship Program, and Section 18. Additional information on these programs can be found at: http://www.fas.usda.gov/export.html.

How the Marketing Loan Program Works

Marketing loans are intended to provide short-term liquidity until the farmer's crop is marketed, and also provide a guaranteed minimum level of revenue from production. The program allows producers to repay nonrecourse commodity loans at a rate less than the original loan rate plus accrued interest, when the adjusted world price (as calculated weekly by USDA) is below the loan rate. The payment rate under the program is the difference between the adjusted world price (AWP) and the national average loan rate for rough rice. The average rough rice loan rate is legislatively fixed at $6.50 per cwt. To achieve the national average loan rate, separate loan rates are calculated for each class of rice—long, medium, and short—based on historic average milling yields and production.

The AWP is calculated by USDA each week and posted on the Internet on Wednesday at 7:00 AM eastern time at: ftp://ftp.fsa.usda.gov/public/cotton/default.htm. It is reported by class (long, medium, and short) for both rough and milled rice and includes a price for brokens (not specified by class). The calculated AWP is based on reported international transaction prices, market weights, marketing costs such as bagging fees, and several quality factors, including milling rates. The calculated AWPs for milled rice by class are converted to a rough basis using estimated milling rates for both head rice and brokens. The rough rice AWPs by class are used to determine the repayment rates by class.

The 2002 Farm Act extends nonrecourse commodity loans with marketing loan provisions, but eliminates the requirement that rice producers enter into an agreement for direct payments in order to be eligible for loan program benefits. All current rice production is eligible for the program, subject to payment limitations. Farmers can receive government payments in two ways: (1) marketing loan gains or (2) loan deficiency payments. A marketing loan gain (MLG) occurs when producers repay their nonrecourse CCC commodity loans at a repayment rate less than the loan rate. The difference between the loan rate and the repayment rate is referred to as a marketing loan gain. Or, producers can opt to receive a payment when the adjusted world price is below the loan rate in lieu of taking out commodity loans. These payments are referred to as loan deficiency payments (LDPs).

For details on marketing assistance loans, MLGs, and LDPs, visit the program provisions section in the Farm and Commodity Policy: Program Provisions briefing room at http://www.ers.usda.gov/Briefing/farmpolicy/2002malp.htm.

Farm Bill Issues from a Domestic and Trade Policy Perspective

As with producers of other commodity program crops, the level, type, and eligibility for government payments under future legislation is a source of uncertainty for stakeholders in the rice sector (rice farmers and owners of rice base acres). Rice policy under the 2007 farm bill will likely be determined by the overall direction of U.S. farm policy, particularly programs affecting direct commodity payments to producers of major field crops. Domestic market conditions and Federal budget concerns are important in this debate. In addition, any resumption in the Doha Round of the World Trade Organization (WTO) negotiations, as well as any regional trade agreements, will also affect legislation.

The current and projected Federal budget deficit, in particular, will likely play a significant role in the farm bill debate. The 2002 Farm Act was considered at a time when projected budget surpluses allowed for increased spending on farm programs. However, the 2007 farm bill debate is occurring at a time when there is concern over large projected deficits in the Federal budget, which could affect funding levels for domestic farm programs. Thus, budget concerns could result in potential changes to the overall level of spending and basic structure of commodity programs, or in modifications to existing programs such as loan rates, direct and counter-cyclical payment rates, the use of commodity certificates, and payment limitations.[6] In addition, funding for crops currently supported by commodity programs could face competition from proposals to provide support for other farm commodities, to expand support for conservation programs, or to change current restrictions on planting fruits and vegetables (Womack, 2005). Virtually no rice acreage is enrolled in the Conservation Reserve Program. The Mountain States, Southern Plains, and the Corn Belt account for most Conservation Reserve Program acreage.

[6]Commodity certificates are payments issued by the Commodity Credit Corporation (CCC) in lieu of cash payments to participants in farm subsidy or agricultural export programs. Holders of certificates are permitted to exchange them for commodities owned by the CCC.

