

Economic Contribution of the Agricultural Sector to the Arkansas Economy in 2008



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Katherine McGraw, and Kyle Karr

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Executive Summary

Agriculture and associated agricultural activities are major contributors to the Arkansas economy. Agriculture is defined as the sum of agricultural production and processing activities, unless otherwise specified, and includes crop and animal production and processing, agricultural support industries, forestry and forest products, and textile goods. Agriculture contributes to the economy through direct agricultural production and value-added processing, and also leads to economic activity in other parts of the economy.

This report¹ is the fifth in a series of reports examining agriculture's economic contribution to the Arkansas economy. Utilizing data from the United States Bureau of Economic Analysis (BEA), USDA Economics Research Service (ERS), USDA National Agricultural Statistics Service (NASS), and Minnesota IMPLAN Group, Inc. (MIG), the economic contribution of agriculture on the Arkansas economy was estimated for the most recent year available, 2008. Gross Domestic Product (GDP) by State information for Arkansas was compared with those of other states in the southeast U.S. to give a measure of the relative importance of agriculture in Arkansas.² The total economic contribution of agriculture (direct, indirect, and induced effects) on value added, employment, and labor income was estimated by employing the Impact Analysis for Planning System (IMPLAN). The economic contributions of agricultural production and processing were estimated for agriculture as a whole and also separately for the Crops Sector, the Animal Agriculture Sector, and the Forestry Sector. Key findings of the IMPLAN analysis are as follows:

- When comparing the GDP contributions of agriculture, forestry and many food related industries, Arkansas agriculture accounts for a larger percentage of total economic activity in the state than any other state in the Southeastern U.S. – 12% of total GDP by State or \$10.6B.³
- Agriculture contributed \$16.3B in total value to the state economy; this is \$0.17 of every \$1 in value generated in the state.
- Agriculture accounted for 261,101 jobs, which is almost 17% of all jobs in the state. Direct employment in agriculture is 157,646 or 10% of all state employment.
- *Poultry and Egg Production* and *Poultry Processing* alone continued to provide over one in four of the state's agricultural jobs.
- Agriculture paid \$9.6B in labor income, or almost 16% of the state's total labor income; directly, agriculture payrolls total nearly \$8.0B, or 15% of total state wages.
- Agriculture generates value added, employment, and income in all 20 of the 2-digit NAICS aggregated industries in the state. Roughly 48% of agriculture's contribution to value added occurs in industries closely tied to agriculture but not defined as part of the agriculture sector, such as Wholesale Trade, Real Estate and Rental, and Transportation and Warehousing.
- The direct contribution of the Crops Sector included \$3.3B in value added, 56,051 jobs and \$1.4B in labor income. *Grain Farming*, *Oilseed Farming*, and *Cotton Farming* together represented 63% of jobs, 32% of labor income, and 54% of value added in the Crops Sector.
- In direct contributions, the Animal Agriculture Sector generated \$2.6B in value added, 57,601 jobs and \$1.8B in labor income. *Poultry and Egg Production* and *Poultry Processing* provided 74% of jobs, 83% of income and 75% of value added in the Animal Agriculture Sector.
- The direct contribution of the Forestry Sector included \$2.6B in value added, 34,065 jobs, and \$1.7B in income. Within the Forestry Sector, *Sawmills*, *Logging*, *Paper Mills* and *Paperboard Mills* contribute 47% of forestry jobs, and over half of forestry income and value added.

Arkansas' agricultural sector continues to be a critical component of Arkansas' economy. Agriculture in Arkansas contributes a larger share to the state's economy than does agriculture in the neighboring southeast states and the U.S. Including multiplier effects, agriculture generates over one in six jobs and 17% of value added in the state. The diversity of the state's agriculture helps to mitigate the effects of low world market prices or trade embargoes for a particular commodity. Crops, animal agriculture, and forestry production and processing are all major contributors to agriculture and to the state's economy. The large and diverse natural resource base of the state provides the opportunity for agriculture to change and develop new value added and bio-energy industries. The size and diversity of the state's agriculture contribute greatly to the well-being of Arkansans and to the stability of the state's economy.

Definitions Methods, and Styles

Agricultural Sectors

Aggregate Agriculture consists of the Crops, Animal Agriculture, and Forestry Sectors' production and processing industries, plus the Agriculture-Related Sector. See Appendix A, Tables 1-4 for a complete listing of the sectors included.

Crops Sector comprises those industries directly involved in crop production and processing. See Appendix A, Table 1 for a complete listing of the industries included.

Animal Agriculture Sector comprises those industries directly involved in livestock production and processing. See Appendix A, Table 2 for a complete listing of the industries included.

Forestry Sector comprises those industries directly involved in forestry production and processing. See Appendix A Table 3, for a complete listing of the industries included.

Agriculture-Related Sector comprises those industries that support the Crops, Animal Agriculture, and Forestry Sectors. See Appendix A, Table 4 for a complete listing of the industries included.

Note: The Agriculture and Food Sector terminology used in Part 1 consists of the Aggregate Agriculture Sector plus agricultural retail. This terminology is used only in Part 1, and not in Part 2 for the computation of direct agricultural impacts reported elsewhere in this publication. See "Gross Domestic Product" discussion under "Style Notes" (page 7) for further explanation.

Economic Contribution

The **total economic contribution** of the Aggregate Agriculture Sector includes three areas of wealth and job generation:

Direct Contributions are the sum of the contributions of farm production and processing of farm products. Only direct contributions are reported for the Crops, Animal Agriculture and Forestry Sector discussions.

Indirect Contributions result when agricultural firms purchase raw materials and services from other Arkansas businesses to produce their products.

Induced Contributions result when employees of agricultural firms and employees of the raw material and service firms spend a portion of their income on local purchases.

These contributions are reported in terms of **Employment, Labor Income, and Value Added:**

Employment includes all wage and salary employees, as well as self-employed workers in a given sector.

Labor Income consists of two parts: proprietary income and wages. Proprietary income includes all income received by self-employed individuals, such as private business owners, doctors, or lawyers. Wages include all worker salaries, payments, and fringe benefits paid by employers.

Value Added includes labor income plus indirect taxes and other property-type income such as payments for rents, royalties, and dividends. Value added and Gross Domestic Product (GDP) are equivalent measures in theory but are estimated using different methods and data sources.

Methods

For Part 1 of this report, the most recent estimates from the BEA for agricultural production, processing and retail are reported. BEA's GDP by State data set includes the following eight sectors as part of the Agriculture and Food Sector: 1) Agriculture, Forestry, Fishing, and Hunting; 2) Wood Product Manufacturing; 3) Furniture and Related Products Manufacturing; 4) Food Manufacturing; 5) Textile and Textile Product Mills; 6) Apparel, Leather, and Allied Products Manufacturing; 7) Paper Manufacturing; and 8) Food Services and Drinking Places. It is important to note that agriculture retail is included as a component of the Agriculture and Food Sector in the GDP comparisons but is not included as a direct economic contribution when estimating the contribution of agriculture to the state economy. No input providers (fertilizer, pesticide and equipment manufacturers) or retail locations (restaurants, grocery stores, lawn and garden centers, etc.) are considered as direct contributors to the agriculture sector in the contribution analysis. However, much or some of the economic activity in these firms is picked up as indirect and induced effects and reported as part of the total economic contribution.

For the economic contribution analysis of the agriculture sector, Part 2, the entire measure of economic activity in the industries that make up the Aggregate Agriculture Sector (such as crop, livestock and forestry production and processing industries) are considered to be 100% agriculture. This is the basic rule for inclusion/exclusion of industries as part of the agriculture sector. The Aggregate Agriculture Sector is made up of three kinds of industries: agriculture production industries, agriculture processing industries, and agriculture-related industries. The version 3.0 IMPLAN model was used to estimate the contribution of agriculture to the state economy. The IMPLAN agriculture production sectors (1-16) data must be verified prior to analysis and often require updating. The default IMPLAN output data for these sectors are checked against the latest available value of production estimates and cash receipts estimates from the NASS and ERS. In any agriculture production industry where a data discrepancy exists, the default output data must be changed to reflect the NASS/ERS output estimate. Accordingly, a corresponding change must be made to all four components of Total Value Added. This holds the relationship between Total Industry Output and Total Value Added (a fundamental relationship in I-O analysis) constant, and the model production functions are left unchanged.

Style Notes

This report consists of two parts. In Part 1, information about Arkansas agriculture is presented in a historical context. In Part 2, the contributions of agriculture to the Arkansas economy are presented for 2008. Throughout the report, agriculture is defined in terms of agricultural sectors, NAICS sectors, industries, and general descriptive terms that can be applied to agriculture. Different font styles are used throughout the text to distinguish these terms.

Agricultural Sectors. These comprise the areas of focus in our study. These sectors are capitalized throughout the report. Part 1 of the report refers to the Agriculture and Food Sector. In the second part of the report, we refer to the four areas of analysis: Crops Sector, Animal Agriculture Sector, Forestry Sector, and Aggregate Agricultural Sector.

