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U.S. Agriculture After Hurricanes Katrina and Rita: Status and Issues

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Specialists in Agricultural Policy
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Summary

On August 29, 2005, Hurricane Katrina struck the Gulf Coast region coming ashore just east of New Orleans. On September 24, 2005, Hurricane Rita hit the Gulf Coast region making land fall near the border of Texas and Louisiana. Both hurricanes left behind widespread devastation. Rita appears to have done most of its damage to energy infrastructure off-shore in contrast to Katrina which devastated large swaths of Louisiana, Mississippi, and Alabama. This report examines the impact of these hurricanes on three important factors affecting the U.S. agricultural sector: marketing infrastructure based on the Mississippi River waterway and Gulf ports; production losses for major crop and livestock producers in the affected region; and potential consequences for agricultural production as a result of high energy costs. It also discusses the federal government response to agricultural concerns.

Agricultural producers from the states directly impacted by Katrina have suffered economic losses, although this varies greatly by crop and locality. Preliminary estimates by USDA is that Hurricane Katrina contributed to \$882 million in total crop, livestock, and aquaculture losses. Those activities most affected were aquaculture (\$151 million), sugar cane (\$50 million), and cotton (\$40 million). The damage estimate does not include losses in timber and nursery and greenhouse products. No preliminary estimate has been released by USDA concerning agricultural damage from Hurricane Rita.

Hurricane Katrina temporarily halted the flow of agricultural trade through New Orleans — a major gateway for U.S. oil imports and agricultural exports — causing commodity prices to decline in interior markets along the Mississippi River waterway. Although partial recovery of marketing infrastructure occurred soon following Katrina's passage (with a brief shutdown in late September due to Hurricane Rita), substantial congestion and high costs continue to plague the Mississippi River grain transport network. This traffic bottleneck and its depressive effect on farm commodity prices could persist into the spring of 2006.

Energy prices jumped substantially in early September 2005, as a significant portion of U.S. petroleum and natural gas production, import, and refining facilities were damaged and shut down. There is considerable uncertainty surrounding the permanency of energy price rises and their potential impact on the U.S. economy in general, and U.S. agriculture in particular. By raising the overall price structure of production agriculture, sustained high energy prices could result in significantly lower farm and rural incomes in 2006.

Certain ongoing federal programs, primarily crop insurance and disaster loans, are available to eligible producers. The combination of Hurricanes Katrina and Rita with a Midwestern drought might also cause Congress to consider supplemental crop and livestock disaster assistance. This report is intended as an overview of how the hurricanes have affected and are likely to continue to affect the agricultural sectors of both the impacted regions and the United States. It is not intended to provide a day-to-day update of events. It will, however, be updated as events warrant.

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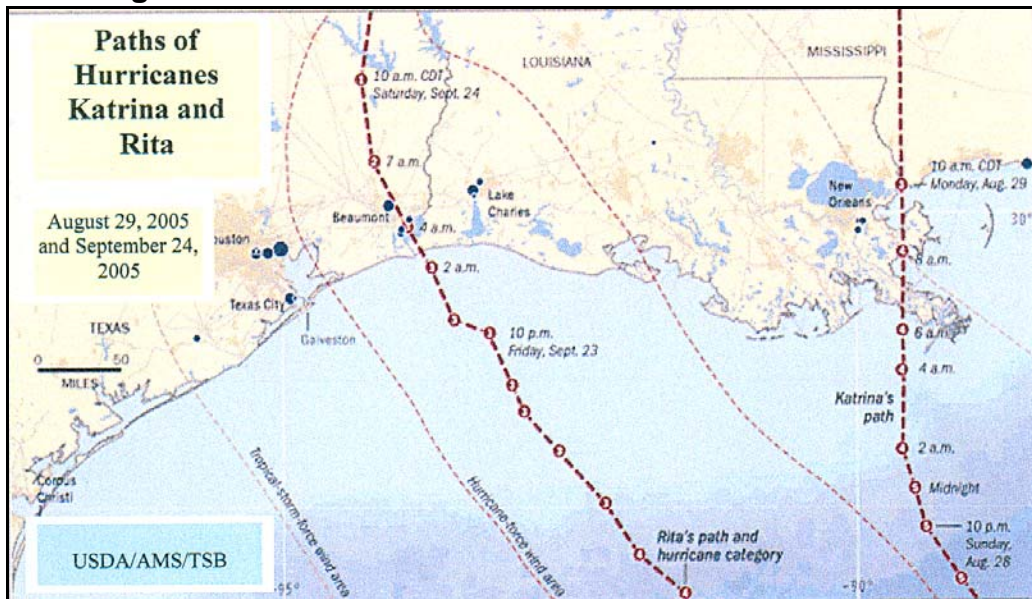
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U.S. Agriculture After Hurricanes Katrina and Rita: Status and Issues

On August 29, 2005, Hurricane Katrina struck the Gulf Coast region coming ashore just east of New Orleans near the Louisiana border with Mississippi. On September 24, 2005, Hurricane Rita hit the Gulf Coast region making land fall near the border of Texas and Louisiana. This report examines the impact of these hurricanes on three important factors affecting the U.S. agricultural sector: marketing infrastructure based on the Mississippi River waterway and Gulf ports; production losses for major crop and livestock producers in the affected region; and potential consequences for agricultural production as a result of high energy costs. It also discusses the federal government response.

Figure 1. Gulf Coast Paths of Hurricanes Katrina & Rita



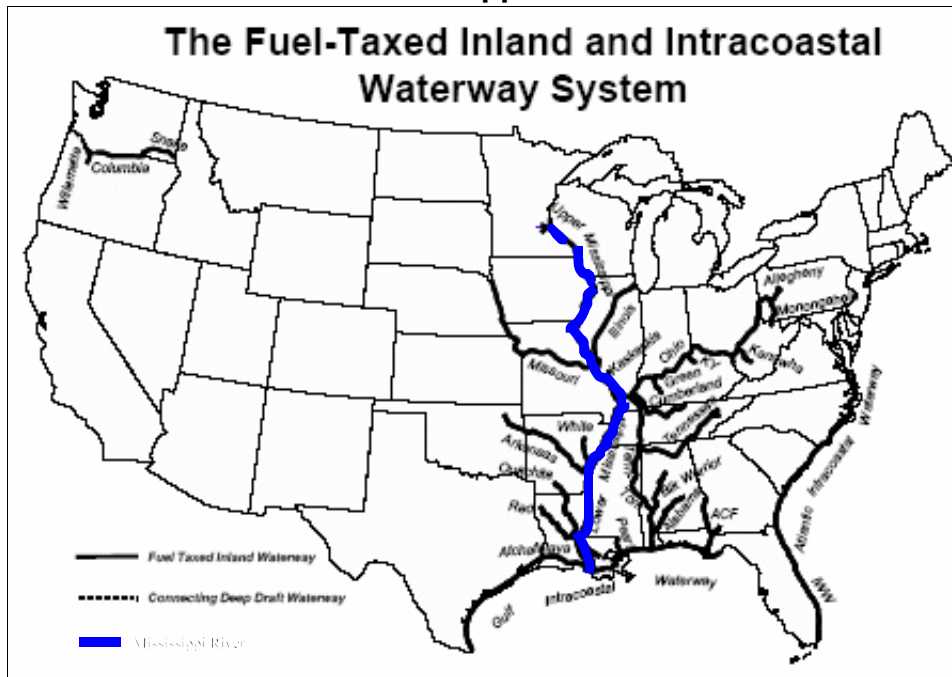
Agricultural Marketing Infrastructure Issues