Government Payments Are a Significant Share of Rice Sector Revenue…

Government payments constitute a large share of rice sector revenues, and are quite large compared with most other program crops on a value-of-production or per-base-acre basis. Government payments to the rice sector under the three main commodity programs (marketing loans, direct payments, and countercyclical payments) for example, averaged $949 million annually during market years 2002/03-2005/06, or about 39 percent of the gross receipts to the rice sector. By comparison, the same payments were equivalent to 19 percent of cash receipts for all eligible program crops and 5 percent of cash receipts to the entire farm sector for calendar years 2003-2005.[7] For the U.S. rice industry, direct government payments for market years 1999/2000-2002/03 were the highest on record, a result of weak domestic and global prices. Direct payments as a share of total revenue for the rice sector averaged 60 percent for 1999/2000-2002/03, well above the 1976/77-2005/06 average of 34 percent.

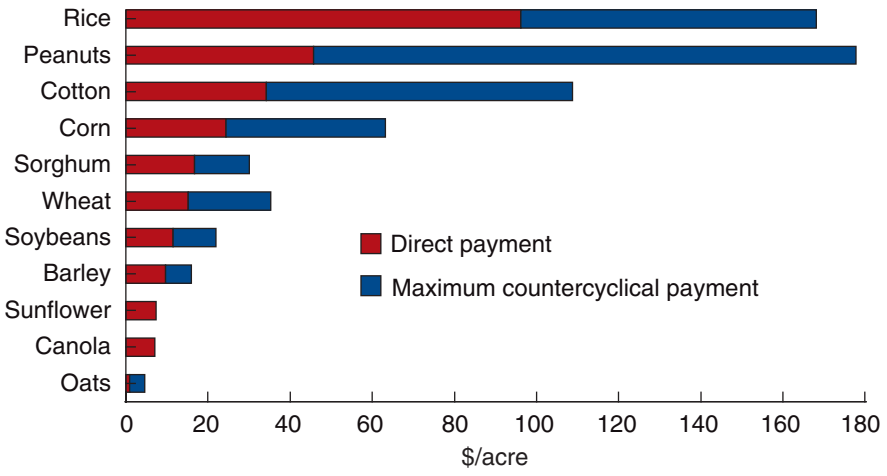
[7]Based on historical calendar year data from 2003-05 (http://ers.usda.gov/Data/FarmIncome/Finfidmu.htm/). About 40 percent of all farms receive some type of direct government payment.

Assuming a maximum countercyclical payment, per-base-acre payments (direct payments plus countercyclical payments) for rice under the 2002 Farm Act are calculated at $168, compared with $63 for corn, $35 for wheat, and $22 for soybeans. Only peanuts, at $178 per base acre, exceed the calculated level for rice (fig. 17). Thus, the impact of eliminating or reducing farm program payments (including lower payment limitations) could be much more severe for the rice sector than for most other program commodities. Cotton and peanuts are the only other program crops as dependent on farm payments as the rice sector. In addition, off-farm income accounts for a smaller share of total farm household income for rice producers than for producers of most other program commodities. According to the U.S. Department of Agriculture's 2004 Agricultural Resource Management Survey (ARMS), off-farm income accounted for 31 percent of total farm household income for rice producers, well below 61 percent for corn, 58 percent for soybeans, and 53 percent for wheat.

Rice farmers would face disproportionate difficulty under reduced program payments for additional reasons. First, most rice farms have large investments in specialized equipment and infrastructure, making it costly to switch to an alternative crop. Second, much of the U.S. rice crop is grown in areas without another economically viable crop. The climate along the Texas Gulf Coast is too wet for soybeans and the region needs greater investment in infrastructure to support an expanded livestock sector. Much of the Delta rice soil is not suitable for cotton, although soybeans are a viable rotation crop. In California, most producers grow rice year after year on the same land. Much like the Gulf Coast, the California rice area has few economically viable alternative crops. If payments were reduced, some California rice producers may be able to switch to fruits, vegetables, tree nuts, or other crops if returns were high enough to justify initial investments.

Figure 17

Per acre government payments are highest for peanuts, rice, and cotton[1]



[1]Assumes national average payment yields and maximum countercyclical payments.
Source: Young et al. , 2005.

