

The Food and Fiber System and Production Agriculture's Contributions to the Texas Economy

Production Agriculture: Part of the Food and Fiber System

Production agriculture in Texas is second only to California in productivity and is one component of the larger food and fiber system that serves Texas' 24.6 million consumers as well as millions of consumers beyond the state. The production, processing, distribution, and consumption activities associated with meeting these consumer needs provides the impetus for significant economic activity contributing to the state's economy.

The food and fiber system in Texas is evolving and changing. The structure of production agriculture is such that a large share of gross cash sales is being generated by fewer farm and ranch operations. Production and marketing are becoming more integrated, and computer systems are being used to more efficiently manage the supply chain from producer to consumer. Throughout the system, greater emphasis is being given to quality, safety, and consumer convenience.

As a result of these changes in Texas' food and fiber system, important policy questions are being raised about the role of the system in state and local economies. Of particular interest is the relationship between the food and fiber system and the economic health and viability of rural areas.

Defining the Food and Fiber System: From Farm to Consumer

The total food and fiber system includes all economic activities linked to agricultural production, such as machinery repair, fertilizer production, food processing and manufacturing, transportation, wholesale and retail distribution of products, and eating establishments. Also included are the economic activities that link the production of plant and animal fibers and hides to fabric, clothing, and footwear.

The impact of the food and fiber system on the state's economy is multiplied by its links to a variety of industries. Machinery, fertilizer, chemicals, seed, feed, labor, financial services, and other inputs are required to produce crops and livestock. This production is then sold to the sectors that store, process, transport, manufacture, distribute, export, and retail farm products. The food and fiber system is also among the largest users of real estate and rental services and transportation and warehouse services.

Measuring Economic Impact: Value-Added Contribution

Although the value of production, or gross receipts, is often used as an indicator of economic impact, a more appropriate measure is the contribution to the state's gross domestic product (GDP).

The state's GDP is the value added in production through the use of the land, labor, capital, and management resources of the state. GDP for a state is derived as the sum of the gross domestic product originating in all industries in a state. In concept, an industry's contribution to the state's GDP is equivalent to its value of production (sales or receipts and other operating income, and inventory change) minus its intermediate inputs (consumption of goods and services purchased from other U.S. industries or imported). The state's GDP is the state counterpart to the nation's gross domestic product, the federal government's measure of U.S. economic output.

Contributions to the Texas Economy

The food and fiber system's total estimated contribution to Texas' gross domestic product in 2006 was \$90 billion, or approximately 8.4 percent of the state's total GDP (Table 1). As illustrated in Figure 1, the contribution of the food and fiber system to the state's GDP over the past ten years has ranged from approximately 8 to 10 percent of the state's GDP, even though the absolute dollar value of the contribution has increased. From 1997 to 2006, the food and fiber system's contribution to GDP grew by over 50 percent in dollar value, and the rest of the Texas economy grew by 78 percent.

The slight decrease in the food and fiber sector's percentage contribution from 2002 to 2006 can be attributed to a 4.2 percent annual growth rate in the food and fiber sector, while the rest of the economy grew at an annual rate of 8.5 percent over this time frame. This period was characterized by high energy and real estate prices that raised agricultural producers' costs. During the same period, a drought resulted in lower output and cash receipts. Most of the growth in the state's economy since 2002 occurred in the mining and utilities sector (oil and gas exploration), services, and manufacturing.

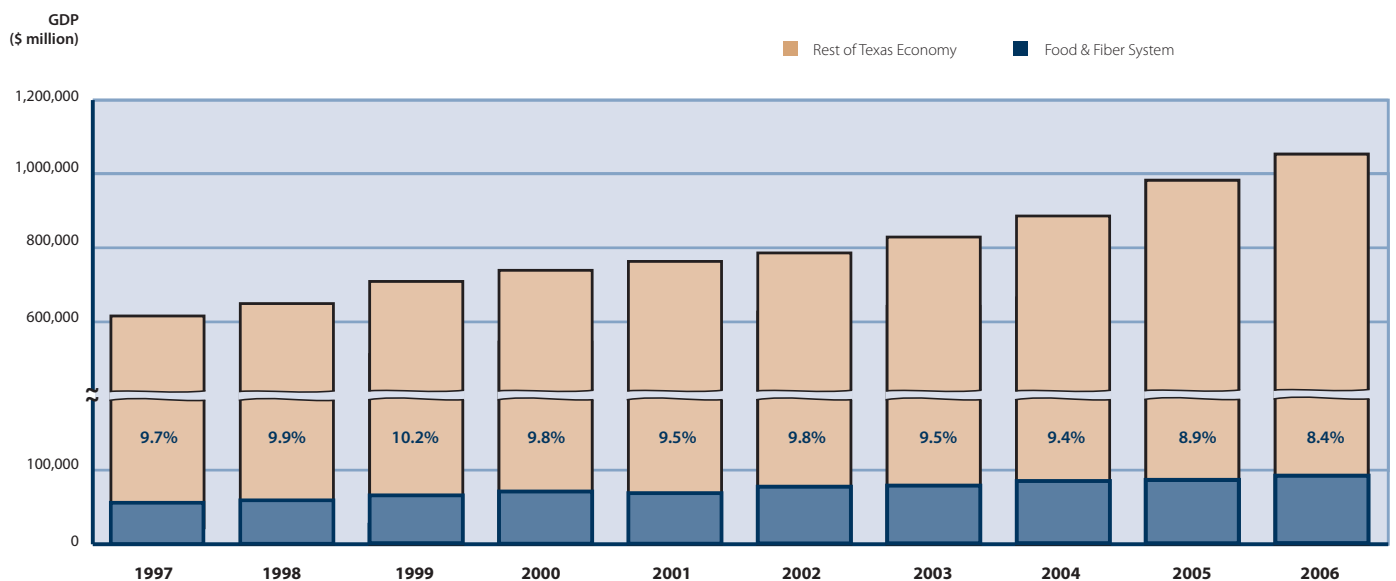
Figure 2 compares the contribution of the food and fiber system to that of the other industries making up the state's economy. The largest single industry classification is services, followed by the finance, insurance, and real estate sector; mining and utilities; manufacturing; government; and the food and fiber system.