Overview and Current Status

Hurricane Katrina damaged much of the nation's grain marketing infrastructure located in the New Orleans region including port facilities, river traffic infrastructure (buoys, moorings, channels, etc.), and grain elevators, as well as those barges and ships in the region at the time of landfall. Agricultural traffic on the Mississippi River came to a temporary standstill. The sharp decline in barge availability shifted transport demand to rail and truck systems that were already operating near capacity, thus driving alternate transport prices higher and contributing to substantial

congestion within the Mississippi River grain transportation system centered on the Mississippi River and its tributaries — the Missouri, Illinois, Ohio, and Arkansas Rivers (**Figure 2**). Grain elevators within the Mississippi River inland waterway system have reported disruptions in train service as rail cars were being diverted to handle grain previously destined for barges according to the Kansas Grain and Feed Association.¹ Farmers' transportation options also have been hurt by rising fuel prices which have sharply increased the cost of moving grain by truck. Economists are reporting the shortage of rail cars and storage space could last into 2006.²

Figure 2. Most U.S. Inland Waterways are Centered on the Mississippi River



In a competitive market, the price that producers receive for their agricultural commodities is derived from the price established in major markets such as Gulf port export terminals, less the transportation and handling costs required to move grain from the farm to those markets. When marketing costs rise — as they have in the wake of Katrina — farm-gate prices usually fall and along with them so do farm and rural incomes. This is exactly what has happened following Katrina's damage to the inland barge-based Mississippi River system. The news media reported sharp drops in commodity prices in interior producing regions that depend on the Mississippi River as an outlet for their surplus production.

When weather services and news media forecast a second hurricane — Rita — approaching the central Gulf coast, authorities shut down those transport services that were still operable or had already been restored. Fortunately, Hurricane Rita dissipated in intensity prior to landfall and dealt only a glancing blow to most Gulf

¹ *U.S. Rail News*, September 21, 2005, p. 140.

² *Ibid.*

coast transport infrastructure. As a result, Mississippi River-based agricultural transportation has again resumed its post-Katrina recovery; however, grain traffic flows are still well below last year's pace. Mississippi Gulf grain inspections during each of the first two weeks of September were 81% and 79% below levels of a year earlier.³ Gulf vessel loading activity was also significantly below levels of a year earlier.

Agricultural producers remain concerned about the rapid resumption of barge traffic on the Mississippi in advance of the peak harvest-time period, about repair of the marketing infrastructure, and about rising energy prices in part related to hurricane damage. It is still unclear how much time will be required before barge and ship traffic resumes its normal flow.

In mid-September, USDA announced that it was undertaking several activities to alleviate the grain transport congestion. (See final section of this report, Government Response, for more details on USDA's response.)

Port of New Orleans

New Orleans is among the world's busiest ports. It is served by 6 major railroads, 50 ocean carriers, 16 barge lines, and over 75 motor carriers.⁴ More than 6,000 ocean vessels annually move through New Orleans on the Mississippi River. The port of New Orleans and its surrounding Gulf ports are the primary outlet that links a vast barge-based inland waterway system to international markets (**Figure 2**).

Every year a substantial share of the U.S. corn, soybean, and wheat crops are trucked from farms in interior states to grain elevators located along the Mississippi River and its major tributaries, then loaded onto barges for the trip down river to a Gulf port facility where grain shipments are aggregated before being loaded onto ocean-going vessels for the trip to foreign markets. The Port of New Orleans reportedly handles 2 billion bushels of grain each year.⁵ Corn, soybeans, wheat, and rice are the primary agricultural products exported via the Mississippi River. During the 2002-2004 period, nearly 64% and 67% of U.S. corn and soybean exports (by value), respectively, passed through Louisiana ports on their way to foreign markets. In addition, about 23% of wheat and 41% of rice exports passed through the mouth of the Mississippi during that same period (**Table 1**).

The Port of New Orleans provides a major destination for international containers, rubber, steel, plywood and coffee, and is an important link to the inward movement of fertilizers, fuel, and other vital farm inputs. The Port of New Orleans is the nation's top port for imported natural rubber. In addition, New Orleans is the nation's premier coffee-handling port, with 14 warehouses, more than 5.5 million

³ *Grain Transport Report*, USDA, Agricultural Marketing Service, Sept. 15, 2002.

⁴ "Hurricane Damage Necessitates Ship-Cargo Diversions," *Truckline Express*, Sept. 7, 2005.

⁵ *International Trade Reporter*, "Cost to U.S. Farmers from Hurricane Katrina Could Run to \$500 Million in Lost Exports," Vol. 22, No. 35, Sept. 8, 2005.

feet of storage space and six roasting facilities in a 20 mile radius. Two of the most modern bulk processing operations are located in New Orleans: Dupuy Storage and Forwarding Corp. (largest in the United States) and Silocaf of New Orleans, Inc. (the world's largest).⁶

Table 1. Exports of Major Agricultural Commodities, U.S. Total versus District of New Orleans, Average for 2002-2004

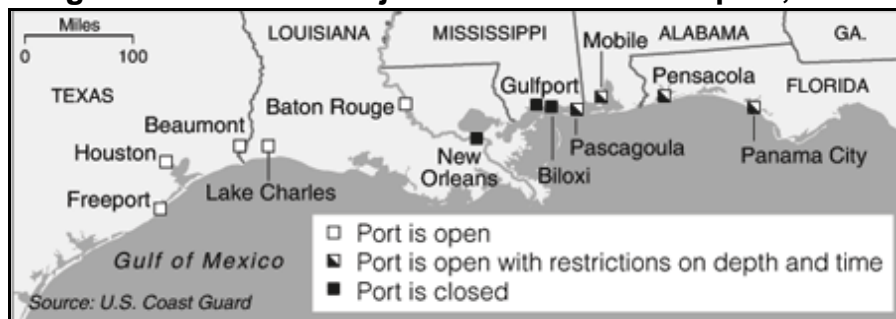
Commodity	U.S. Total (\$ Million)	District of New Orleans (\$ Million)	District of New Orleans, % of U.S. Total
Total Exports	744,979	34,329	5%
Agricultural Products	57,954	na	na
Corn	5,412	3,608	64%
Soybeans	6,751	4,307	67%
Wheat	4,257	933	22%
Rice	992	410	41%

na = not available.

Sources: U.S. Total from *World Trade Atlas*; District of New Orleans data are from U.S. Census Bureau, Foreign Trade Division.

When Hurricane Katrina struck the Gulf Coast region, the storm brought a halt to the flow of agricultural trade entering and exiting the United States through the Mississippi River System centered on New Orleans and surrounding Mississippi-River-based Gulf ports. Flooding and power outages stopped operations at most of the port facilities within the affected region. Concerns for the United States' ability to export its surplus agricultural production were immediate.

Figure 3. Status of Major Gulf Ports as of Sept. 6, 2005.