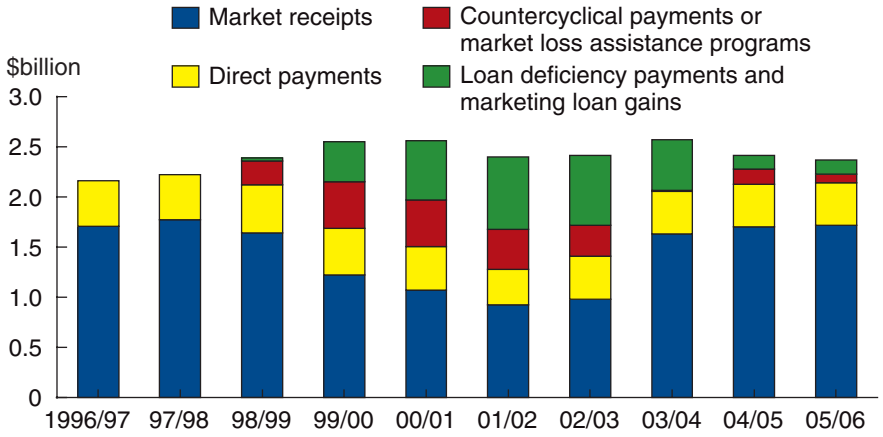
…But Are Declining With Higher Domestic and Global Prices

Government payments to the rice sector declined each year from 2001/02 to 2004/05 and are estimated to have declined in 2005/06 as well. A big decline in marketing loan benefits—due to higher world prices—has accounted for much of the reduction in government payments since 2003/04. The adjusted world price has increased each year since 2003/04. In fact, most government payments since 2004/05 have been direct and countercyclical payments made to farms with rice base acres rather than marketing loan benefits associated with current rice production. Total payments under the marketing loan program have declined from $723 million in 2001/02 and $700 million in 2002/03—years in which global prices were extremely low—to $135 million in 2004/05. The 2005/06 marketing loan payments are estimated at $128.0 million. USDA's 2005/06 long-term baseline forecasts indicate that the adjusted world price for rice will steadily rise over the next decade, equaling or exceeding the loan rate each year from 2007/08 to 2015/16. This would make producers ineligible for marketing loan benefits. The 2005/06 baseline projects domestic rice prices to steadily increase over the next decade as well.

Countercyclical payments have typically been smaller than the market loss assistance payments they replaced in the 2002 Farm Act and are declining in the face of higher U.S. prices. Since 2003/04, the U.S. season-average farm price has been well above levels reported from 1999/2000 to 2002/03. Government payments under all three programs are estimated to have accounted for 28 percent of gross revenue to the rice sector in 2005/06, down from 61 percent in 2001/02.

With rising global and domestic prices, government payments as a share of gross revenue are expected to continue to decline over the next 10 years. In fact, contract holders are not expected to receive countercyclical payments in 2006/07 as the U.S. season-average farm price is projected to be well

Figure 18
Revenue sources for the rice farm sector



Sources: Government payments: U.S. Department of Agriculture, Farm Service Agency. Market receipts: U.S. Department of Agriculture, National Agricultural Statistics Service, Quick Stats database.

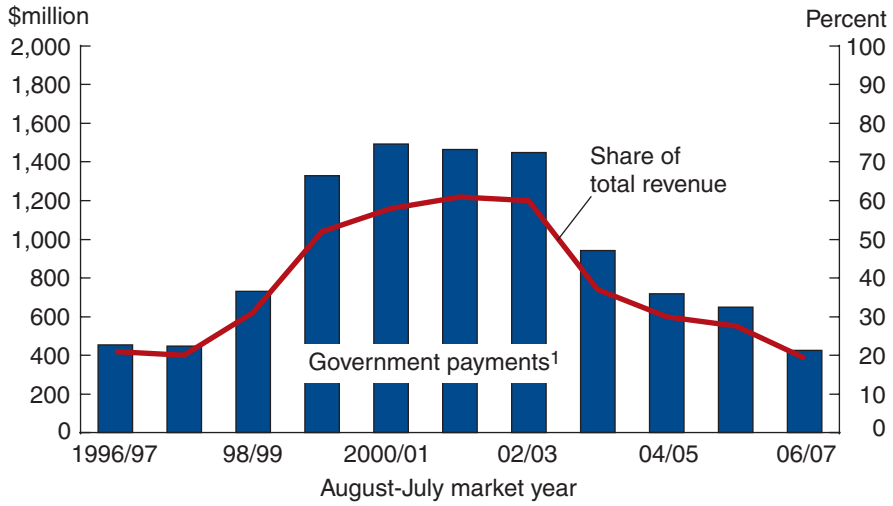
above $8.15 per cwt. Despite expectations of higher U.S. and global rice prices in 2006/07, U.S. rice plantings are estimated to have dropped 16 percent in 2006/07, primarily due to higher fuel costs and difficulty getting loans. Weather problems limited plantings in some areas as well, primarily Louisiana and California.