NAICS Sectors. The North American Industry Classification Scheme (NAICS) is "...an industry classification system used by statistical agencies to facilitate the collection, tabulation, presentation, and analysis of data relating to establishments.... Under NAICS, an establishment is classified to one industry based on its primary activity" (USCB, 2006). Agricultural activities are classified under, or can impact, multiple sectors. Throughout the document, capitalization of sectors is used when referring to NAICS sectors. Examples include Food Manufacturing, Paper Manufacturing, and Wood Product Manufacturing.

Industries. These are defined as individual industries that can be aggregated to create NAICS sectors or the sectors used in our analysis. These industries are capitalized and italicized. Examples include *Poultry and Egg Production* and *Paperboard Mills*.

Gross Domestic Product by State, formerly Gross State Product, is the state equivalent of the national measure of GDP, the most comprehensive measure of U.S. economic activity. GDP by State is derived as the sum of the GDP originating in all the industries in a state (USDC, BEA, 2008). As described in Kemper et al. (2009) BEA's 2009 revisions to GDP by state made it necessary for us to include two additional industries to bring this study in line with that new methodology used by ERS to measure agriculture and food's contribution to GDP (USDA, ERS, 2008a). One NAICS industry was added to agricultural processing, (Apparel, Leather, and Allied Products Manufacturing), and agricultural retail was newly added and consists of the NAICS industry Food Services and Drinking Places. It is important to note that agriculture retail is included as a direct effect in the GDP by State portion of the report, but not in the contribution analysis. Some retail activity is picked up as part of the induced effect and included in the total economic contribution.

General Descriptive Terms are terms used throughout the text to describe agriculture that are not related to established industry classification schemes or specific agricultural sector titles used in this analysis. These terms are presented in lower case. Examples include agricultural production, agricultural processing, and agricultural retail.

Note: In some cases, numbers reported in this research report may be different than numbers reported in its companion document, the pocket guide *Economic Impact of Arkansas Agriculture 2010*, due to rounding.

The Economic Contribution of Agriculture and Food to Arkansas' GDP

Introduction

Agricultural production, processing and support industries are major contributors to the Arkansas economy. While agriculture contributes to the economy through direct agricultural production, value-added processing, and agricultural services and support activities, it also plays an important role through its interactions with other sectors. The use of non-agricultural goods and services as inputs into the agricultural sector promotes diversified growth in Arkansas' economy; thus agriculture remains a vital part of the Arkansas state economy. Part 1 of the report compares the relative size of the Agriculture and Food Sector in Arkansas and those of neighboring states, the Southeastern region of the United States, and the nation; provides an overview of Arkansas' economy and discusses Arkansas' agricultural sector in relation to the state economy; and examines components of agricultural production and processing, including a review of historical sales trends for raw and processed agricultural output.

Methods

As previously stated, for the GDP by State portion of this report, the most recent estimates from BEA for agricultural production, processing and retail are reported. The BEA definitions in the GDP by State data set includes the following eight sectors as part of the Agriculture and Food Sector: 1) Agriculture, Forestry, Fishing, and Hunting; 2) Wood Product Manufacturing; 3) Furniture and Related Products Manufacturing; 4) Food Manufacturing; 5) Textile and Textile Product Mills; 6) Apparel, Leather, and Allied Products Manufacturing; 7) Paper Manufacturing; and 8) Food Services and Drinking Places. This terminology is used to emphasize the important differences in what is being measured in the GDP portion of this report in comparison to the economic contribution analysis portion.

This report builds upon previous reports (Goodwin et al., 2002; Popp et al., 2005, 2007; Kemper et al., 2009). This report utilizes data for 2007, the most recent year for which all relevant data are available. Under normal circumstances, 2008 data for GDP by state would have been available from BEA in June 2010. However, benchmark revisions delayed the release of the 2008 data until November 2010. The data release date is after this publication's deadline; therefore, the GDP data in this publication is the same as in Kemper et al. (2009). All dollar values in Part 1 are expressed in 2007 constant dollar terms, unless otherwise noted. For example, Figs. 6 and 7 are expressed in constant 1990-1992 dollars.

A Note Regarding Presentation of GDP by State (Formerly Gross State Product) Estimates

Gross Domestic Product by State is the state-level analog to national GDP. Early reports (Goodwin et al., 2002; Popp et al., 2005) made comparisons of historical gross state product (GSP)⁴ data from the BEA using a starting year of 1986. However, there is a discontinuity in the GSP (now known as GDP by State) time series at 1997. This discontinuity results from the BEA's change in methods for classifying data from the Standard Industrial Classification (SIC) to the North American Industrial Classification System (NAICS) scheme. GDP by State data estimates for 1997 forward are now prepared for 81 NAICS industries. Estimates for earlier data years remain in only the 63 SIC industry format. The differences between SIC- and NAICS-based industries are many, including the facts that these estimates are based on different source data and different estimation methodologies.⁵ Additionally, the NAICS-based GDP by State estimates are consistent with U.S. gross domestic product (GDP), while the SIC-based GSP estimates were consistent with U.S. gross domestic income (GDI). The data discontinuity affects the dollar values, industry categories - particularly with respect to manufacturing components - (see Appendix B for changes relevant to the discussion of agriculture) and the growth rates of the GDP by State estimates. The BEA strongly cautions analysts using the GDP by State estimates against appending the two data series in an attempt to construct a single time series of GDP by State estimates for 1977 to the present (USDC, BEA, 2009a). Due to these reasons, following Kemper et al. (2009), this study reports only GDP by State estimates since 1997.

Agriculture and Food – The Regional Context

In the following GDP by State discussion, the Agriculture and Food Sector is defined as the sum of agricultural production, processing, and retail, unless otherwise mentioned.⁶ Arkansas' Agriculture and Food Sector, expressed as a percentage of total GDP, has exceeded those of contiguous states since at least 1969, when the BEA began publishing regional GDP information. In 2007, the Agriculture and Food Sector accounted for 12% of Arkansas' GDP (Table 1). However, the Agriculture and Food Sector in the Southeast region⁷ experienced a 0.1% drop as a percentage of real GDP from 2006 to 2007. Still, Arkansas' agricultural production, processing, and retail as percentage of GDP is well over two times greater than that of the U.S. agricultural sector as a percentage of its Gross Domestic Product in 2007.

The individual contributions of agricultural production and processing also comprise a greater percentage of Arkansas' GDP than agricultural production and processing do in neighboring states' and the nation's respective economies (Fig. 1). Agricultural production contributed almost 4% to Arkansas' GDP in

Table 1. The Agriculture and Food Sector As a Percentage of GDP, 2007^a.

State / Region	Percent of GDP by state
Arkansas	12.03
Louisiana	4.55
Mississippi	9.19
Missouri	7.09
Oklahoma	5.46
Tennessee	6.68
Texas	4.28
Southeast ^b	6.94
U.S. ^c	5.50

Source: USDC, BEA (2009b)

^a Current 2007 dollars

^b The BEA includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the Southeast region

^c Agriculture and food is measured as a percent of GDP for the U.S.

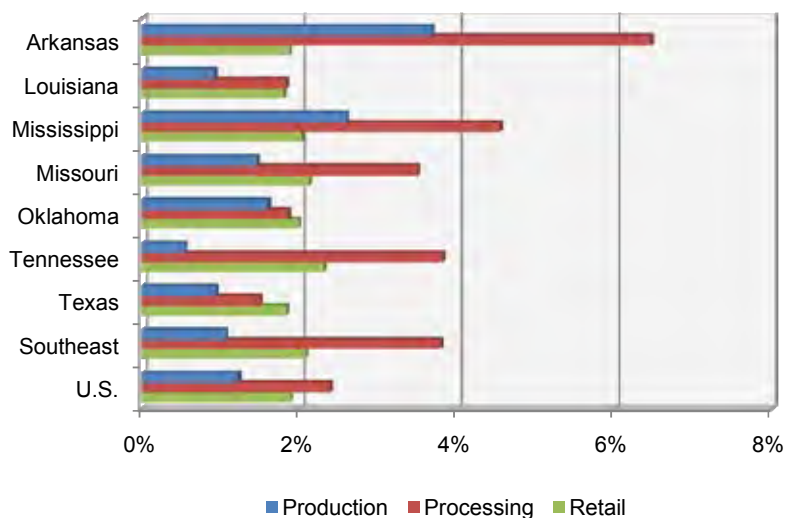
2007, whereas agricultural production in Mississippi, the southern State whose contribution comes closest to Arkansas', contributed only almost 3% to its GDP. Similarly, agricultural processing's contribution to GDP in Arkansas is almost 7% whereas it is only almost 5% in Mississippi. However, Arkansas' agricultural retail contributed less than 2% to GDP by State, behind Tennessee, Missouri, Oklahoma and Mississippi.

The diversity of Arkansas' Agriculture and Food Sector is the foundation of its strength. Arkansas' varied climate and terrain allows for row crops in the east, livestock and poultry in the west, and forestry in the south. For example, Arkansas was one of the top 25 states in the production of 24 different agricultural products in 2009 (USDA, NASS, 2009; Census of Agriculture, 2007). Specifically, the State was the leading producer of rice, the second leading producer of broilers, and the third leading producer of upland cotton, cottonseed, catfish, and turkeys for 2009 (USDA, NASS, 2004-2010).