In addition to affecting Mississippi River traffic and operations at the Port of New Orleans, several other important central and eastern Gulf ports — Gulfport, Biloxi, and Pascagoula, Mississippi; Mobile, Alabama; and Pensacola and Panama City Florida — were completely or partially shut down due to hurricane damage (**Figure 3**). However, a significant share of shipping activity was redistributed to alternate western Gulf ports to facilitate the resumption of trade and economic activity in the region. During the first week in September, most of the 86 ships that

⁶ The Port of New Orleans, [<http://www.portno.com/facts.htm>].

were reportedly queued at the Mississippi River's entrance just prior to Katrina's arrival were diverted to ports in Texas and elsewhere to deliver their cargoes.⁷

Most export facilities did not sustain major structural damage; however, the bigger problem was getting power restored, the channel cleared, and work crews back into the region. The principal concerns regarding the Port of New Orleans were: first, how quickly could the channel be reopened for river traffic, and second, how quickly could port facilities for loading and unloading bulk grain resume operation? Within two weeks both the Mississippi River channel and the Port of New Orleans were engaged in commercial shipping, albeit at substantially reduced levels relative to the pace of trade from a year earlier.

Timeline. Following is a brief timeline surrounding major events at the Port of New Orleans.

August 29, 2005. Hurricane Katrina made landfall as a category 4 hurricane just east of New Orleans temporarily closing all transportation and shipping activities between the Gulf of Mexico and the Mississippi River. An estimated 400 barges (out of over 11,000 barges that ply the Mississippi River) were destroyed or damaged. Of the ten major grain elevators located within the New Orleans region, only one — Myrtle Grove — sustained any substantial damage.

August 31, 2005. The U.S. Coast Guard re-opened the Mississippi River to tug and barge navigation. Ocean vessels were still barred pending Coast Guard investigation of the status of channel depths and navigation aids. The U.S. Coast Guard reported that about 70% of the navigation aids (such as buoys marking the river channel) along the Mississippi River were damaged or missing.⁸ The river channel itself had to be surveyed to guard against possible shoals or other obstructions that might have been left in the hurricane's wake. In the early period following the hurricane, the U.S. Coast Guard focused its full resources on search and rescue operations in the areas affected by the hurricane.

September 4, 2005. The communications manager for the Port of New Orleans announced that the Mississippi River was open in one direction to ships with a draft of 35 feet during daylight hours. That same day, the Port President and CEO, Gary LaGrange announced that the Port of New Orleans' river front terminals had survived Hurricane Katrina in relatively good shape and, although slightly damaged, they would be workable once electrical power and manpower were available.⁹ Although the channel was usable, most of the port facilities were to be dedicated to military relief vessels through mid-September. Commercial vessels would not be allowed to return to the Port of New Orleans until electrical power and manpower were re-established. The U.S. Dept. of Transportation's Maritime Administration

⁷ *New York Times*, "Ad-Libbing Many Routes, Ships Return to Mississippi," Sept. 7, 2005.

⁸ *New York Times*, "Ad-Libbing Many Routes, Ships Return to Mississippi," Sept. 7, 2005.

⁹ *Seaports Industry Update*, September 5, 2005, "Special Announcement," available online at [http://www.aapa-ports.org/pressroom/katrina_updates.htm].

announced that it was providing several ships to the Port of New Orleans with the capacity to temporarily house 1,000 people who will operate the port.

September 7, 2005. Secretary of Agriculture Mike Johanns reported that substantial existing infrastructure was available on the Mississippi River in the New Orleans area for facilitating port activities.¹⁰ In particular, he mentioned three floating rigs with a loading capability of 30,000 to 60,000 bushels per hour from river barges directly on to ocean-going vessels or barges, and 10 export elevators with a storage capacity of 526 million bushels and a loading capability of 970,000 bushels per hour when fully operational (**Figure 4** and **Table 2**). Secretary Johanns estimated that (as of September 7, 2005) the operational capacity of the 3 rigs and 10 elevators was a combined 63% of normal and that slower barge movements and limited staff prevented full utilization of their loading capacity.

Gradually the U.S. Coast Guard began to shift its operational focus from search and rescue to the process of damage assessment and repair of the navigation infrastructure.

September 21, 2005. The U.S. Army Corps of Engineers (USACE) reported in its weekly navigation update, that all of the ports listed as closed or opened with restrictions in **Figure 3** were now fully open to daylight traffic with Gulf Port, Mobile, and Panama City open to 24-hour transit.¹¹

September 22, 2005. Most major ports located along the Texas and Louisiana Gulf coast were temporarily closed in advance of Hurricane Rita.

September 24, 2005. Hurricane Rita makes landfall as a category 3 hurricane at the Texas-Louisiana border near the Sabine-Neches Waterway (Port Arthur and Port of Beaumont) and Calcasieu Lock and River System connecting Lake Charles with the Gulf of Mexico. Preliminary reports suggest that export grain elevators located along the Texas Gulf coast sustained only minimal physical damage from Hurricane Rita.¹² Resumption of operations hinged on how quickly power was restored and personnel were allowed to return to the region following a mandatory evacuation.

September 27, 2005. Myrtle Grove grain elevator, the last of the 10 grain elevators in the New Orleans region, was fully restored for operations.

September 29, 2005. The USACE lifted all remaining restrictions on the Lower Mississippi River through the Southwest Passage (the principal channel out

¹⁰ USDA news release, "Mississippi River Export Grain Industry Recovering from Hurricane Katrina," Sept. 7, 2005.

¹¹ "Hurricane Katrina: Navigation Update," U.S. Army Corps of Engineers, Sept. 21, 2005; available at [<http://www.hq.usace.army.mil/cepa/katrina/navigation.html>].

¹² "Texas Grain Terminals Escape Rita's Fury," *Wheat Letter*, U.S. Wheat Associates, Sept. 29, 2005.

of the Mississippi River system to the Gulf). The Southwest Passage was now open for both day and nighttime traffic.