WTO and Regional Trade Agreements Boost U.S. Rice Exports…

Existing trade agreements under the **WTO** and **NAFTA** have been critical in increasing the level of U.S. rice exports. The recently passed Dominican Republic-Central America Free Trade Agreement (CAFTA-DR) will likely boost U.S. rice sales as well. Both the NAFTA and WTO agreements—signed in the mid-1990s—have increased U.S. rice exports to key global markets, primarily Mexico and Northeast Asia.

Impact of the WTO. As part of the 1994 Uruguay Round Agreement (which also established the WTO), both Japan and South Korea agreed to partially open their domestic markets to imported rice. Japan's minimum-access imports expanded each year from 1995 to 2000; South Korea's expanded from 1995 to 2004. In 1999, Japan opted for tariffication, which halved the rate of import growth required in 1999 and 2000. Under tariffication, the Government of Japan allows over-quota imports, but at a substantially higher tariff than in-quota imports. Prior to tariffication, no rice imports over the minimum access level were allowed. Despite Japan's move to tariffication, there have been no over-quota imports to date as the tariff on any over-quota rice is prohibitively high. Japan's import quota remains fixed at 682,000 tons (milled basis) until another agreement is reached. In 2001, as a requirement for joining the WTO, Taiwan agreed to partially open its rice market in 2002 to imported rice. Taiwan's import commitments remain at

Figure 19
Program payments for rice have dropped sharply since 2002/03



2005/06 preliminary; 2006/07 forecasts.
[1]Direct payments, counter-cyclical payments, and marketing loan benefits.
Sources: Government payments: U.S. Department of Agriculture, Farm Service Agency. Market receipts: U.S. Department of Agriculture, National Agricultural Statistics Service, Quick Stats data base.

the 2002 level of 144,720 tons (brown rice basis), and fixed until another agreement is reached.

In 2005, South Korea renegotiated its WTO commitments, agreeing to double the amount of rice imported annually to 408,000 tons (milled basis) by 2014 in return for a 10-year delay in implementing full trade liberalization for its rice market. South Korea also agreed to permit up to 30 percent of the imported rice to be sold directly to consumers by 2010. Until 2006, all imports had been used by food processors to make products such as rice crackers. Like Japan, neither South Korea nor Taiwan import rice beyond their WTO commitments. Despite the partial opening of these three markets, the bulk of the rice consumed in each country is still produced domestically. In fact, very little of the imported rice has been purchased directly by consumers in any of these three countries.

The U.S. supplies about half of Japan's annual rice imports and is a major supplier to both South Korea and Taiwan as well. Virtually all of this rice is medium/short grain, nearly all from California. Japan is the highest valued market for U.S. rice, and these three markets together account for more than two-thirds of California's rice exports. WTO imports by Japan, South Korea, and Taiwan account for around a third of the medium-grain rice imported globally. Negotiations aimed at further opening these markets would greatly support the U.S. rice sector.

Regional Trade Agreements. Prior to NAFTA, Mexico was a minor importer of rice, buying mostly from Asian sources. Today, it is the largest market for U.S. rice (based on quantity) and one of the largest import markets for rice in the Western Hemisphere. In the Western Hemisphere, only Cuba and Brazil typically import more rice annually than Mexico. With Mexico's rice production stagnant (or declining) and consumption rising every year, Mexico is expected to remain the largest single-country market for U.S. rice well into the foreseeable future. Per capita rice consumption is quite low in Mexico compared with most Latin American countries, so there is opportunity for more consumption and increased imports. Long-grain rough rice from the Southern U.S. accounts for more than 90 percent of U.S. rice exports to Mexico. An October 2002 *Agricultural Outlook* article—"NAFTA's Impacts on U.S. Agricultural Trade & Beyond" (http://www.ers.usda.gov/publications/agoutlook/oct2002/ao295i.pdf) — provides additional information on the benefits of NAFTA to the U.S. rice industry.