Forestland comprises 54% of Arkansas' total land base (Arkansas Forestry Commission, 2007). Relatively low-valued timber is processed to produce higher-valued products (e.g., lumber, paper, and furniture). States that are more than half forested, including Arkansas, Mississippi, and Tennessee, tend to have high values of agricultural processing (Fig. 1) (Mississippi Forestry Association, 2008; Oswald et al., 2004).

Overall, Agriculture and Food's share of total GDP in the Southeast fell 0.1% between 2006 and 2007 due to increased contributions from other sectors towards GDP. However, Arkansas remains number one out of seven contiguous states in terms of agricultural production, processing and retail as a percentage of GDP

Fig. 1. Production, Processing and Retail as a Percentage of GDP, 2007^a.



Source: USDC, BEA (2009b)

^a Current 2007 dollars

^b The BEA includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the Southeast region

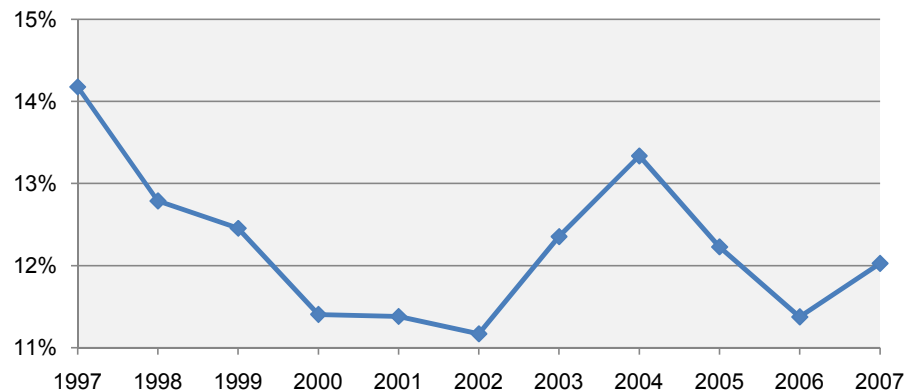
in 2007, and the importance of the Agriculture and Food Sector has increased in terms of its share of the total GDP to 12% in 2007.

Agriculture and Food and the Arkansas Economy

In 2007, Arkansas' total GDP was equal to \$95.1B (constant 2007 dollars are used throughout this section, unless otherwise noted) (USDC, BEA, 2008) with the Agriculture and Food Sector contributing \$11.4B to the total (Fig. 2). From 1997 to 2007, Agriculture and Food's lowest contribution to GDP was \$9.2B in 2000. During the years that followed, the Agriculture and Food Sector increased 30% to nearly \$12.0B in 2004 before declining to \$10.7B in 2006. The Agriculture and Food Sector rebounded in 2007 by increasing 7% to \$11.4B and outpaced the growth of the overall state GDP, which increased only almost 2%. Record cash receipts for Arkansas in 2007 may explain the rebound of the Agriculture and Food Sector's GDP (USDA, NASS, 2008).

The Agriculture and Food Sector represented 12% of the overall Arkansas GDP in 2007, up 0.3% from 2006 (Fig. 3). In 1997, the Agriculture and Food Sector's contribution to GDP was 14%, of the overall total, the highest level from 1997 to 2007. The portion of the state GDP attributed to Agriculture and Food fell to 11% in 2002. Much of this loss is explained by falling prices for agricultural products between 1997 and 2002. The Agriculture and Food Sector rebounded

Fig. 3. The Agriculture and Food Sector's Share of Arkansas GDP, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Constant 2007 dollars.

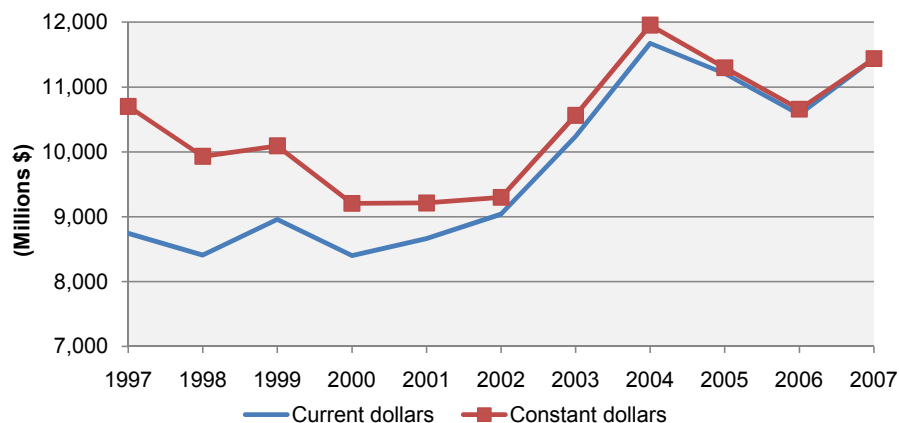
in 2003 to 12% and 2004 to 13%. After two years of decline in 2005 and 2006, the Agriculture and Food Sector as part of Arkansas GDP was up 0.7% in 2007. The 2007 increase in the Agriculture and Food Sector was due in part to high commodity prices resulting from strong demand from foreign buyers and from the domestic biofuels industry (USDA, ERS, 2009).

The Agriculture and Food Sector ranks as the fourth largest sector in the state (Fig. 4). The only sectors larger are Non-Agricultural Service and Retail (20%), Government (14%), and Finance, Insurance, and Real Estate (12%). The three major components of the Agriculture and Food Sector—agricultural production, agricultural processing and agricultural retail—totaled \$3.5B, \$6.2B, and \$1.8B GDP, respectively (Fig. 5).

Agricultural Production

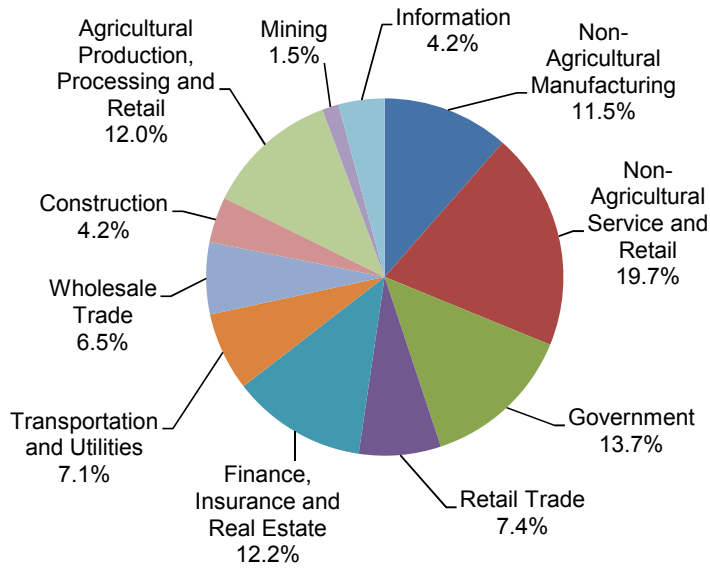
Crop and animal production, forestry, aquaculture, and horticulture are the primary agricultural production industries found in Arkansas. Figure 5 details the time-series trend of agricultural production in Arkansas from 1997 to 2007. From 1997 to 2000, agricultural production declined until rebounding briefly in 2001 before dropping again in 2002. In 2002, agricultural production GDP reached its lowest level (\$2.1B) between 1997 and 2007, representing a loss of 44% in GDP since 1997. The growth of agricultural production's GDP stalled in these years due to low agricultural prices in the world market, especially in the Crops Sector. Barriers to poultry exports also contributed to the decline (USDA, ERS, 2008b). It then experienced an increase for two years, and in 2004, the GDP of agricultural production increased to \$4.0B. 2004 was the highest level from 1997 to 2004, which represented an increase over 2002 of 93%. The declining value of the dollar in the early 2000s and the foreign accumulation of foreign exchange reserves (U.S. dollars) enabled some countries to increase food commodity imports, even as world prices denominated in dollars reached record highs (USDA, ERS, 2008b). In 2003 and 2004, farmers experienced consecutive years of large harvests for major crops and unusually high prices for livestock and milk. These factors combined to yield record earnings for the farm sector (USDA, ERS, 2006). Although the value of animal

Fig. 2. Arkansas' Agriculture and Food Sector GDP, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Constant 2007 dollars.