Figure 1. Contribution of the Food and Fiber System to Texas' Gross Domestic Product, 1997–2006

Table 1. Estimated Contribution of the Food and Fiber System to the Texas Economy, 2006

INDUSTRY	FFS Contribution (\$ million)	Contribution as % of Total FFS
Agriculture, forestry, fishing & hunting	7,807	8.7%
Mining	137	0.2%
Manufacturing		
Wood products	1,902	2.1%
Nonmetallic mineral products	475	0.5%
Machinery	137	0.2%
Furniture & related products	785	0.9%
Food products	9,741	10.8%
Textiles & textile product mills	433	0.5%
Apparel	326	0.4%
Paper	1,922	2.1%
Petroleum & coal products	1,500	1.7%
Chemicals	1,046	1.2%
Wholesale trade	12,964	14.4%
Retail trade	12,489	13.9%
Transportation & warehousing	2,927	3.3%
Finance, insurance, & real estate (F.I.R.E.)		
Federal Reserve banks & related services	3,468	3.9%
Insurance carriers & related activities	1,720	1.9%
Real estate	8,373	9.3%
Rental & leasing services	1,134	1.3%
Services		
Food services & drinking places	19,458	21.6%
Government		
Federal, State & local	1,289	1.4%
Contribution of Food & Fiber System	90,032	100.0%
Texas' Gross Domestic Product	1,068,119	
% of GDP Contributed by FFS	8.4%	

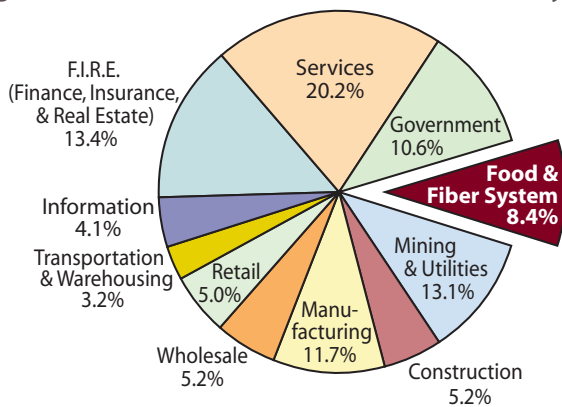
Source: Texas GDP is from the Bureau of Economic Analysis, U.S. Department of Commerce, GDP in current dollars, for Texas, for 2006 (annual; www.bea.gov/regional/gsp). The portion contributed by the food and fiber system in Texas was estimated by Texas AgriLife Research and Extension, Department of Agricultural Economics, The Texas A&M University System, and the Office of the Comptroller, State of Texas.



Food & Fiber system	59,326	63,523	69,667	72,872	72,687	76,547	78,565	85,271	86,909	90,032
Rest of Texas economy	549,296	577,882	615,269	669,402	691,187	706,933	749,891	817,937	892,402	978,087
Total	608,622	641,405	684,936	742,274	763,874	783,480	828,456	903,208	979,311	1,068,119
Food & Fiber %	9.7%	9.9%	10.2%	9.8%	9.5%	9.8%	9.5%	9.4%	8.9%	8.4%

Source: Texas GDP is from the Bureau of Economic Analysis, U.S. Department of Commerce, gross domestic product (GDP) in current dollars, for Texas, for 1997–2006 (annual; www.bea.gov/regional/gsp). The portion contributed by the food and fiber system in Texas was estimated by Texas AgriLife Research and Extension, Department of Agricultural Economics, The Texas A&M University System, and the Office of the Comptroller, State of Texas.