Figure 4. Mississippi River-Gulf Export Grain Elevators

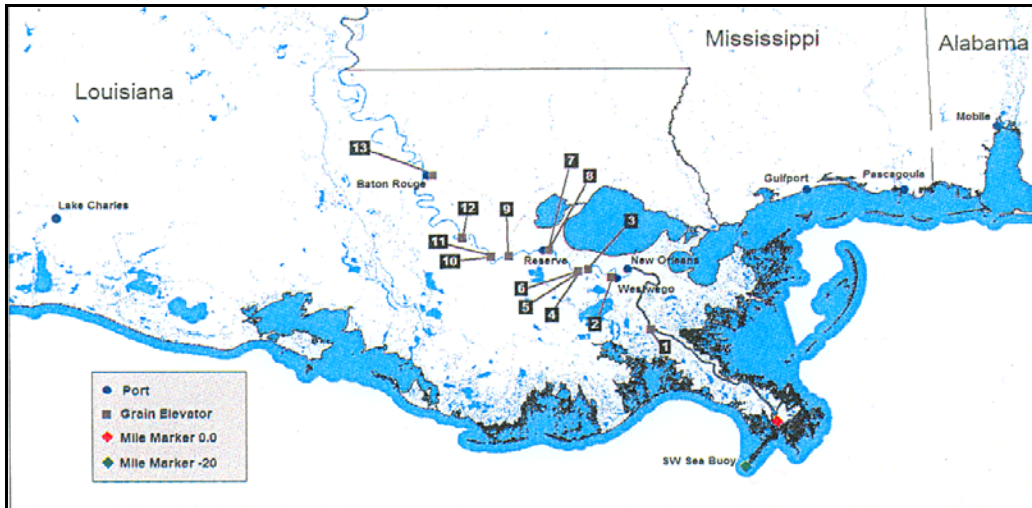


Table 2. Mississippi River-Gulf Elevator Location, Storage and Load Capacity

Map reference #	Location	Storage Capacity (million bushels)	Load Capacity (bushels/hour)
1	Myrtle Grove	6.5	90,000
2	Westwego	4.3	100,000
3	Ama	5.0	80,000
4	Destrehan	6.2	80,000
5	Destrehan	6.3	80,000
6	Destrehan	Floating Rig	30,000
7	Reserve	3.6	80,000
8	Reserve	7.7	100,000
9	Saint Elmo	2.0	60,000
10	Convent	Floating Rig	60,000
11	Convent	4.0	120,000
12	Darrow	Floating Rig	30,000
13	Baton Rouge	7.0	60,000
Total		52.6	970,000

Source: USDA, Agricultural Marketing Service (AMS) materials provided in briefing to staff of House Committee on Agriculture, September 22, 2005.

October 2, 2005. All major Texas Gulf ports were open to vessels with restricted depths of 40 to 45 feet at most harbor channels.¹³ The Calcasieu River to Lake Charles remained restricted to shallow draft tows and light tug traffic, but with 24-hour allowance. Deep draft vessels were restricted to 35 feet in daylight hours.

Barge-based Inland Waterway Transportation

Overview of Barge Transportation. Barge transportation represents the lowest-cost transport mode for moving a high volume of bulk commodities long distances (**Table 3**). Because barge rates are generally significantly lower than either rail or truck, the Mississippi River navigation system provides considerable transportation cost savings to the regional and national economy.¹⁴ Most economists and market analysts agree that inexpensive barge transportation helps check rates charged by the rail and truck transportation industries. In addition, low internal transport costs relative to export competitors such as Argentina and Brazil have helped U.S. products compete in international corn and soybean markets.¹⁵

Table 3. Barge Transport Moves Large Volumes Relative to Truck or Rail

Type of Transport	Capacity ^c		Truck Equivalents
	Bushels	Metric tons	
Truck (large semi)	910	26	1
Jumbo Hopper Car	3,500	100	4
Barge ^a	52,000	1,500	58
100-car unit train	350,000	10,000	385
15-barge tow	787,500	22,500	865
Panamax vessel ^b	2,362,074	60,000	2596

Source: U.S. Tugboat & Towboat Industry.

- a. Assumes a 9-foot channel as is maintained on the Upper Mississippi River by the U.S. Army Corps of Engineers. Barge capacity increases with channel depth.
- b. Panamax vessels are restricted to 60,000 metric tons due to maximum draft requirements.
- c. Bushels are corn-equivalent (1 metric ton = 39.3679 bushels).

A complex web of local supply and demand conditions determines how and when grain moves through the U.S. grain-handling network comprised of on-farm

¹³ "Hurricane Katrina: Navigation Update," U.S. Army Corps of Engineers, Oct. 2, 2005; available at [<http://www.hq.usace.army.mil/cepa/katrina/navigation.html>].

¹⁴ For a discussion of agricultural transportation issues and the cost advantages of barge versus truck or rail, see CRS Report RL32470, *Upper Mississippi River-Illinois Waterway Navigation Expansion: An Agricultural Transportation and Environmental Context*, by (name redacted), Coordinator.

¹⁵ Randall D. Schnepf, Erik N. Dohlman, and Christine Bolling, *Agriculture in Brazil and Argentina: Developments and Prospects for Major Field Crops*, USDA, Economic Research Service, Agriculture and Trade Report No. WRS013, (Washington: Dec. 2001), pp. 53-60.

storage, trucks, railroads, barges, and grain elevators (including county, sub-terminal, and export elevators). Price changes at any point along the chain can result in shifts to alternate transport modes or routes as grain marketers search for the lowest-cost method of moving grain between buyer and seller.

A hurricane such as Katrina or any similar weather or catastrophic event that dramatically slows or severely limits barge traffic will usually have the effect of raising barge freight rates as the demand for barge services exceeds their supply. Higher barge freight rates for corn and soybeans will in turn shift these commodities to alternate uses (feed, food, industrial, or storage), to alternate transport modes (rail or truck), or to alternate trade routes (e.g., to the Atlantic via the St. Lawrence Seaway, or overland to Canada, Mexico, or alternate ports along the Gulf coast or as far away as the Pacific Northwest). The degree of shifting depends, in part, on the perceived permanency of the price change. Because truck and rail are significantly more costly than barge transport, shifting bulk commodities to truck- or rail-based routes can substantially raise the cost of moving grain.

Hurricane Damage to Barge Transportation. When Hurricane Katrina struck the Gulf coast region, an estimated 400 barges (out of over 11,000 barges that ply the Mississippi River) were destroyed or damaged, and a substantial number of barges and vessels in the area surrounding New Orleans were displaced. Although this physical damage was costly, it is not the major factor limiting the quick reprise of barge transportation.

The primary problem for barge-based agricultural transportation on the Mississippi River system is the problem of restoring the entire transportation system encompassing trains, trucks, barges, ports, and ocean-going boats to a synchronized schedule of deliveries and arrivals. As of September 30, 2005, the entire transportation network remained somewhat out of sync. Waterways and rail lines are backed up and congested with barges and trains arriving to deliver their goods to boats that are berthed in port slots awaiting delivery for goods other than those being delivered.

In addition to an “out-of-sync” transportation network, approximately 140 barges containing hurricane-damaged corn (primarily water damage) were left in the New Orleans region. These barges needed to be off-loaded and the barges moved back up-river to elevators eagerly awaiting barge transport to ship their grain down river. However, because of the water damage, the corn was no longer acceptable for contract delivery and could not be off-loaded at any of the export-servicing grain elevators in the New Orleans vicinity. Because of the poor condition of their cargo, these barges must be towed to special locations (primarily back up river) for off-loading and removal before they can re-enter the normal barge traffic.

Commodity Prices

The immediate effect of the slowdown of barge traffic on the Mississippi River was a reported sharp decline in grain elevator bid prices for corn and soybeans in interior grain markets. Many grain elevators serving barge traffic were already near their maximum storage capacity, and felt compelled to reduce their bid prices to avoid buying grain that they could not store. The problem has been made more acute

by the approaching harvest when producers will likely need all of their on-farm storage capacity to store their new crop harvests. As a result, many producers have been looking to sell the remaining supplies from last year's harvest to clear space.

It is expected that this situation will be remedied and elevator bids will strengthen when barge traffic returns to more normal levels. However, USDA officials have expressed concern that the price decline resulting from the temporary delay in the Mississippi barge-based export flow of agricultural products could persist for at least three months and possibly into the spring depending on several factors including how quickly barge traffic resumes; how early the winter freeze and shut-down of the upper Mississippi River occurs; and whether the low water levels of the Missouri and Upper Mississippi Rivers are replenished by rainfall.