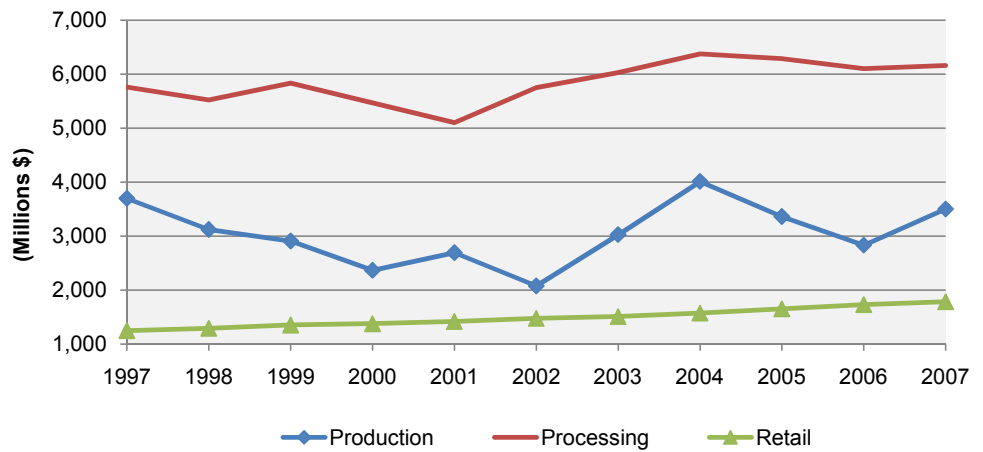
Fig. 4. Sector Percentages of Arkansas' GDP, 2007^a.



Source: USDC, BEA (2009b).

^a Current 2007 dollars.

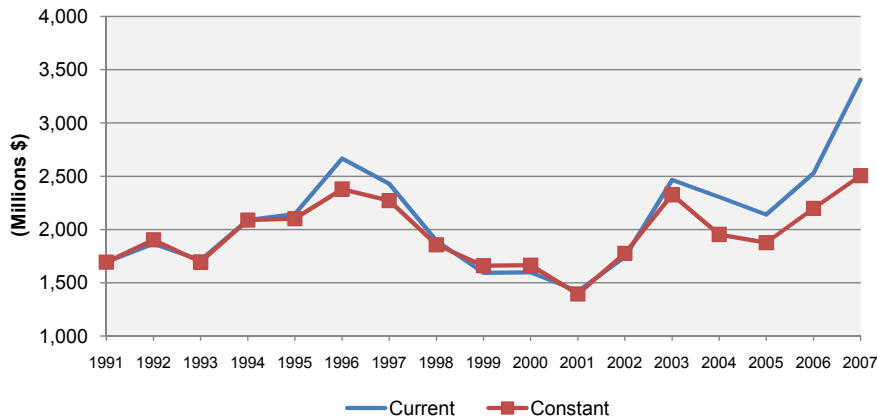
Fig. 5. GDP for Arkansas' Agricultural Production, Processing and Retail, 1997 - 2007^a.



Source: USDC, BEA (2009b).

^a Constant 2007 dollars.

Fig. 6. Arkansas' Crop Production Sales, 1991 - 2007^a.



Source: Computed using data from the USDA, NASS (2009)

For selected crops: Rice, Soybeans, Cotton, Hay, Wheat, Corn, Sorghum, and Oats

^a Constant 1990-1992 dollars

agriculture production increased in 2005, the overall value of agricultural production GDP decreased in 2005 and 2006 to \$2.8B. However, in 2007 it rose sharply to \$3.5B in 2007, representing a 24% increase over 2006. Arkansas cash receipts from all commodities in 2007 were the largest in state history. The boost in income was primarily the result of higher commodity prices.

Crops Production

While crops production continues to be an important part of Arkansas' economy, the crops' value of production has experienced periods of increase and decline since 1991 (Fig. 6). In 2001, crop sales fell to their lowest level since 1991, down to \$1.4B. However, from 2001 to 2003 crops prices and exports, along with strong domestic and international demand for products greatly improved; as a result, the value of crops production jumped 67%. The gains were partly erased as the total market value (in constant 1990-1992 dollars) of crop production in Arkansas dropped in 2004 and again in 2005. During that time there was a general increase in output and prices for agricultural products in the U.S.; however, in Arkansas, cotton, rice, and soybean (Arkansas' top three crops) output increased, but prices did not. In 2006 and 2007, Arkansas crop production sales increased a total of 33% to the highest level over the 11 year period to \$2.5B.

Animal Production

Animal production is also a major component of Arkansas' agricultural production. In terms of current dollars, the animal production cash receipts (which measure income and sales from marketing) in Arkansas increased from \$3.5B in 2006 to \$4.0B in 2007 (Fig. 7). Exports, boosted by a weak dollar and increasing global demand for protein, were responsible for much of the increases. However, when adjusted for inflation and the rising costs of farm inputs, an examination of the animal production sector in 2007 reveals that producers were actually worse off. In terms of constant 1990-1992 dollars, Arkansas' livestock and livestock products cash receipts decreased from \$3.1B in 2006 to \$3.0B in 2007. The Animal Agriculture Sector is susceptible to changes in global agricultural policies. Instability in Russia, Japan, and Hong Kong negatively impacted trade during the late 1990s through 2002, resulting in fewer livestock purchases (particularly poultry) and depressed world prices. However, the livestock market improved greatly between 2002 and 2005; the market value of livestock increased 23% to \$3.6B. In constant dollars, cash receipts declined dramatically in 2006 and were down again in 2007 to \$3.0B. Production expenses at the U.S. level were 75% of the value of farm gross income in 2007, which actually represents a 5% improvement over 2006. Since 2002, expenses have increased at an accelerating rate, rising 15% from 2002 to 2007 (USDA, ERS, 2009a). So while on-farm cash receipts

set a record in Arkansas in 2007, Fig. 7 shows that increases in expenses of livestock products have outpaced increases in cash receipts for these commodities.

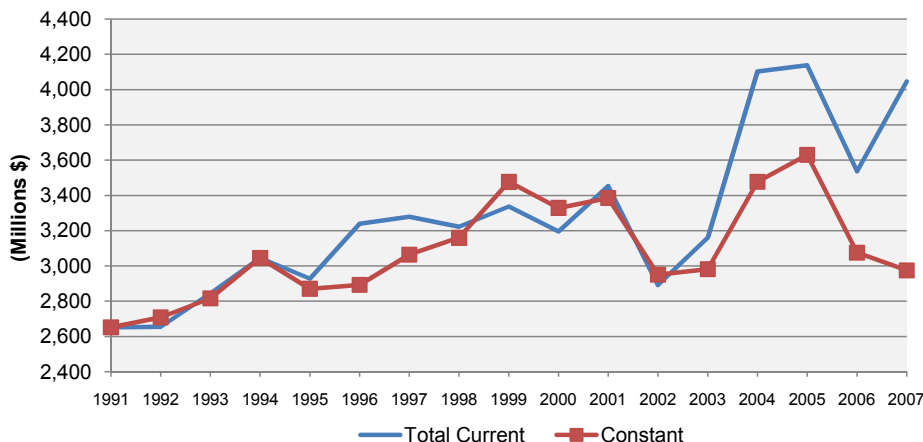
Forestry Production

Arkansas' land base is composed of approximately 18.5M acres of forest (54% of total land base) (Arkansas Forestry Commission, 2007). The state is fourth in the production of saw-logs in the South⁸ (Johnson, Bentley, and Howell, 2009). There were 16.5M tons of timber (soft- and hardwood) removed from forests in Arkansas in 2009, valued at \$300M. From 2005 to 2009, forestry production and value of production decreased steadily. While pine production decreased approximately 34% over the last five years, hardwood has declined 35% (Arkansas Forestry Commission, 2010). Forestry production is essential to Arkansas' economy. Foresters supply wood product manufacturers with raw materials. Arkansas' timber is fundamental to such industries as paper, lumber and wood, and furniture and fixtures. As will be discussed later, processed goods derived from forestry production are the third largest component of processed agricultural goods, in terms of employment, labor income, and value added.

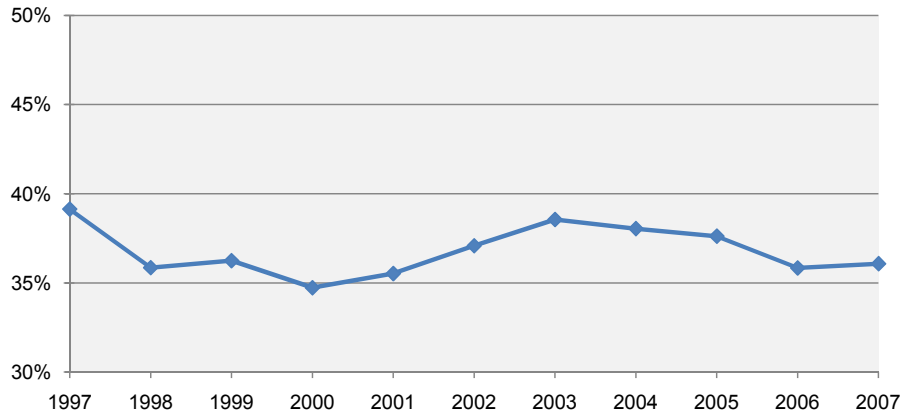
Agriculture-Related and Support Industries

Agriculture-related industries include commercial fishing, hunting and trapping from the natural environment (not farm-raised), and agriculture and forestry support activities (e.g., cotton ginning and crop dusting). In pre-2007 reports, on-farm construction was also included; however, the data are no longer available and have been dropped from the analysis. The largest of these industries is agriculture and forestry support activities. These activities may be performed by an independent firm as an input required for the production process for a given crop, animal, or forestry industry. Typical activities include but are not limited to cotton ginning; soil preparation, planting, and cultivating; breeding services and livestock sprayers. As will be discussed later, the ag-related activities sector alone employed almost 9,930 in 2007 (Table 2).

