

# 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 21 million consumers in 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 also is among the largest users of real estate and rental services and transportation and warehouse services.

## Measuring Economic Impact

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

Gross state product (GSP) is the value added in production through the use of the land, labor, capital, and management resources of the state. GSP for a state is derived as the sum of the gross state product originating in all industries in a state. In

concept, an industry's contribution to the state's GSP is equivalent to its value of production (sales or receipts and other operating income, commodity taxes, and inventory change) minus its intermediate inputs (consumption of goods and services purchased from other U.S. industries or imported). GSP is the state counterpart of the nation's gross domestic product (GDP), 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 state product in 2001 was \$73 billion, or approximately 9.5 percent of the state's total GSP (Table 1). As illustrated in Figure 1, the contribution of the food and fiber system to the state's GSP over the past five years has remained stable at about 10 percent of the state's GSP, even though the absolute dollar value of the contribution has increased. From 1997 to 2001, the food and fiber system's contribution to GSP grew by 22.5 percent and the rest of the Texas economy grew by 25.8 percent. The slight decrease in the food and fiber sector's contribution from 1999 to 2001 can be attributed to a 5.8 percent annual growth in the state's economy over the period, while the growth in the food and fiber sector was just over 2 percent annually. Most of the growth in the state's economy occurred in the retail sector, F.I.R.E., and services.

**Table 1.**  
**Estimated Contribution of the Food and Fiber System to the Texas Economy, 2001**

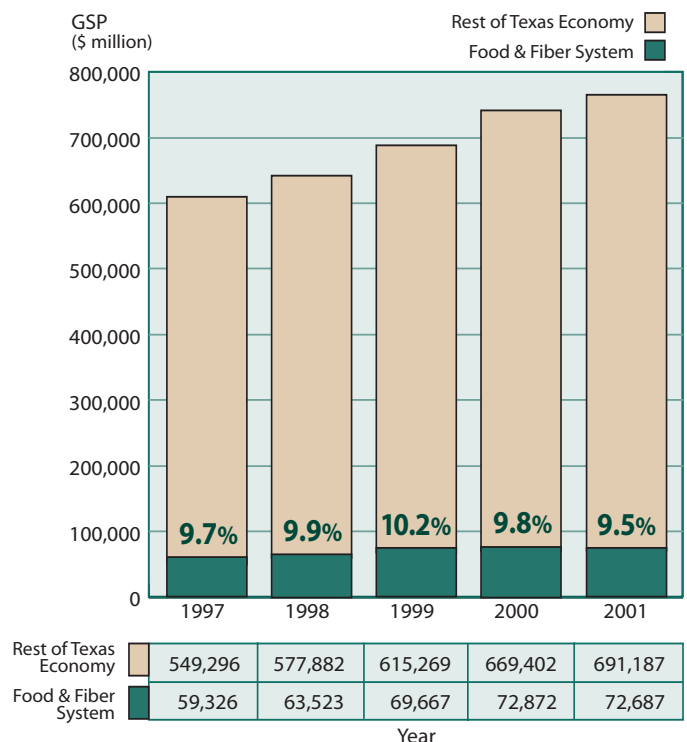
INDUSTRY	FFS Contribution (\$ million)	Contribution as % of Total FFS
Farming and ranching	5,516	7.6%
Agricultural services, etc.	4,059	5.6%
Mining	63	0.1%
Manufacturing		
Lumber & wood	2,122	2.9%
Furniture and fixtures	450	0.6%
Industrial machinery	107	0.1%
Food & kindred products	7,553	10.4%
Tobacco products	9	0.0%
Textile mill products	181	0.2%
Apparel & textile	1,106	1.5%
Paper products	2,489	3.4%
Chemicals	265	0.4%
Petroleum products	1,001	1.4%
Leather products	272	0.4%
Transportation & utilities	2,293	3.2%
Wholesale trade	11,521	15.9%
Retail trade	13,341	18.4%
Finance, insurance, & real estate		
Depository institutions	1,724	2.4%
Insurance	1,596	2.2%
Real estate	6,687	9.2%
Services		
Food service	7,821	10.8%
Misc. repair services	699	1.0%
Government		
Federal direct payments	1,683	2.3%
State and local	132	0.2%
<b>Contribution of Food &amp; Fiber System</b>	<b>72,688</b>	<b>100.0%</b>
<b>Texas' Gross State Product</b>	<b>763,874</b>	
<b>% of GSP Contributed by FFS</b>	<b>9.5%</b>	

Source: The Texas GSP is from the Bureau of Economic Analysis, U.S. Department of Commerce, gross state product (GSP) in current dollars, for Texas, for 2001 (annual), published May 2003. <<http://www.bea.doc.gov/bea/regional/gsp/>> The portion contributed by the food and fiber system in Texas was estimated by the Department of Agricultural Economics, Texas A&M University System, and the Office of the Comptroller, State of Texas.

Figure 2 compares the contribution of the food and fiber system to the other industries that make up the state's economy. The largest single industry classification is services, followed by the finance, insurance, and real estate sector. The contribution of the food and fiber system in total is 9.5 percent, compared to approximately 10.5 percent each for manufacturing, transportation and utilities, and government that are not included in the food and fiber system.