Figure 2. Contribution of the Food and Fiber System to Texas' Gross Domestic Product (2006)



INDUSTRY	Texas GDP (\$ million)
Food and fiber system	90,032
Mining & utilities	140,153
Construction	55,325
Manufacturing	124,585
Wholesale	55,265
Retail	53,244
Transportation and warehousing	33,657
Information	43,829
F.I.R.E. (Finance, insurance & real estate)	143,050
Services	215,298
Government	113,683
TOTAL	1,068,119

Measuring the Impacts of Individual Commodities

The economic contribution of the production activities for a specific commodity is often estimated using either the market value of production or total cash receipts. The costs of inputs purchased from other industries are not subtracted from either of these measures. However, because the value of the inputs is also included as a part of each supplying industry's value of production, the analysis may be misleading. A more appropriate measure is the contribution to the state's gross domestic product (GDP) because it eliminates the possibility of double counting.

The economic impact of specific commodities beyond the farm gate is difficult to separate from that of other commodities because of data aggregation problems. It is possible, however, to estimate economic impacts from the farm gate back through the supply chain using the IMPLAN input-output system.*

When evaluating the impacts of individual agricultural commodities on the state's economy, input-output analysis provides an appropriate economic procedure to trace the direct and indirect links of these production activities. Input-output analysis is based on the idea that a change in one sector of the economy may have effects on other sectors of the economy. The input-output

analysis captures the relationships between industries and estimates the change in each sector's sales due to an initial change in final demand for a given industry's output. The sum of these changes is the industry's multiplier. Multipliers estimate a change in a state's gross domestic product as a result of sales to final demand in a specific sector of the economy.

Estimates of the economic contribution of the production activities for a specific commodity are based on the value added through production. Each commodity has unique requirements for purchased inputs and land, labor, capital, and management resources. Therefore, the contribution to the state's GDP through the farm gate for individual commodities, relative to the gross value of production, will vary across commodities. One standard multiplier cannot be applied across all agricultural commodities.

Table 2 contains the cash receipts, Texas GDP multiplier, and the direct and total contributions to Texas' GDP of some leading agricultural commodities in Texas. Commodities are listed in descending order based on total contribution to Texas' GDP. Beef cattle and calves generate the largest total contribution to GDP of the agricultural commodities listed, followed by cotton, greenhouse and nursery, dairy, and broilers.

* For more information see Minnesota IMPLAN Group, Inc. 2004. IMPLAN Professional User's/Analysis/Data Guide, version 2.0, Minnesota IMPLAN Group, Inc., Stillwater, MN, or go to <http://www.implan.com>.

Calculating Economic Impacts

A Value of Production (avg. 2003–2006)	The value of an individual economic sector's output. This is commonly referred to as value of production, because it reflects price times quantity sold.
B Government Payments	The value of payments made by the government to producers. This includes such items as loan deficiency payments and other monetary incentives and all decoupled farm program payments.
C Total Cash Receipts	Value of all production plus government payments.
D Direct Contribution to Texas' GDP	The portion of output that contributes to Texas' GDP. This value is equivalent to gross revenue less costs of goods sold; that is, returns to land (rent), labor (wages), capital (interest), and management (profit). The value is direct in terms of its origin; it is "directly" from the producer because contributions from input suppliers are explicitly not included.
E Statewide GDP Multiplier (from IMPLAN)	The multiplier captures all of the changes on contributions to statewide GDP, including direct and indirect contributions. Multiplying this value times direct contributions to GDP yields a value that represents the total change to the state's GDP.
F Total Contribution to Texas' GDP	The total contribution to the state's GDP includes the direct contribution plus contributions made to GDP indirectly. Indirect contributions arise from inter-industry activities. These economic activities are stimulated by output. As output changes, suppliers (to the producer of the output) must change as well; as a result, the suppliers' contributions to GDP are affected.

Table 2. Leading Agricultural Commodities Based on Contribution to Texas' Gross Domestic Product*

	Total Cash Receipts** (\$ million)	Direct Contribution to GDP (\$ million)	Statewide GDP Multiplier	Total Contribution to GDP (\$ million)
Beef cattle & calves	7,740.9	2,399.7	2.44	5,855.2
Cotton (including cottonseed)	2,164.2	822.4	2.31	1,899.7
Greenhouse & nursery	1,463.4	848.8	1.78	1,510.8
Dairy (milk & cows)	992.4	446.6	1.87	835.1
Broilers	1,289.5	296.6	2.46	729.6
Timber***	440.4	374.3	1.60	598.9
Corn	535.9	348.3	1.57	546.9
Vegetables	335.2	184.4	1.98	365.0
Sorghum grain	327.9	213.1	1.57	334.6
Wheat	331.8	149.3	2.04	304.6
Fruits, nuts, & berries	256.7	148.9	1.79	266.5
Peanuts	172.9	127.9	1.50	191.9
Rice	183.5	82.6	2.04	168.5
Sheep, goats, wool, & mohair	106.9	17.1	3.81	65.2

* These figures capture only the impact of the production of these commodities based on the economic impact through the point of first sale. Economic impacts through further value-added processes are not captured in this analysis.

** Average annual cash receipts (from the Texas Office of the National Agricultural Statistics Service) and estimated government payments, 2003–2006.

*** Based on stumpage value reported by the Texas Forest Service and National Agricultural Statistics Service.

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January 2009

Produced by AgriLife Communications, Texas A&M System

MKT 3579

750 copies