Fig. 7. The Value of Arkansas' Animal Agriculture Production, 1991 - 2007^a.



Source: Computed using data from USDA, ERS (2009b).
 For selected livestock: Broilers, Cattle and Calves, Eggs, Turkeys, Hogs and Pigs, Milk, Catfish, Farm Chickens, and Honey
^a Constant 1990-1992 dollars.

Fig. 8. Arkansas' Agricultural Processing's Share of Manufacturing GDP, 1997 - 2007^a.

Source: USDC, BEA (2009b)

^a Constant 2007 dollars

Agricultural Processing

Processed crop, livestock, and forestry products are an integral part of agriculture in Arkansas. Arkansas' manufacturing sector depends upon raw materials from the crops, animal agriculture, and forestry sectors for use in many of its largest industries. Broiler production and processing, for example, may lead to such processed goods as frozen chicken, eggs, animal feed, and animal oils; cotton production may lead to ginning and processing of materials to be used in the textile industry.

Figure 5 details the time series trend of agricultural processing in Arkansas from 1997 to 2007. From 1997 to 2001, the GDP of agricultural processing fell by 11% to its lowest level at \$5.1B. Since 2001, agricultural processing has been on an upward trend, peaking at its 11-year high of \$6.4B in 2004. Following a slight decline in 2005 and 2006, agricultural processing increased to \$6.2B in GDP in 2007.

From 1997 to 1999, the GDP of manufacturing increased by 9%; however, over the following two years, it decreased by 11% to \$14.4B in 2001. Other than a small decrease from 2004 to 2005, the GDP of manufacturing has been on the rise since 2001, increasing 19% to its highest level over the 11-year period of \$17.1B in 2007. The overall increase from 2001 to 2007 represented a 21% rise in agricultural processing, a slightly higher increase than the overall manufacturing sector.

Agricultural processing's share of the overall manufacturing sector was 36% in 2007, up slightly from 2006 by 0.3% (Fig. 8). Since 1997, agricultural processing's share of manufacturing GDP has ranged from a low of 35% in 2000 to a high of 39% in 1997. The 11-year average is 37% indicating that agricultural processing has been and remains to be an important component of the manufacturing sector in Arkansas. Food Manufacturing, Paper Manufacturing, and Wood Product Manufacturing accounted for 91% of Arkansas' processed agricultural goods in 2007.

The contribution of individual agricultural processing industries to agricultural processing in 2007 is shown in Fig. 9. Each industry's share of agricul-

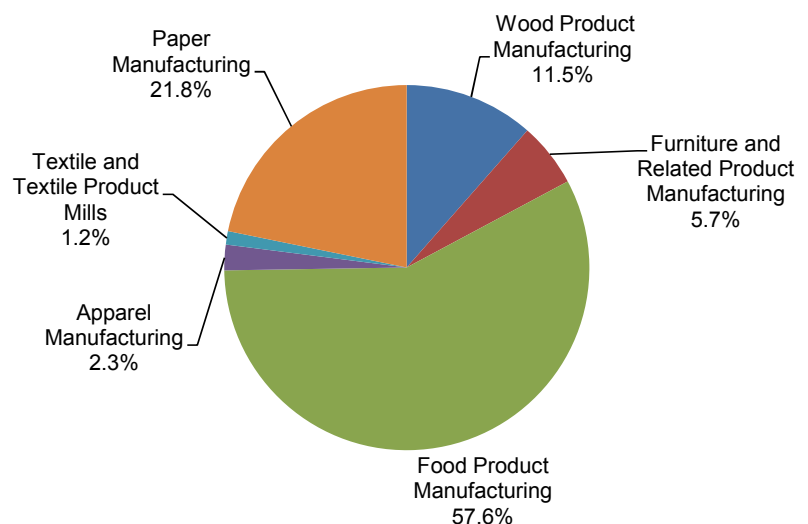
tural processing was relatively constant between 2006 and 2007. A discussion of each industry's percentage of GDP over time follows.

Food Product Manufacturing

The Food Product Manufacturing Sector is the largest agricultural processing sector in Arkansas, accounting for almost 58% of agricultural processing's GDP in 2007. The Food Product Manufacturing Sector's GDP grew 10% from 1997 to 1999 but then dropped 6% from 1999 to 2001 (Fig. 10). From 2001, the sector increased by 40% to \$3.7B in 2004, which was the 11-year high. After two years of decline in 2005 and 2006, the sector increased 9% to \$3.5B in 2007, close to the high in 2004. Some of the growth in the industry is explained by the record high levels of production agriculture in Arkansas (e.g., turkeys, chicken eggs, pecans, and watermelons), the resolution of many trade issues between Russia and Mexico, and a general increase in foreign demand for agricultural products.

Paper Manufacturing

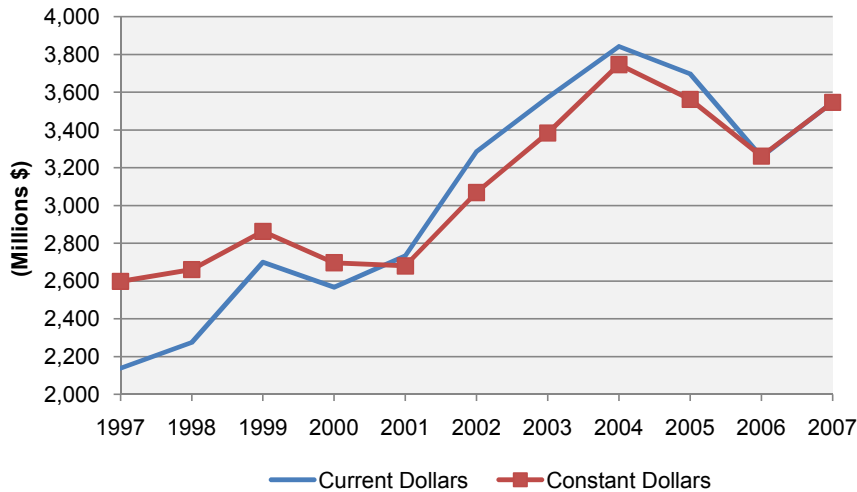
The Paper Manufacturing Sector is consistently one of the three largest processing industries in Arkansas. In 1997, its GDP was \$1.6B (Fig. 11). However, pulp and paper manufacturers in North America were strongly affected by the Asian financial crisis during the mid-to-late 1990s (Simard, 1999), which continued to impact manufacturers through

Fig. 9. Components of Arkansas' Agricultural Processing Sector GDP, 2007^a.

Source: USDC, BEA (2009b).

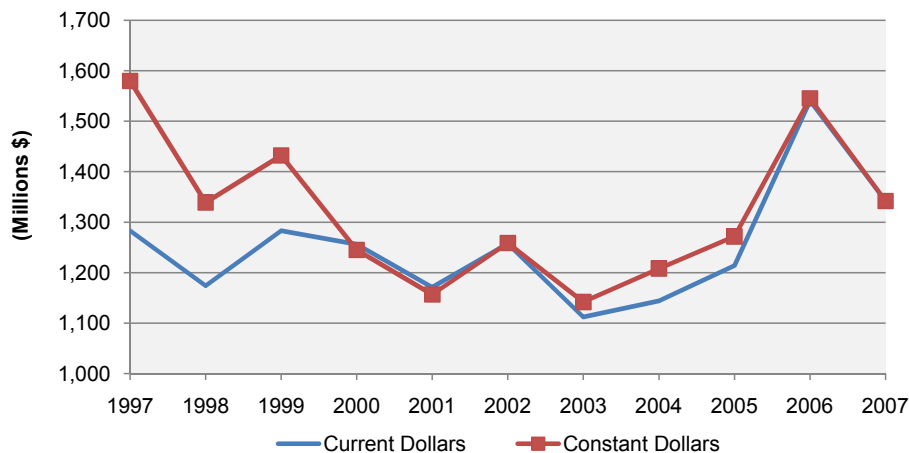
^a Current 2007 dollars.

Fig. 10. The GDP of Food Product Manufacturing, 1997 - 2007^a.