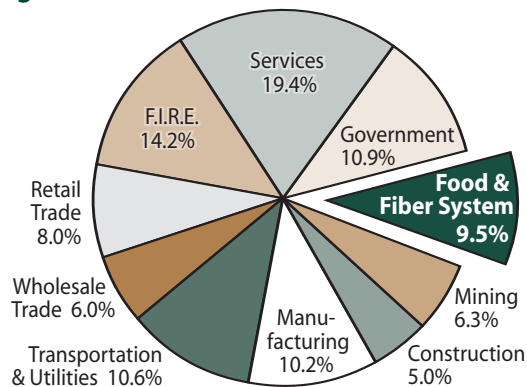
Estimating the economic contribution of the production activities for a specific commodity should be based on the value added through production. Each commodity has unique requirements for purchased inputs and land, labor, capital, and management resources. Therefore, the contribution to gross state product, 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.

**Figure 1. Contribution of the Food and Fiber System to Texas' Gross State Product, 1997–2001**



Source: The Texas GSP is from the Bureau of Economic Analysis, U.S. Department of Commerce, gross state product (GSP) in current dollars, for Texas, for 1997–2001 (annual), published May 2003. <<http://www.bea.doc.gov/bea/regional/gsp/>> The portion contributed by the food and fiber system in Texas was estimated by the Department of Agricultural Economics, 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 State Product**



INDUSTRY	Texas GSP 2001 (\$ million)
Food and fiber system	72,688
Mining	47,827
Construction	37,846
Manufacturing	78,199
Transportation and utilities	80,717
Wholesale trade	46,085
Retail trade	60,776
F.I.R.E. (Finance, insurance & real estate)	108,229
Services	147,890
Government	83,616
<b>TOTAL</b>	<b>763,874</b>

## Measuring the Impacts of Individual Commodities

The economic contribution of the production activities for a specific commodity is often estimated using the value of production, or gross receipts. As a result, the analysis may be misleading. The appropriate measure is the contribution to the state's gross state product because it eliminates the possibility of double counting.

The economic impact of specific commodities beyond the farm gate is difficult to separate from 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.

IMPLAN is a widely used system for carrying out input-output analysis for any county or state in the United States. It was developed originally for use by the U.S. Forest Service, in cooperation with the Federal Emergency Management Agency, and has been in use since 1979. 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. Multipliers are a product of input-output analysis. They quantify for each economic sector or industry the effects caused by an initial change in the sales of production. Multipliers estimate a change in gross state product (similar to GDP in the national economy) as a result of sales to final demand in a specific sector of the economy.\*

When information is needed about 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. The contribution of the production activity to gross state product (GSP) is measured, with some minor refinements, as the difference between the sale of goods and the purchase of raw materials or services from other sectors or industries. This contribution to GSP also represents the return to land, labor, capital, and management resources used in this activity.

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

\* For more information see Minnesota IMPLAN Group, Inc. 1999. 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

<b>A Value of Production (avg. 1999-2002)</b>	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>B Government Payments</b>	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.
<b>C Total Cash Receipts</b>	Value of all production plus government payments.
<b>D GSP Fraction of Receipts (from IMPLAN)</b>	The fraction of total cash receipts that represents the contribution to gross state product (GSP).
<b>E Direct Contribution to GSP [C x D]</b>	The portion of output that contributes to GSP. 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.
<b>F Statewide GSP Multiplier (from IMPLAN)</b>	The multiplier captures all of the changes on contributions to statewide GSP, including direct and indirect contributions. Multiplying this value times direct contributions to GSP yields a value that represents the total change to GSP.
<b>G Total Contribution to GSP [E x F]</b>	The total contribution to GSP includes the direct contribution plus contributions made to GSP indirectly. Indirect contributions arise from inter-industry activities. These economic activities are stimulated by output. As output changes, the suppliers (to the producer of the output) must change as well; as a result, the suppliers' contributions to GSP are affected.

**Table 2. Leading Agricultural Commodities Based on Contribution to Gross State Product\***

	<b>Total Cash Receipts**</b> (\$ million)	<b>GSP Fraction of Receipts</b>	<b>Direct Contribution to GSP</b> (\$ million)	<b>Statewide GSP Multiplier</b>	<b>Total Contribution to GSP</b> (\$ million)
<b>Beef cattle &amp; calves</b>	6,480.9	0.31	2,009.1	2.44	4,902.2
<b>Cotton</b> (including cottonseed)	1,432.9	0.38	544.5	2.31	1,257.8
<b>Greenhouse &amp; nursery</b>	1,200.5	0.58	696.3	1.78	1,239.4
<b>Timber***</b>	518.9	0.85	441.1	1.60	705.8
<b>Dairy</b> (milk & cows)	834.9	0.45	375.7	1.87	702.6
<b>Broilers</b>	929.0	0.23	213.6	2.46	525.6
<b>Corn</b>	501.9	0.65	326.2	1.57	512.2
<b>Sorghum grain</b>	385.8	0.65	250.7	1.57	393.7
<b>Wheat</b>	394.8	0.45	177.6	2.04	362.4
<b>Rice</b>	237.2	0.45	106.8	2.04	217.8
<b>Peanuts</b>	195.0	0.74	133.8	1.50	200.7

\*The above 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 Texas Agricultural Statistics Service) and estimated government payments, 1999-2002.

\*\*\*Based on stumpage value reported by the Texas Forest Service.

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