The recently signed CAFTA-DR treaty will likely boost U.S. rice exports. The U.S. already supplies nearly all of the rice imported by Central America and most of the rice imported by the Dominican Republic. U.S. shipments to Central America increase almost every year and the size of the market is rapidly catching up with Mexico's. Except for the Dominican Republic, these markets import almost exclusively rough (or unmilled) rice. Virtually all of this rice is long grain from the Southern United States. A small amount of U.S. milled rice is shipped to Central America each year as food aid. The United States is the only major exporter that allows rough rice exports. The governments of all the major Asian rice exporters—Thailand, Vietnam, India, Pakistan, and China—prohibit the export of rough rice in order to support their internal milling industry. Mexico, Central America,

and the Dominican Republic currently account for more than 45 percent of the volume of southern U.S. rice exports (total rough, brown, and milled). Like California, the Southern rice industry is quite dependent on exports for its economic viability, with more than half the region's crop typically exported annually.

…And Impose Constraints on Policy Options

Government outlays to rice producers are relevant to more than the U.S. budget; they have implications for, and are affected by, international agreements such as the WTO and various regional trade agreements.[8] As a member of the WTO, for example, the United States agreed to limit the amount of trade-distorting domestic support provided to the agricultural sector. Rice producers benefit from marketing loans, countercyclical payments, and crop insurance subsidies that are, or may be, subject to aggregate spending limits under existing WTO agreements. Global tariffs and other barriers to market access could factor into a new WTO agreement or unfolding regional trade agreements. Because U.S. tariffs on imported rice are already quite low, U.S. rice growers would likely be net gainers from a more open global trading environment and lower tariffs worldwide.

WTO Domestic Support Issues: Under the WTO agreement, the U.S. agreed to limit total trade-distorting or "amber box" support for agriculture to no more than $19.1 billion annually after 2000.[9] The value of amber box price support to the rice sector ranged from $459 million to $1.42 billion annually between 1996 and 2001, or 2-7 percent of the total annual limit. Government payment of storage fees and marketing loan benefits have previously been declared as amber box payments under the WTO by the United States. The United States has not declared how government payments to the rice sector and other crops under the 2002 Farm Act will be notified to the WTO.[10]

Even without a new trade agreement, the legality of some domestic farm policies is being challenged under current WTO rules and may affect policy options. Brazil's recent successful challenge to some segments of the U.S. cotton program, although not directly related to rice (except for export credit programs), may have general ramifications for the U.S. commodity programs, including the marketing loan and countercyclical payments that were implicated in the ruling. The United States has already made some adjustments to its export credit guarantee programs to comply with one aspect of the WTO ruling on export subsidies (Schnepf, 2005). Specifically, the United States has adopted new risk-based fees on borrowers and eliminated the GSM-103 credit program to ensure that, over the long term, borrower fees entirely cover program costs.

[8]See http://www.ers.usda.gov/Briefing/WTO/Glossaries.htm for a glossary of domestic and trade policy terms.

[9]A traffic light analogy plus a blue light is used to categorize domestic support policies and place them in one of four colored policy boxes. Amber box policies are policies that directly influence production decisions and are subject to careful review and spending limitations. Amber box policies include policies such as market price support, direct payments, and input subsidies.

[10]For information on the domestic support provisions of the WTO, see http://www.ers.usda.gov/Briefing/WTO/domestic.htm.

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Appendix 1

Operating and Financial Characteristics of Farms Producing Rice: More Specialized Versus Less Specialized Rice Farms

According to the 2004 Agricultural Resource Management Survey (ARMS),[11] farms that grew rice averaged 1,116 acres of cropland in 2004, of which 1,055 acres were harvested crop acres (appendix table 1). Rice accounted for 371 harvested acres or 35 percent of the harvested crop acres and for 49 percent of the farm value of production. Production specialty (determined by the largest proportion of gross commodity receipts from the farm operation) across farms growing rice was 68 percent for rice, 7 percent for soybeans, and 4 percent for cotton. Farms that grew rice were concentrated in Arkansas (39 percent), Louisiana (25 percent), and California (25 percent). Rice grown in Arkansas is typically rotated every 2 or 3 years with soybeans. Rice grown in California is usually grown continuously. In Arkansas, the production specialty across farms growing rice was 14 percent for soybeans and 50 percent for rice (appendix table 1a). In California, no farms specialized in soybeans.

Farms vary widely in size and other characteristics, ranging from very small retirement and residential farms to establishments with sales in the millions. ERS combines occupation of operators and sales class of farms to assign farms into one of three categories:

- **Commercial** farms: annual sales of $250,000 or more;
- **Intermediate** farms: annual sales less than $250,000 and whose operators report farming as their primary occupation; and
- **Rural-residence** farms: annual sales less than $250,000 and whose operators report their primary occupation as either retirement or off-farm.