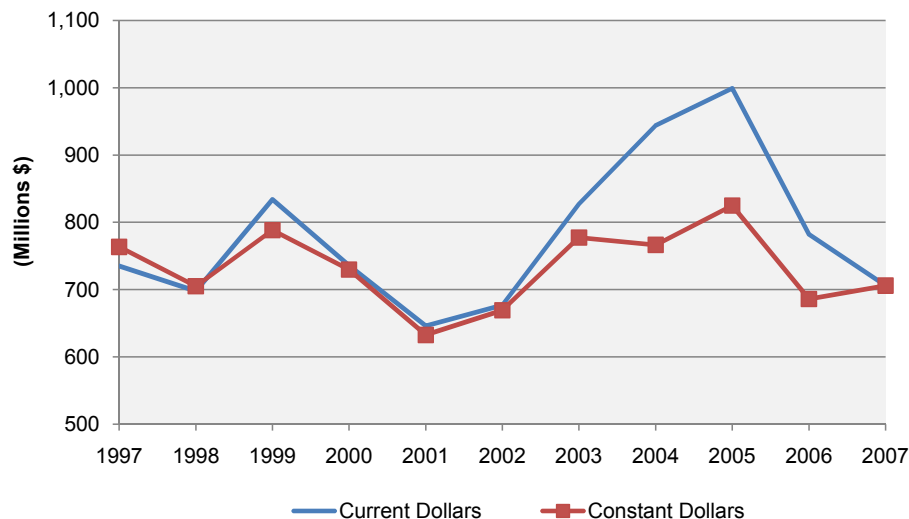
Source: USDC, BEA (2009b).
^a Current and constant 2007 dollars.

Fig. 11. The GDP of Paper Manufacturing, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Current and constant 2007 dollars.

Fig. 12. The GDP of Wood Product Manufacturing, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Current and constant 2007 dollars.

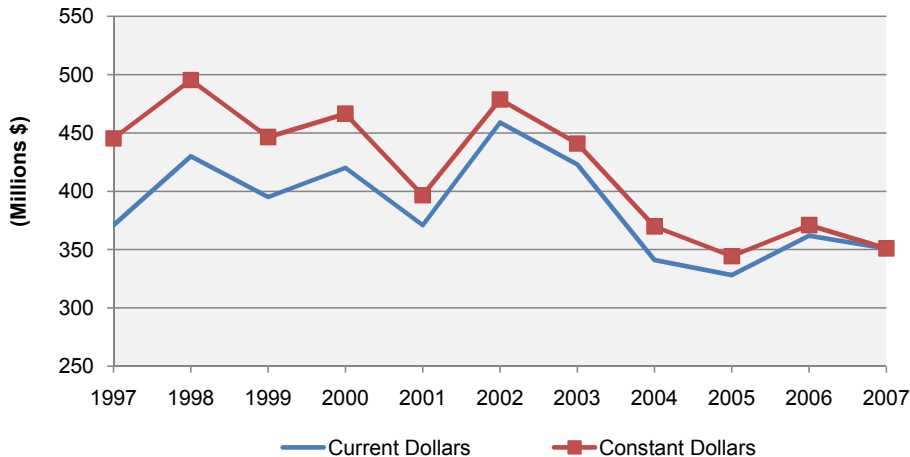
2001. Figure 11 shows a substantial decline (15%) in the industry's value from 1997 to 1998 with a rebound of 7% the following year. From 1999 to 2001 the constant value of paper and allied products fell an additional 19%. This sector experienced strong growth from 2003 to 2006 as the GDP of the Paper Manufacturing Sector improved by 35%; however, it declined 13% in 2007 down to \$1.3B.

Wood Product Manufacturing

After a brief increase from 1998 to 1999, the GDP of Wood Product Manufacturing plummeted 20% from 1999 to 2001 (Fig. 12). As explained in detail in Popp et al. (2005), most of the decline in this industry was attributed to a slowdown in the international market for U.S. wood chips and a drop in soft wood prices that followed an influx of Canadian wood on the market. This sector experienced steady growth from 2001 to 2005, the only exception being a slight decrease in 2004, as the GDP for wood product manufacturing increased by 30% to \$825M. Economic activity in the U.S. was strong in 2005 and during the first half of 2006; however, new housing construction weakened during the second half of 2006 (USDA Forest Service, 2009). New construction accounts for more than one-third of the U.S. annual consumption of sawn wood and structural panels, as well as other soft- and hardwood products. As a result, the sector's value dropped 17% in 2006 and rebounded only slightly in 2007, up 3% to \$706M.

Furniture and Related Products Manufacturing

During the period in which most agricultural processing sectors experienced a decline in GDP, the Furniture and Related Products Manufacturing Sector actually increased 11% between 1997 and 1998 to its 11-year high of \$495M (Fig. 13). This sector benefited from a strong resale housing market throughout the 1990s. The resale housing market is a leading indicator of demand for the furniture industry (Schuler, Taylor and Araman, 2001); however, as housing activity slowed in the late 1990s, lumber and furniture GDP also fell, as witnessed in a 20% decline from 1998 to 2001 to \$397M. The housing and real estate markets gained

Fig. 13. The GDP of Furniture and Related Products Manufacturing, 1997 - 2007^a.

Source: USDC, BEA (2009b).

^a Current and constant 2007 dollars.

momentum in 2002, represented by the sharp increase in this sector for that year; however, imports of furniture and other wood producers were also on the rise, flooding the market with less expensive substitutes for U.S. manufactured products. A flooded market partially led to the 28% drop from 2002 to 2005 to its lowest point, \$344M. The GDP of the Furniture and Related Products Manufacturing Sector recovered slightly in 2006 before declining again in 2007 to \$351M.

Textile and Textile Product Mills

The Textile and Textile Product Mills Sector has been in decline for three decades. Technological improvements and import competition have reduced the industry's activity in the U.S. The decline in textile and apparel industries accelerated following the implementation of the North American Free Trade Agreement (NAFTA) with Canada and Mexico in 1994. In late summer 2000, U.S. manufacturing went into a downturn and, in March 2001, the economy slipped into recession (USDA, ERS, 2008d). From 1998 to 2001, textile and textile product mills declined in value by almost half (48%) to its 11-year low (Fig. 14); much of the steep decline in 2001 occurred because a major textile manufacturer closed its last plant in Arkansas in 2000. In 2002 and 2003, the industry experienced a dramatic increase of 78% before declining each year since 2003. Although the overall effect of NAFTA on the U.S. economy is controversial, some studies have concluded that

NAFTA has actually increased demand for U.S. textiles in Mexico and Canada, which may explain some of the growth in 2002 and 2003 (USCC, 2002; USDA FAS, 2001; Wall, 2000).

Apparel, Leather, and Allied Products Manufacturing

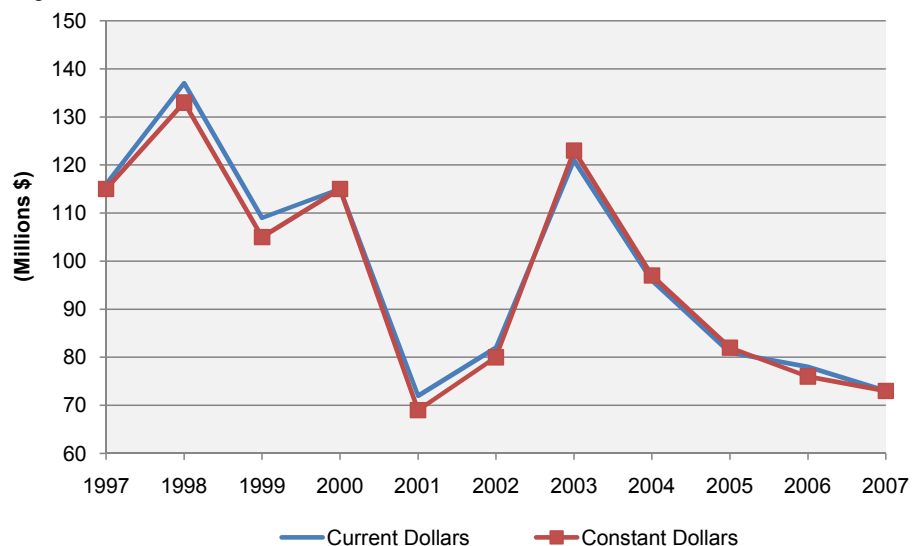
As seen in Fig. 15, the GDP for Apparel, Leather, and Allied Products Manufacturing has experienced alternating periods of growth and decline. Overall, from 1997 to 2007, the sector has declined from a high of \$225M in 1997 to a low of \$139M in 2007, representing a drop of 38% over the 11-year period. Much like

the textile industry, apparel manufacturing has been in decline in the U.S. for over thirty years. The decline has also been partly attributed to NAFTA, which possibly accelerated the drop in apparel manufacturing in the late 1990s. Although there have been periods of growth in the sector, the GDP for Apparel, Leather, and Allied Products Manufacturing has decreased 28% since 2005.

Agricultural Retail

Food Services and Drinking Places

GDP in agricultural retail in 2007 was \$1.8B (Fig. 16). From 1997 to 2007, agricultural retail has increased by 38%; there has been an increase in agricultural retail each year since 1997, and a 3% increase was realized from 2006 to 2007. The average annual growth rate for the sector has been 3% over the 11-year period. Food service operators, including restaurants, have steadily increased their share of total food expenditures over time contributing to the steady increases in the sector.⁹ Food service operators, including restaurants and fast food outlets, have increased their share of total food spending over the years. Long-term trends show that as household incomes have increased, and more women have entered the workforce, the share of household spending for prepared foods and meals has risen.