Harvest-time Concerns. Harvest time generally signals the busiest period of export movement for agricultural products for several reasons. First, supplies are generally most abundant at harvest time and can often exceed on-farm or local storage capacity. As a result, both producers and marketers are eager to move surplus production through the marketing channels. Second, the more northerly inland waterways — the Upper Mississippi River waterway and the St. Lawrence Seaway — shut down during the winter months due to freezing conditions. This limits export opportunities and increases the urgency for moving excess production into marketing channels ahead of the winter. Third, the arrival of surplus agricultural production into marketing channels at harvest time tends to pressure commodity market prices to their season lows and frequently offers the best purchasing opportunities for foreign buyers.

Table 4. Harvest Period for Major U.S. Crops

Crop	Major U.S. Growing Zone	Southern-Tier States	Central-Tier States	Northern-Tier States
Winter Wheat	June-July	May-June	July	—
Spring Wheat	Aug-Sept	—	July	Aug-Sept
Corn	Oct-Nov	Sept-Oct	Oct	Oct-Nov
Soybeans	Oct-Nov	Sept-Oct	Oct	Oct-Nov

Source: *Major World Crop Areas and Climatic Profiles*, Agr Handbook No. 664, World Agricultural Outlook Board and Joint Agricultural Weather Facility, USDA, Sept. 1994.

USDA has initiated several activities designed to alleviate weak commodity prices by easing the grain transport congestion that has raised transport costs and lowered farm prices. (See the final section of this report, Government Response, for details of USDA's activities.)

Farm Production Losses

From a national perspective, the region's agriculture is dominated by Louisiana's sugar cane crop which accounts for nearly one-third of the value of U.S. annual sugar cane production (**Table 5**). Poultry in Alabama and Mississippi, rice in Louisiana, and cotton in Mississippi also have national significance. However, several crops play a much bigger role at the state level. Broilers and eggs accounted for over 62% of Alabama's agricultural output value in 2003, while broilers represented a 42% share of Mississippi's agricultural economy. Cotton's share of state agricultural output value in 2003 was 15% in Mississippi, 12% in Louisiana, and 5% in Alabama.

Preliminary estimates by USDA economists are that Hurricane Katrina contributed to \$882 million in total crop, livestock, and aquaculture¹⁶ losses in the Southeast.¹⁷ (Estimates for Hurricane Rita are not yet available, but are expected to be significantly less than for Katrina.) USDA reports that the greatest agricultural losses caused by Katrina, in terms of value of production, were to aquaculture (\$151 million), sugarcane (\$50 million), and cotton (\$40 million). Other crops such as soybeans and rice were also prone to some wind damage. The \$882 million loss estimate does not include Gulf state losses of timber (which USDA says could be in the billions of dollars depending on its salvage value — see the following section for more details), or losses of nursery and greenhouse products and facilities in Florida, for which a Florida trade association projects \$370 million in structural damage and plant losses.¹⁸ Also, the loss of electricity, the shortage of fuel, and infrastructure damage temporarily interrupted the flow of poultry, milk and other agricultural products to markets.

For some crops, particularly sugarcane, the extent of losses will not be known until harvest. Damage to the region's sugarcane crop initially appeared to be extensive because the high winds flattened the crop. Some analysts report that much of the crop that was downed by the storm was not destroyed and can still be harvested. USDA estimates that Louisiana's sugarcane production will be 9% below pre-hurricane estimates, which translates into an estimated processed value loss of \$50 million. Katrina also caused two Louisiana sugar refineries to temporarily halt operations, which exacerbated what was already a tight supply of sugar. In response, USDA increased available sugar supplies by increasing the quantity of domestic sugar that may enter the market under the sugar price support program.¹⁹

¹⁶ Aquaculture is defined as farm-raised fish and seafood. For more on aquaculture losses, see CRS Report RS22241, *Hurricanes Katrina and Rita: Fishing and Aquaculture Industries — Damage and Recovery*, by (name redacted).

¹⁷ All USDA estimates referenced in this section of the report are from "A Preliminary Assessment of the Effects of Katrina and Drought on U.S. Agriculture," USDA/Office of Chief Economist, September 19, 2005 at [http://www.usda.gov/oce/Katrinadamage_1_2.pdf].

¹⁸ [<http://www.fnpla.org/articles/viewArticle.asp?articleID=504>].

¹⁹ [http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1RD?printable=true&contentido]

According to USDA, the largest cotton production areas (east and west of the storm track) were spared significant crop losses. Mississippi and Alabama, which account for 10% and 3% of expected U.S. cotton production, respectively, experienced some damage. Cotton production is estimated by USDA to be down 2.4% in Alabama and 4.3% in Mississippi following Hurricane Katrina. Total cotton losses in the Gulf region are expected to be about \$40 million. Some of the damage to the crop might be quality losses rather than production losses. Similarly, minor rice losses were experienced, since the storm track was east of the major rice growing areas and most of the Louisiana rice acreage already had been harvested before Katrina struck.

The corn and soybean crops were also affected by the hurricane, but the region normally accounts for less than 3% of national production of these two crops. The most serious market effects attributable to corn and soybeans are more transportation related (as discussed above). According to USDA, estimated regional losses are \$14 million for corn and \$17 million for soybeans.

Industry analysts also report that the Gulf region's dairy industry experienced production and processing losses. USDA reports that 60,000 dairy cows were located in counties that experienced hurricane-strength winds. Some of these cows were lost, but no estimates are available. The region's dairy industry was hampered by the loss of production caused by power outages in milking facilities, and the inability to transport milk because of damaged roads and bridges, as well as the loss of refrigeration and metropolitan retail dairy markets. Alabama, Louisiana, and Mississippi combined account for less than 1% of U.S. milk production; hence, market effects are expected to be limited to the region.

USDA also reports losses to cattle operations and broiler production in the three-state region. The region accounts for about 4% of national beef production, so national market effects are expected to be minimal. Poultry is a significant enterprise in the region: Alabama and Mississippi rank third and fifth, respectively, among all states in broiler production. Most of the broiler losses were concentrated in Mississippi where facilities were either damaged or without power for an extended period. According to USDA, an estimated 6 million chickens were killed and 2,400 poultry barns were damaged in Mississippi alone, and another 200,000 chickens were lost in Alabama. The broiler losses are valued by USDA at approximately \$15 million. Some analysts estimate that large area broiler losses could cause an increase in market broiler prices in the short term (1-2 months). However, increased production elsewhere would eventually fill the gap so that market effects would be minimized by the end of the year.²⁰

¹⁹ (...continued)
nly=true&contentid=2005/08/0338.xml].

²⁰ Global Insight's *Agri-View*, September 8, 2005.