Farms that grew rice were mostly commercial and intermediate farms. Commercial farms accounted for 51 percent of the total compared with 46 percent intermediate and 3 percent rural residence (appendix table 2).

Characteristics of More Specialized and Less Specialized Rice Farms

Farms growing rice where rice accounted for more than 75 percent of the total value of production (more specialized rice farms) were distinct from less specialized rice farms. More specialized rice farms accounted for 51 percent of total rice production. On average, rice accounted for 95 percent of the total value of production on more specialized rice farms, compared with 32 percent on less specialized rice farms (appendix table 1).

Farms that were more specialized in rice were generally smaller in size and level of sales than less specialized rice farms. More specialized rice farms had, on average, much lower gross and net farm incomes and substantially fewer financial assets than less specialized rice farms. More specialized rice

[11]For more information on ARMS and to access data, see http://www.ers.usda.gov/Briefing/ARMS/

Appendix table 1
Characteristics of rice farms, 2004

Item	More specialized[1]	Less specialized	All rice farms
Total farms	3,060	2,924	5,984
ARMS share (percent)			
Rice farms	51	49	100
Rice acres	49	51	100
Rice production	51	49	100
Farm value of production from rice (percent)	95	32	49
Farm size (average acres):			
Operated	657	1,752	1,192
Owned	140	349	242
Rented	517	1,403	950
Cropland	583	1,673	1,116
Harvested crop acres	426	1,713	1,055
Sales class (percent of farms):			
Less than $40,000	4	1	2
$40,000 -$99,999	21	2	12
$100,000 - $249,999	50	20	35
$250,000 - $499,999	16	30	23
$500,000 or more	9	47	28
Rice acreage (average):			
Harvested	358	384	371
Yield (cwt per acre)	75	71	73
Other crop acreage (average):			
Soybean	49	809	420
Cotton	0	208	102
Production specialty (percent of farms):[2]			
Rice	100	35	68
Soybean	0	15	7
Cotton	0	9	4
Rice States (percent of farms):			
Arkansas	12	68	39
Louisiana	40	9	25
Mississippi	1	10	6
Texas	8	2	5
California	39	11	25

[1]More specialized rice farms are farms where rice value of production is greater than 75 percent of total value of production.
[2]Production specialty is the farm's production classification that represents the largest proportion of gross commodity receipts from the farm operation.

Source: 2004 USDA Agricultural Resource Management Survey.

farms were concentrated in Louisiana and California. Less specialized rice farms were concentrated in Arkansas (appendix table 1).

About 68 percent of more specialized rice farms were classified as intermediate and 28 percent as commercial farms, compared with 22 percent intermediate and 77 percent commercial on less specialized rice farms. Very few farms in both categories were classified as rural residence farms. Farming was the primary occupation on 88 percent of more specialized rice farms and 97 percent of less specialized rice farms (appendix table 2).

Appendix table 1a
Characteristics of rice farms, 2004

Item	Arkansas	California	All rice farms
Total farms	2,346	1,509	5,984
ARMS share (percent)			
Rice farms	39	25	100
Rice acres	42	25	100
Rice production	40	31	100
Farm value of production from rice (percent)	37	68	49
Farm size (average acres):			
Operated	1,577	531	1,192
Owned	282	195	242
Rented	1,295	336	950
Cropland	1,517	505	1,116
Harvested crop acres	1,608	501	1,055
Sales class (percent of farms):			
Less than $40,000	5	1	2
$40,000 -$99,999	6	6	12
$100,000 - $249,999	25	38	35
$250,000 - $499,999	26	35	23
$500,000 or more	38	20	28
Rice acreage (average):			
Harvested	395	375	371
Yield (cwt per acre)	69	89	73
Other crop acreage (average):			
Soybean	811	0	420
Cotton	179	10	102
Production specialty (percent of farms): [1]			
Rice	50	80	68
Soybean	14	0	7
Cotton	8	0	4

[1]Production specialty is the farm's production classification that represents the largest proportion of gross commodity receipts from the farm operation.

Source: 2004 USDA Agricultural Resource Management Survey.

Financial Characteristics of More Specialized and Less Specialized Rice Farms

Less specialized rice farms had gross crop sales three times larger than sales on more specialized rice farms (appendix table 3). Net farm income for more specialized rice farms was about one-quarter that of less specialized rice farms. More specialized farms had a larger share of farm household income accounted for by off-farm income—40 percent versus 26 percent on less specialized farms.