Fig. 14. The GDP of Textile and Textile Product Mills, 1997 - 2007^a.

Source: USDC, BEA (2009b).

^a Current and constant 2007 dollars.

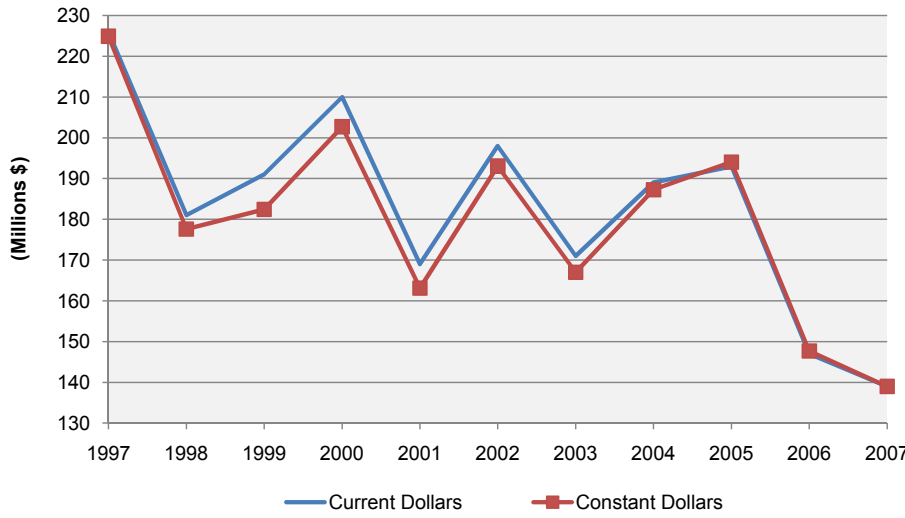
By 2006, food away from home spending by households and businesses account for almost half of all food spending, up from 39% in 1980, further evidence of the market forces behind the increases in agricultural retail GDP (USDA, ERS, 2008c).

Summary of the Trends in Gross State Product for Agriculture and Food

Goodwin et al. (2002) showed the Agriculture and Food Sector to be a very strong part of the Arkansas economy. Popp et al. (2005) found that between 1999 and 2001, Agriculture and Food

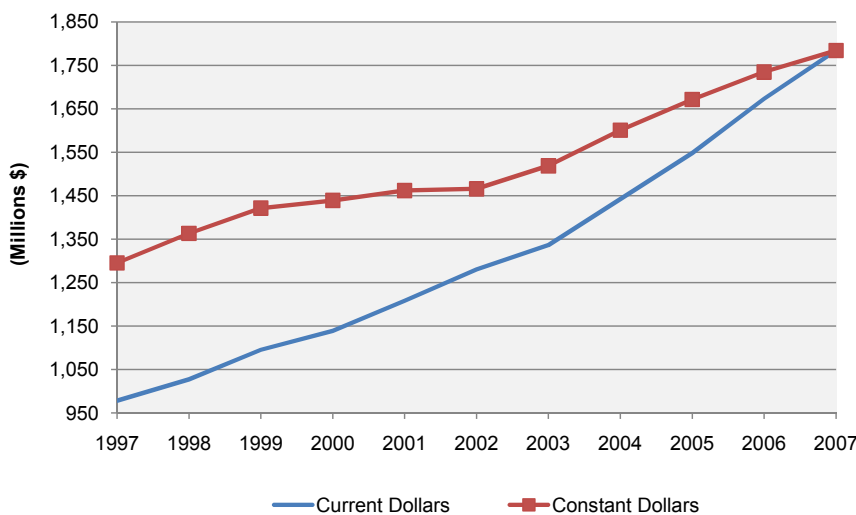
had lost share and value in nearly all of its production and processing areas, mainly due to depressed prices and lost market share. Popp et al. (2007) concluded that more recent data suggested that between 2001 and 2003, much of the Agriculture and Food Sector has rebounded. In 2004, Arkansas' Agriculture and Food Sector experienced its 11-year high, but value declined from 2004-2006 before rebounding slightly in 2007. While production and processing followed the overall trend of GDP, agricultural retail has been consistently increasing since 1997 (Kemper et al. 2009). The GDP by State data from the BEA indicate that Arkansas' Agriculture and Food Sector continues to contribute a larger share of GDP by State to the overall Arkansas state economy than does Agriculture and Food in other states of the southeastern U.S. While cash receipts records for Arkansas commodities were set in 2006, 2007, and again in 2008, on-farm expenses have also been on the rise. Crop production values have also risen since 2005 due to a strong foreign demand and from the domestic biofuels industry. These increased prices have been sufficient to outpace increasing expenses, for the most part. Conversely, in the Animal Agriculture Sector, cash receipts rose in 2007 but the increased costs of production offset most of the gains in income. Most agricultural manufacturing sectors declined in 2007, with the exception the Food Manufacturing Sector which benefited from the record high levels of production. The overall decline in manufacturing becomes more evident later in this document through the in-depth contribution analysis, which examines the effects of lower input purchases and decreased spending by employees in these manufacturing industries. Finally, agricultural retail has continued to grow, as it has done for the past 11 years. If food service operators continue to increase their share of total food spending by consumer, the upward trend in this industry could continue.

Fig. 15. The GDP of Apparel, Leather and Allied Products Manufacturing, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Current and constant 2007 dollars.

Fig. 16. The GDP of Food Services and Drinking Places, 1997 - 2007^a.



Source: USDC, BEA (2009b).
^a Current and constant 2007 dollars.

Direct, Indirect, and Induced Contributions of the Aggregate Agriculture Sector

Introduction

The total economic contribution of Arkansas' Aggregate Agricultural Sector is much more than the direct contribution of agricultural production and processing. To measure agriculture's total economic contribution, the indirect and induced contributions of agriculture must also be taken into consideration. Indirect contributions occur when the Aggregate Agricultural Sector purchases goods and services from local businesses. The production of fertilizers and certain farm machinery and equipment, for example, are indirect contributions of agricultural production. Agriculture's induced contributions are measured by increases in economic activity to satisfy the personal consumption by employees of the Aggregate Agricultural Sector and by employees of firms that provide inputs to the Aggregate Agricultural Sector. The sum of direct, indirect, and induced agricultural effects provides a measure for the total economic contribution of agriculture. Part 2 of the report discusses the overall economic contribution of agriculture to Arkansas' economy, considering the direct, indirect, and induced effects of the Aggregate Agricultural Sector in 2008.

Methods

As in our previous reports, the economic contribution of Arkansas' Aggregate Agricultural Sector were modeled using the IMPLAN System (MIG, 2009) input-output (I-O) modeling software. Contributions are reported in terms of employment, labor income, and value added (introduced previously and described in depth in section 2.3). The only sectors included as part of the agriculture sector in the analysis are those directly producing agricultural products, processing raw agricultural products, or providing agricultural services to producers. This is our basic rule for inclusion/exclusion of industries as part of the Aggregate Agriculture Sector. Any sector less than 100% tied to agriculture is not included as part of the Aggregate Agriculture Sector (such as restaurants, grocery stores, fertilizer manufacturers and distributors). The Aggregate Agriculture Sector is made up of three types of industries: agricultural production industries, agricultural processing industries, and agriculture-related industries. However, the indirect and induced contributions of these non-agricultural sectors are still included in the total contribution of agriculture.

The version 3.0 IMPLAN model was used for the contribution analysis portion of the report. The IMPLAN agricultural production sectors (1-16) data must be verified prior to analysis and often require updating. The default IMPLAN output data for these sectors is checked against the latest available value of production estimates and cash receipts estimates from NASS and ERS. In any agricultural production industry where a data discrepancy exists, the default output data must be changed to reflect the NASS/ERS output estimate. Accordingly, a corresponding change must be made to all four components of Total Value Added. This holds the relationship between Total Industry Output and Total Value Added (a fundamental relationship in I-O analysis) constant, and the model production functions are left unchanged.

General Procedures

There are several key considerations in the construction of the IMPLAN I-O models used to measure the economic contribution of the Aggregate Agriculture Sector. For each step of the analysis, careful consideration was taken to ensure that the analysis reflects accurately the Arkansas Aggregate Agriculture Sector. The main steps for constructing the models were: data reconciliation, selection of

multipliers, estimating trade flows, the transaction basis, and local purchase coefficients.

The Aggregate Agriculture Sector is made up of three broad categories of agricultural industries: agricultural production industries, agricultural processing industries, and agricultural related industries. The output data for the agricultural production industries (IMPLAN sectors 1-16) were checked for accuracy against the latest available estimates for

the value of production from NASS and ERS. The agricultural production data in IMPLAN are sometimes unreliable for three reasons. First, output data for all industries outside of agriculture are estimated from a large number of sources, but data for agricultural production are derived entirely from NASS value of production data and the most recent U.S. Census of Agriculture. Due to NASS publication lags, IMPLAN data are often released using preliminary estimates

for a given year. To check the accuracy of the IMPLAN data, the agricultural production industries are compared against finalized NASS/ERS data for the relevant year. Second, there are also non-disclosure problems, particularly at the county level (which is why analysis is done at the state level); this makes data reconciliation between IMPLAN and NASS data difficult at the county level. Third, employment and income data for the agriculture sectors are difficult to estimate since there are no employment and earnings data collected on a commodity basis. The only farm employment and income data are derived from BEA's Regional Economic Information System (REIS) program but these are only single farm employment and income numbers for all agriculture sectors combined. MIG collects estimates of output and creates vectors of employment and income to allocate the single REIS value to the separate IMPLAN agricultural production sectors (Lindall, 1998). MIG encourages analysts with better agriculture data to use it when building models (Olson and Lindall, 2009, p. 237).