**Table 5. Top 5 Agricultural Commodities:
Alabama, Louisiana, and Mississippi, 2003**

	Total Cash Receipts (\$ Millions)	Share of State's Total Farm Receipts (as %)	Share of U.S. Farm Value (as %)
Alabama			
1. Broilers	1,837.7	53.8	12.1
2. Cattle and Calves	425.2	12.5	0.9
3. Chicken Eggs	295.7	8.7	5.6
4. Greenhouse & Nursery	256.9	7.5	1.7
5. Cotton	160.5	4.7	3.2
All Alabama Farm Commodities	3,415.3		1.6
Louisiana			
1. Sugar cane	329.2	16.5	32.8
2. Cotton	238.0	11.9	4.7
3. Cattle and calves	178.3	8.9	0.4
4. Rice	165.6	8.3	13.6
5. Soybeans	163.4	8.2	1
All Louisiana Farm Commodities	1,993.4		0.9
Mississippi			
1. Broilers	1,424.1	41.8	9.4
2. Cotton	517.4	15.2	10.3
3. Soybeans	309.4	9.1	1.9
4. Aquaculture	244.7	7.2	31.3
5. Cattle and Calves	208.1	6.1	0.5
All Mississippi Farm Commodities	3,411.0		1.6

Source: U.S. Department of Agriculture's Economic Research Service.

Damage to Forestry and Wood Products. The Gulf Coast states are significantly forested and are major producers of lumber and plywood. Information on the effects of Hurricane Katrina on Gulf Coast forests is sketchy. The Mississippi Forestry Commission issued a news release estimating that 1.3 million acres of forest land in the state had been damaged, with commercial timber valued at about \$1.3 billion; urban tree damage in Mississippi was estimated at \$1.1 billion.²¹ The USDA Forest Service estimated 19 billion board feet of timber damaged on over 5 million

²¹ Available at [<http://www.mfc.state.ms.us/pdf/katrina/timberdamage.pdf>], visited on Sept. 15, 2005.

acres in Mississippi, Alabama, and Louisiana.²² In addition to the damages to wildlife habitat and other environmental services from the loss of forest cover, the dead and damaged trees can become hazardous fuels for wildfires as well as a haven for forest insects and diseases.

Forestry assistance programs exist to help landowners, and can be used to help in the recovery of forest lands. One particular program, Emergency Reforestation Assistance, was enacted in the 1990 farm bill (P.L. 101-624) to assist private landowners, primarily in South Carolina, with reforestation following Hurricane Hugo that hit in 1989. The program has not been funded since FY1993, following Hurricanes Andrew (FL and LA) and Iniki (HI).²³ Other forestry assistance programs are generally available to help landowners and states with forestry activities and forest protection, such as reducing wildfire and insect threats from trees damaged by the hurricane.

The impact of the hurricanes on wood products is less certain. Damages to structures has prompted an urgent demand for plywood, for temporary repairs; if plywood prices follow the pattern that ensued from Hurricane Andrew in 1993, prices might have peaked at about the time of the event in anticipation of the damage, and will fall back to more normal levels within a few weeks. Longer-term impacts are less clear. Rebuilding will increase the demand for additional wood products, although demand depends greatly on interest rates. The dead and damaged trees might provide a significant boost to wood product supplies, as salvage and mill operations convert the trees to usable products. However, salvage operations are hampered by the increasingly fragmented ownership of forest land and by rising fuel costs, and some mills may have been damaged by the hurricane. The effect over the coming weeks and months is thus likely to be both greater wood products demand and greater wood products supply, and the net effect on wood product prices (after the current urgent demand for plywood has passed) is indeterminate.

Energy Costs and Agriculture

Following the damage inflicted by Hurricanes Katrina and Rita on the Gulf region's oil and natural gas production, refining, and importing capability, energy prices — gasoline, diesel fuel, and natural gas — rose sharply.²⁴ Considerable uncertainty surrounds the longevity of recent energy price rises, and the implications for U.S. agriculture hinge on their permanency. Fuel prices have been trending

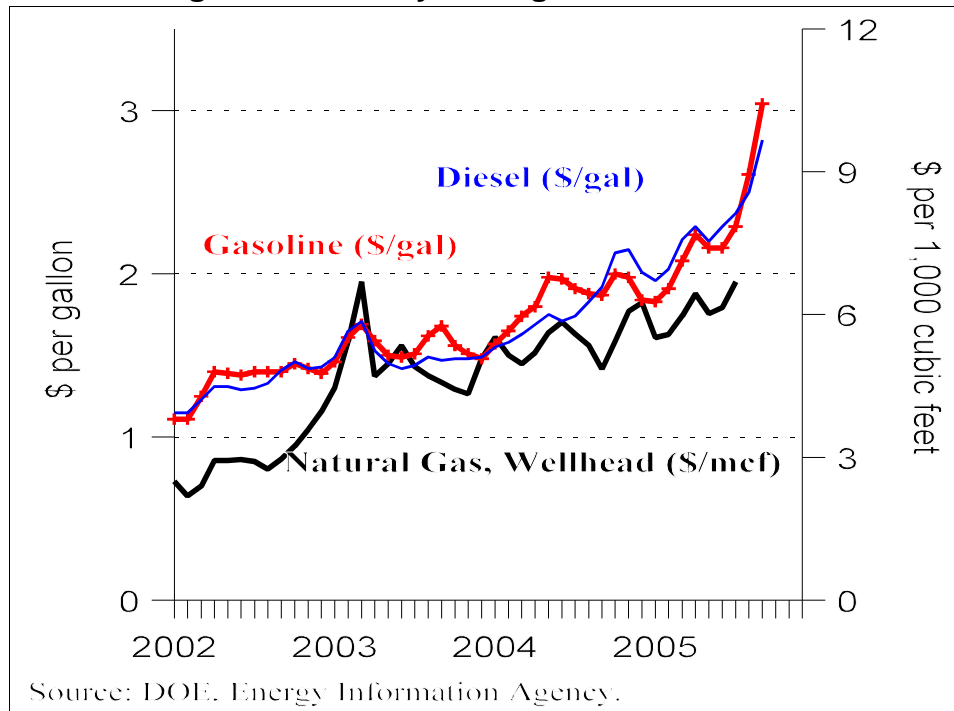
²² U.S. Dept. of Agriculture, *USDA Forest Service Reports Significant Damage by Hurricane Katrina to Public and Private Timberland*, USDA News Release No. 0376.05, available on Sept. 16, 2005, at [http://www.usda.gov/wps/portal/!ut/p/s.7_0_A/7_0_1RD?printable=true&contentidonly=true&contentid=2005/09/0376.xml].

²³ See “Emergency Reforestation Assistance” in CRS Report RL31065, *Forestry Assistance Programs*, by (name redacted).

²⁴ For a discussion of energy supply issues See CRS Report RS22233, *Oil and Gas: Supply Issues After Katrina*. For information on energy prices see the U.S. Dept of Energy's Energy Information Administration's website at [<http://www.eia.doe.gov/>].

higher over each of the past three years, and farmers were already likely to see record high fuel costs before the post-Katrina runup in prices struck (**Figure 5**). In the near-term, it is likely that such strong energy price rises will significantly increase energy's share of total production expenses and could significantly alter the farm income outlook for affected farm households and rural economies.

Figure 5. Monthly Average U.S. Fuel Prices



Energy Prices Already Trending Higher, Jump After Katrina

The national average annual retail price for No. 2 diesel fuel has been rising steadily from \$1.32 per gallon in 2002 to \$1.51 per gallon in 2003, and \$1.81 per gallon in 2004. In August 2005, it hit a then-record \$2.50 per gallon. Gasoline prices followed a very similar pattern. In September 2005, post-Katrina concerns have spiked both gasoline and diesel prices to record monthly average levels at \$3.04 and \$2.82 per gallon, respectively.