Reflecting the lower profitability of more specialized rice farms, farm asset and equity positions of less specialized rice farms were much higher than of more specialized rice farms. Financial positions were more favorable for less specialized rice farms than for more specialized rice farms (appendix table 3).

Appendix table 2
Farm operator characteristics of rice farms, 2004

Item	More specialized[1]	Less specialized	All rice farms
Average operator age (years)	52	51	52
Operator age (percent of farms):			
Less than 50 years	40	41	40
More than 50 years	60	59	60
Education (percent of farms):			
Less than high school	7	3	5
Completed high school	35	42	39
Some college	36	31	33
Completed college	22	24	23
Primary occupation (percent of farms):			
Farming	88	97	93
Retirement	9	2	5
Nonfarm job	3	1	2
Farm typology (percent of farms)[1]:			
Rural residence	4	1	3
Intermediate	68	22	46
Commercial	28	77	51

[1]Rural residence farms had operators whose occupation was retirement or a nonfarm job. Intermediate and commercial farms had operators whose primary occupation was farming. Intermediate farms had sales less than $250,000, whereas commercial farms had sales of $250,000 or more.

Source: 2004 USDA Agricultural Resource Management Survey.

Appendix table 3
Financial characteristics of rice farms, 2004

Item	More specialized	Less specialized	All rice farms
Gross value of production (dollars)	231,439	676,981	449,170
Rice value of production (dollars)	219,684	219,603	219,644
Rice value of production (percent)	95	32	49
Farm income statement ($ per farm):			
Gross cash income	305,278	702,683	499,485
Livestock sales	2,218	9,577	5,815
Crop sales	158,479	521,208	335,741
Government payments	49,788	77,683	63,420
Commodity-program payments	49,255	76,200	62,356
Conservation payments	533	1,483	1,064
Cash expenses	240,038	519,044	376,385
Net cash farm income	65,240	183,639	123,100
Depreciation	15,800	46,782	30,940
Net farm income[1]	46,102	174,674	108,933
Farm balance sheet ($ per farm):			
Farm assets	545,359	1,316,285	922,102
Farm liabilities	51,956	197,779	123,218
Farm equity	493,403	1,118,506	798,884
Debt/asset ratio	0.10	0.15	0.13
Favorable position (percent)[2]	56	65	60
Farm household income ($ per household):			
Total household income	69,425	171,219	119,567
Farm-related income[3]	40,970	125,846	82,779
Off-farm income	28,455	45,373	36,788
Earned sources	16,922	37,050	26,837
Unearned sources	11,533	8,322	9,951

[1]Net farm income is net cash farm income less costs for depreciation and noncash benefits for hired workers, plus the value of the inventory change in 2004 and any nonmoney income. Nonmoney income includes the value of farm products consumed on the farm and an imputed rental value for the farm dwelling.
[2]Favorable position means a positive income and debt/asset ratio less than 0.40. These farms are generally considered financially stable.
[3]Farm-related income is that portion of farm income that is accrued by the farm household. Farm-related income is then adjusted to reflect any other households that share in the farm business income, and the farm earnings of household members other than the farm operator.

Source: 2004 USDA Agricultural Resource Management Survey.

Appendix 2

Rice Production Costs and Returns Without Government Payments

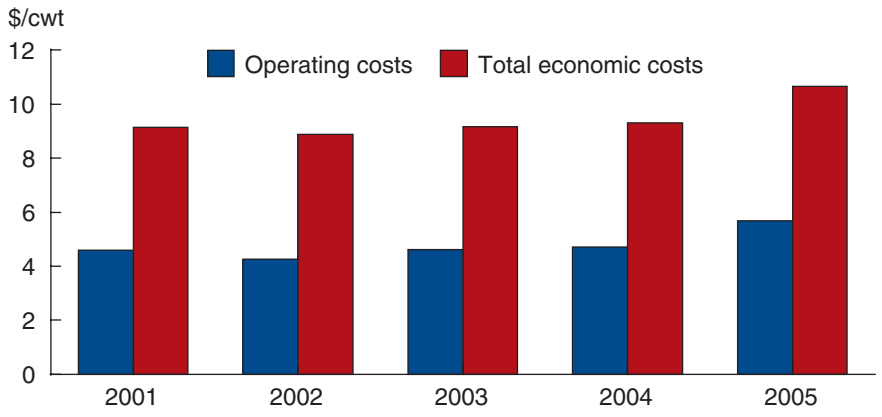
In the short run, annual production decisions are typically based on the relationship between operating costs and expected prices. Operating costs for rice production include such items as seed, fertilizer, pesticides, fuel, and custom operations. As the planning span increases and capital assets have to be replaced, producers must consider total economic costs in relation to prices. In addition to operating costs, total economic costs include the annualized cost of maintaining the capital investment (depreciation and interest) in machinery, equipment, and facilities, and costs for property taxes and insurance as well as costs for land and labor. The replacement of farm assets requires substantial investments, so farmers often make that decision in conjunction with determining whether to continue producing a particular commodity.