Natural gas prices also have experienced substantial demand-driven price rises over the past 3½ years. After hovering just below \$2.00 per 1,000 cubic feet (mcf) through most of the 1990s, natural gas (wholesale or wellhead) prices moved upwards to average \$2.95 per mcf in 2002, then surged to a \$4.98 per mcf average in 2003. Wellhead prices continued rising in 2004, averaging \$5.49 per mcf. Since April 2005, natural gas prices have been above \$6.00. During the final week of August (August 24-31), Henry Hub spot market prices (Henry Hub is a primary wholesale market location for natural gas) sky rocketed in anticipation of Katrina's disruption to an average of \$12.70 per mcf. During September, after Katrina had moved through the Gulf Coast region and analysts had a chance to better assess the

damage to production facilities, natural gas prices retreated to average around \$11 per mcf.

Natural gas spot prices spiked again, jumping to over \$14 per mcf in advance of the arrival of Hurricane Rita. However, natural gas prices declined following Hurricane Rita's actual landfall as a weaker hurricane than expected, even while causing massive evacuations of rigs and platforms in the Gulf of Mexico and inflicting damage to both offshore and onshore energy-related infrastructure. As of September 28, price quotes were still unavailable at the Henry Hub, which was shut down owing to Hurricane Rita.²⁵ However, trading at other market locations in Louisiana saw an average decrease of \$1.35 per MMBtu on the week (Wednesday-Wednesday, September 21-28). The average price among Louisiana trading locations on September 28, 2005, was \$13.45 per mcf.

Evaluating the potential effect of such volatile energy price movements on U.S. agriculture hinges greatly on their permanency.²⁶ The relative importance of energy costs as a share of total agricultural production expenses varies greatly by both activity and region. Although there are many kinds of operations performed by the different farm types, nearly all mechanized field work, as well as marketing and management activities involve machinery, trucks, and cars that are dependent on petroleum fuels. Dryers and irrigation equipment are often more versatile in that they can be powered by petroleum fuels, natural gas, or electricity, while electricity is the primary source of power for lighting, heating, and cooling in homes, barns, and other farm buildings. Some activities such as dairy and poultry production, that require a constant supply of energy for refrigeration or cooling are particularly vulnerable to a cut-off of energy supply as evidenced by the damage sustained in the hurricane-affected region.

In the immediate term, higher diesel fuel and gasoline prices will raise the cost of harvesting and post-harvest treatment (e.g., drying, moving, and storing) of crops still in the field. For those farms that have been indirectly impacted by Katrina's damage to the region's marketing infrastructure, higher fuel prices will make the overall cost of marketing products more expensive, while making rail and truck more costly options relative to barge transport. Such higher marketing costs inevitably result in a widening farm-to-market basis and lower prices received at the farm gate. This, in turn, will alter the farm income outlook for affected farm households and rural economies.

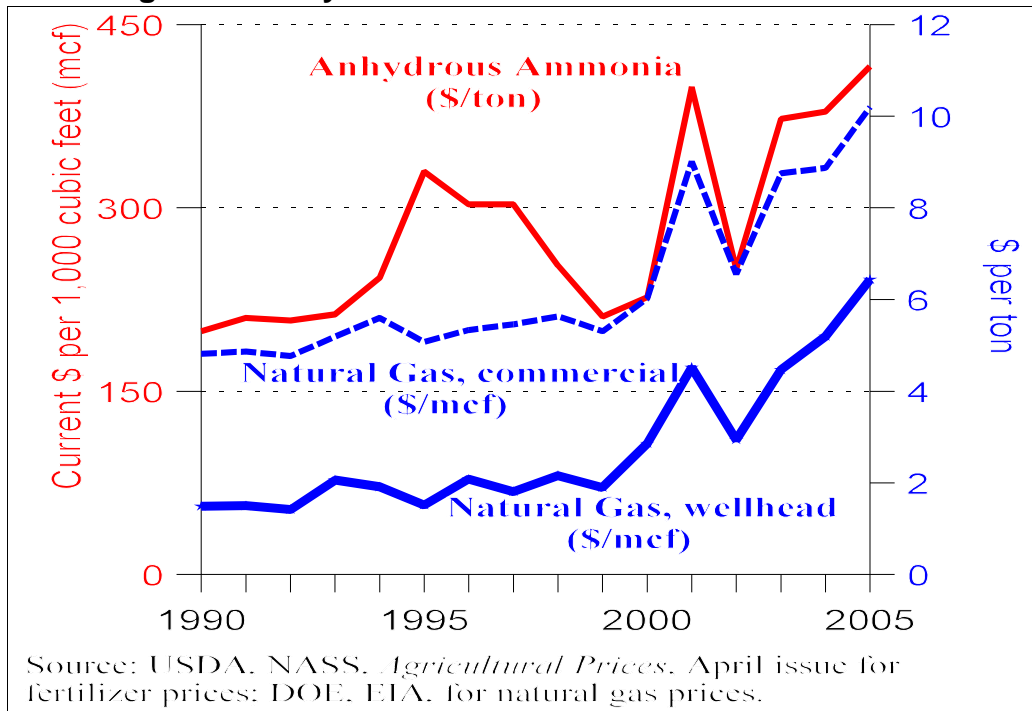
In the longer term, sustained high energy prices through the winter could lead to significant regional shifts in agricultural activities as early as 2006. High natural gas prices are particularly troublesome because of their relationship with nitrogenous fertilizer production. Natural gas accounts for a substantial portion (75% to 90%) of nitrogen fertilizer production costs, either directly as a feedstock or indirectly as a fuel to generate the electricity needed in production. Because U.S. fertilizer manufacturers are at a competitive disadvantage with foreign producers when U.S.

²⁵ *Natural Gas Weekly Update: Overview*, DOE, EIA, Sept. 29, 2005.

²⁶ For a broad discussion of energy use and U.S. agriculture see CRS Report RL32677, *Energy Use in Agriculture: Background and Issues*, by (name redacted).

natural gas prices rise, the high prices of recent years have contributed to a substantial reduction in its U.S. nitrogen fertilizer production capacity — over a 25% decline since 1999. In addition, higher natural gas prices have contributed to significantly higher nitrogen fertilizer prices (Figure 6).

Figure 6. Anhydrous Ammonia and Natural Gas Prices



The post-Katrina jump in U.S. natural gas prices casts a cloud of uncertainty over the future of the U.S. nitrogen fertilizer industry as well as raising concerns about the potential supply and price of nitrogen fertilizer for crops in 2006. Producers are undoubtedly eyeing fuel and fertilizer price developments and will consider shifting away from crops that rely heavily on fuel-dependent field work or fertilizer applications and towards those crops and activities that are less energy dependent. Corn is perhaps the most vulnerable crop due to its high per-acre energy usage rates.²⁷

In the longer term, a sustained rise in energy prices may have serious consequences on energy-intensive industries like agriculture by reducing profitability and driving resources away from the sector.

²⁷ For more information on energy use variations by region and crop, see CRS Report RL32677, *Energy Use in Agriculture: Background and Issues*, by (name redacted).

Government Response

USDA Initiatives Targeting Export Traffic Congestion

During September 2005, USDA announced that it was initiating several activities to help alleviate the grain transport congestion described below. On September 7, 2005, USDA announced changes to its Marketing Assistance Loan Program to help alleviate the urgency of marketing grain at distress-level prices.²⁸ USDA's Commodity Credit Corporation (CCC) is implementing changes to allow producers to obtain loans for "on-farm" storage on grain stored on the ground in addition to grain bins and other normally approved structures. This action was designed to alleviate short-term logistical problems and support local cash prices above the distressed levels that have resulted from the slowdown of barge traffic on the Mississippi River.

On September 20, 2005, Secretary of Agriculture, Mike Johanns, announced that USDA was taking four additional steps to alleviate the grain transport congestion.²⁹ First, USDA, acting through the CCC, was providing temporary incentives to facilitate the immediate movement of 140 barges of damaged corn (over 7 million bushels) from New Orleans to up-river locations for off-loading. Once unloaded, the barges can return to duty moving new-crop commodities. Second, USDA was providing incentives for alternative grain storage.³⁰ Under this activity, the CCC would provide special, one-time assistance to operators to help with the costs associated with storing corn and wheat in alternative storage facilities. Up to 50 million bushels of corn or wheat could be eligible for this activity. Third, USDA was encouraging alternative shipping patterns through regions other than the central Gulf by providing for a transportation differential incentive on the movement of up to 200,000 metric tons of corn, wheat or soybeans. Fourth, for those producers with farm-stored commodities under loan to USDA whose loans mature at the end of September and October and who would otherwise forfeit those commodities to USDA, USDA would allow such producers to buy back the grain at the posted county price. Normally, these producers would be required to move the forfeited grain to commercial warehouses. This offer is being made on a state-by-state basis.

Current USDA Disaster Authorities and Programs

USDA has at its disposal three major ongoing programs designed to help crop producers recover from the financial effects of any natural disaster:

- federal crop insurance,

²⁸ "USDA Offers Emergency Relief Programs for Farmers and Ranchers Coping with Hurricane Katrina Disaster," USDA News Release No. 0355.05, Sept. 7, 2005.

²⁹ "USDA Takes Action to Ease Grain Transportation," USDA News Release No. 0389.05, Sept. 20, 2005.

³⁰ USDA, Commodity Credit Corporation, "Request for Proposals: Billing Code 3410-05-P." [<http://www.fsa.usda.gov/pas/absolutenm/articlefiles/453-KatrinaTransStoreIncentivesNotice0929v6final2.pdf>]

- non-insured assistance program (NAP) payments, and
- emergency disaster loans.

All three of these programs have permanent authorization and available funding. For background information on these and other farm disaster programs, see CRS Report RS21212, *Agricultural Disaster Assistance*, by (name redacted).

For the 2005 crop year, Alabama, Mississippi, and Louisiana crop producers purchased just over \$1 billion in crop insurance coverage, with nearly 70% of the value of coverage being for cotton, soybeans, and rice. According to preliminary reports from USDA, the three-state region has relatively high participation rates in the crop insurance program. However, much of that coverage is at the catastrophic level, which provides an indemnity payment only on losses in excess of 50% of normal production. For example, 90 to 95 percent of the cotton acreage in the three Gulf states is enrolled in the federal crop insurance program. However, in Louisiana and Mississippi, just over one-half of that acreage is enrolled only at the catastrophic level. For those producers who grow a crop that is not eligible for crop insurance coverage, USDA makes NAP payments available for catastrophic losses, as long as the producer signed up for coverage and paid an administrative fee in advance.

Agricultural producers in a county that has been declared a disaster area may be eligible for low-interest emergency disaster (EM) loans available through USDA's Farm Service Agency. USDA currently has authority to provide just over \$150 million in EM loans. An eligible producer must be a family-sized farmer who suffered a minimum crop loss of 30%, and is unable to qualify for a loan from a commercial lender. EM loan funds may be used to help eligible farmers, ranchers, and aquaculture producers recover from production losses (when the producer suffers a significant loss of an annual crop) or from physical losses (such as repairing or replacing damaged or destroyed structures or equipment, or for the replanting of permanent crops such as orchards). A qualified applicant can then borrow up to 100% of actual production or physical losses (not to exceed \$500,000) at a below-market interest rate.

USDA announced on September 8, 2005, that \$20 million in Emergency Conservation Program funding will be given to Louisiana (\$12.45 million), Mississippi (\$7.1 million), Alabama (\$855,000) and Tennessee (\$25,000) to help these states clean up debris, and restore fences and conservation structures. Eligible participants can receive cost-share assistance of up to 75% of the cost to implement these practices.

Congressional Response

Since 1988, Congress frequently has supplemented the regularly funded disaster assistance programs with additional emergency aid. Funding for these programs generally are provided in emergency supplemental appropriations bills. Among these major ad-hoc farm disaster programs are (1) direct disaster payments, (2) livestock assistance, (3) tree assistance, and (4) emergency conservation assistance. Most recently, the FY2005 Military Construction Appropriations Act (P.L. 108-324) contained supplemental funding to provide an estimated \$3.5 billion in assistance for 2003 and 2004 crop, livestock, and tree losses, primarily in response to ongoing

drought in the West and a series of 2004 hurricanes that damaged or destroyed agricultural production in the Southeast. (For more information on the ad-hoc agricultural assistance that was provided in response to the 2004 hurricanes, see CRS Report RS21212, *Agricultural Disaster Assistance*.)

Prior to Hurricanes Katrina and Rita, portions of the Midwest were experiencing significant 2005 crop losses caused by a prolonged drought. The combination of the Midwest drought and losses caused by the two hurricanes is expected to provide momentum for Congress to consider emergency crop and livestock assistance for 2005 production losses some time this year. Several bills have been introduced in the 109th Congress that would provide supplemental agricultural assistance, primarily in the form of crop disaster payments and livestock assistance. To date, these include bills (H.R. 3809, H.R. 3754/S. 1692, H.R. 3702, S. 1636) that would provide disaster assistance to all regions of the country that meet certain loss requirements, using similar payment formulas as in past years. Other bills (H.R. 3958 and S. 1766) have been introduced that include agricultural assistance as a part of a much larger package of assistance for recovery and relief from the effects of Hurricane Katrina in Louisiana.

Congressional leadership has not yet determined the specifics of any agricultural disaster assistance package, or what legislative vehicle might be used to authorize this assistance.³¹ The most likely vehicle for agricultural assistance is in the context of a third supplemental appropriations bill for Hurricane Katrina recovery, which many expect will provide billions of dollars of assistance for rebuilding the infrastructure of the affected region. Other possibilities include agricultural assistance being attached to the pending FY2006 agriculture appropriations bill (H.R. 2744) which is currently in conference committee, or the agriculture committees potentially could report emergency agricultural legislation to the floor for consideration.

³¹ Congress has provided a total of \$62.3 billion in two emergency supplemental acts (P.L.109-61 and P.L.109-62) for Hurricane Katrina assistance. Most of the funds were appropriated to the Federal Emergency Management Assistance (FEMA) for recovery and relief operations. To date, no emergency funds have been appropriated to USDA programs.

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