To illustrate how production costs compare with per unit production revenues excluding government payments, appendix figure 1 shows both operating and total economic costs of rice production for crop years 2001-2005. During these years, the season-average price for rice varied from $4.25 per cwt in 2001 to $8.08 in 2003. The season-average price for rice was less than average total economic costs in each year from 2001 to 2005.

Reliance on Program Payments

One way to assess the extent to which farmers rely on subsidy payments to cover their economic costs of production is via the *economic cost ratio* (ECR), a ratio of expenses to revenues. The ECR gives the economic rather than accounting cost required to produce each dollar of agriculture's value of producing crops and livestock. An ECR greater than 100 percent suggests

Appendix figure 1
U.S. rice production costs, 2001-2005



Note: These costs do not include storage and marketing costs. Ownership costs include land costs. In this figure, costs refer to costs solely related to rice production.

Source: U.S. Department of Agriculture, Economic Research Service, Data Sets, Commodity Costs and Returns. http//www.ers.usda.gov/Data/CostsAndReturns.

that a farm operation is in difficulty, although it may be still be able to operate in the short run. An ECR equal to 100 percent indicates a state of equilibrium in which there is no theoretical incentive for change for a particular size of operation or commodity.

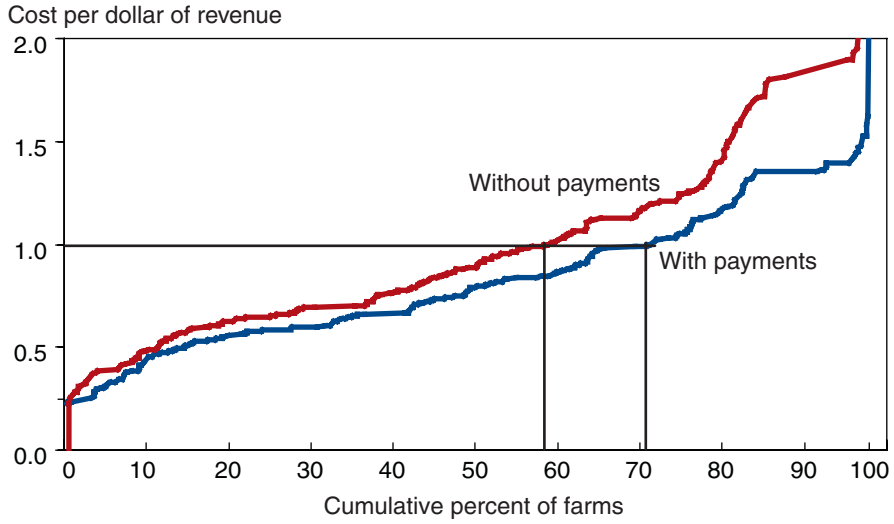
Appendix figure 2 compares ECR with and without government payments. Of particular interest is the vertical distance between the cumulative distribution of the ECR with payments and that without. This vertical distance can be considered the dependence of farms–in the context of the ECR–on program payments.

Distribution of Rice Farms by Economic Costs

In 2004, at least 70 percent of all rice-producing farms had whole-farm operations that were considered profitable. About 30 percent of rice-growing farms were unable to cover economic costs (total cash cost plus an allowance for depreciation, along with an imputed return to management and to unpaid labor of the operator and family) with farm-related income. Appendix figure 2 shows that 59 percent of rice-growing farms in 2004 had farm revenues greater than costs with government payments excluded. The share able to cover economic costs rises to 71 percent when government payments are included as farm revenues.

Appendix figure 2

Distribution of rice farms by economic costs per dollar of revenue, 2004



Note: In this figure, costs and returns refer to the whole farm operation of farms that produce rice.

Source: 2004 USDA Agricultural Resource Management Survey.