The default IMPLAN data were updated with the most recent NASS/ERS output estimates for the state of Arkansas. In any industry where a data discrepancy exists, the default output data was changed to reflect the NASS/ERS output estimate. For any sector where a change was made to the value of output, a change corresponding to the percent change in output was also made to all four components of value added. This holds the relationship between Total Industry Output and Total Value Added (a fundamental relationship in I-O analysis) constant, and the model production functions are left unchanged. Once the default IMPLAN data have been updated to reflect the most recent NASS/ERS estimates, the type of multiplier used to construct the model is selected.

Multipliers describe the response of the economy to a change in economic activity and estimate changes in output, employment, income and value added. When analyzing the economic contributions of the Aggregate Agriculture Sector, type SAM (Social Accounting Matrix) multipliers are used to incorporate household expenditures into the models and to calculate the indirect and induced contributions. Type SAM multipliers are the direct, indirect and induced ef-

fects where the induced effect is based on both study area data and additional information in the social account matrix. The SAM framework tracks both market and non-market flows. The non-market flows are transactions between non-industrial institutions such as households to government, government to households, and so on. These flows are called "inter-institutional transfers" (Alward and Lindall, 1996). The SAM multiplier approach enables the model to account for commuting, social security tax payments, household income tax payments, and savings; it accounts for income that is not normally re-spent immediately within the region, such as commuting workers who live outside the region and retirement benefits. I-O models built with Type SAM multipliers would have results that are lower than an I-O model built with Type II multipliers (also available in IMPLAN). The Type SAM is the most appropriate choice for analyzing the contributions of the Agriculture Sector.

Estimating trade flows across regional boundaries is possibly the largest source of error in non-survey I-O models (Stevens and Trainor, 1980) and the selection and use of the RPC is one way to eliminate some of the errors. The RPC represents the proportion of intermediate demands and local demands for a specific commodity that will be satisfied by local production (Olson and Lindall, 2009). For example, a RPC value of 0.80 means that 80% of the final demand for the industry is provided by local producers. The remainder (20%) is the portion imported from outside the region. To avoid overestimation of the Aggregate Agriculture Sector, the model RPCs must be set to zero for these industries (see Appendix A), instructing the model not to purchase products and services from the Aggregate Agriculture Sector. This removes the agriculture sectors from the production function and eliminates multiple counting of economic activity in these sectors.

When conducting contribution analysis, IMPLAN allows the user to determine the transaction basis (industry or commodity) for the change in final demand. The industry basis assumes that the sector is solely responsible for the entire value of the product or service being sold (such as the *Oilseed Farming* industry is solely responsible for the entire value of soybeans

produced). The commodity basis will allocate spending to all industry sectors that produce the goods and services purchased according to their market shares (such as retail purchases of groceries). Each industry included in the Aggregate Agriculture Sector is solely responsible for the entire value of the product or service in their respective industry; thus the industry basis is selected when running the analysis.

The final important procedure is to estimate the portion of activity that accrues to the local (in this case the state) economy. This was previously termed in IMPLAN as the Local Purchase Coefficient (LPC) but is now known as %Local. Only the portion of an industry's value that is produced locally should accrue to the local economy. For instance, output in the *Oilseed Farming* industry (IMPLAN sector 1) involves the %Local being set at 100%, which means the entire output value of the industry accrued to the region, because the goods in the sector are produced within the study region. Alternately, spending by tourists on gasoline and oil would involve the %Local being set to the RPC generated value so that only the portion produced locally (hence the RPC) accrues to the local economy. Estimating the economic contribution of the Aggregate Agriculture Sector involves applying 100% of each industry considered part of the Aggregate Agriculture Sector to the local economy.

Important Changes

There are two key differences between the IMPLAN models 2007 and later and pre-2007 releases. First, the sectoring scheme was changed to conform to the 2007 NAICS. As a result, the IMPLAN model number of sectors went from 509 to 440 sectors. Second, the 2007 model was the first to incorporate the 2002 BEA I-O benchmark tables. As a result of the sectoring changes just mentioned, some sectors previously defined as agriculture were combined or aggregated into larger sectors; additionally, some new sectors were created. Overall, the number of agriculture sectors in the Arkansas Agriculture Sector model decreased from 114 to 96; however, with the new data, some economic activities from sectors not included in the 2003 and 2006 data year studies were included.

A small number of low output sectors in Arkansas were also included to bring our sectoring scheme in line with the BEA definitions (also NAICS based) in the GDP by State data set for 1) Agriculture, Forestry, Fishing, and Hunting, 2) Wood Product Manufacturing, 3) Furniture and Related Products Manufacturing, 4) Food Manufacturing, 5) Textile and Textile Product Mills, 6) Apparel, Leather, and Allied Products Manufacturing, and 7) Paper Manufacturing. The IMPLAN sectors used to create those categories are presented in Appendix A, Tables 1 - 3.

The results of the economic contributions of agriculture were grouped into four main categories: Crops Sector, Animal Agriculture Sector, Forestry Sector, and Aggregate Agriculture. For the first three sub categories, agriculture is defined as those production and processing sectors in IMPLAN directly related to that category (crops, animal, or forestry). The IMPLAN sectors used to create those categories are presented in Appendix A, Tables 1-3. Aggregate Agriculture is defined as the Crops, Animal Agriculture, and Forestry Sectors plus the Agriculture-Related Sector (presented in Appendix A, Table 4). Aggregate Agriculture was created using all of the sectors listed in Appendix A, Tables 1-4. In some cases, results are presented as production and processing contributions. The sectors that contributed to these contributions are listed in Appendix A, Tables 5-6. State level IMPLAN data for Arkansas for 2008 (the most recent data available) were used to calculate all contributions (MIG, 2008 and 2009). The relevant employment, labor income, and value added contributions of agriculture are detailed in Appendix C and are summarized below. All labor income and value added figures in Part 2 are reported in current 2008 dollars, unless otherwise noted.

Measures of Economic Contribution

Total economic contributions are made up of three separate components: 1) direct contributions—generated by farm production and processing of crops, poultry, livestock and forest products; 2) indirect contributions—generated when

agricultural firms purchase materials and services from other Arkansas businesses; and 3) induced contributions—result when employees of agricultural firms and their suppliers spend a portion of their income within Arkansas. Each of these contributions makes up an important part of the total economic contribution of the Arkansas Agriculture Sector. The overall definition of the Aggregate Agriculture Sector in this study is limited to only those sectors considered to be 100% tied to agriculture, as defined in the “Methods” section. However, the indirect and induced contributions measure the contributions of those industries that are linked to agriculture but may not be entirely defined as agriculture. These industries represent important economic bases of many communities across the state and contribute to the jobs, income and value added in these communities due to their relationships with agriculture. Since sectors are interlinked throughout the state, expansion in activities in one sector can cause activities in other sectors to expand. Therefore, the contributions accruing in other sectors as a result of agricultural production and processing are included in the total economic contribution.

Economic contributions are often measured in terms of: 1) total industry output, 2) wages and labor income (wages, salaries, rents and profits), 3) total value added, and 4) employment. I-O analysis can be used to assess the economic contribution of an existing sector. These measures are thought of as a sector’s gross contribution to the regional economy. This is accomplished by “removing” the sector of choice from the I-O model and examining how this removal affects the economic activity in the region. This provides an estimate of the contribution of the sector by looking at the losses experienced (or activity generated) by the sector of interest.

Employment includes all wage and salary employees, as well as self-employed jobs in a given sector. All jobs are not equal; they pay different wages, require different skills and different work hours, etc., which makes aggregate estimates or comparisons across regions and industries problematic. However, jobs as a measure of economic contribution are easily understood and an important compo-

nent of economic activity. Labor income consists of two parts: first is proprietary income, which includes all income received by self-employed individuals including private business owners, doctors, lawyers, etc; second is wages, which includes all worker salaries, payments, and fringe benefits paid by employers. Value added represents all payments to workers (labor income) plus indirect taxes and other property-type income, such as payments for rents, royalties, and dividends. Value added is comparable to GDP by State but is measured using different data sources and methodologies, so the data may not be precisely equal. Value added is the income and indirect business taxes generated by the activity and offers a more complete examination of the total economic contribution of an activity on a region; therefore, economists generally prefer value added to output as the measure for assessing the contribution of a given industry or activity to a region’s economy (Olson and Lindall, 2009). Income and value added are also relatively clear measures of economic contribution that can be directly compared across industries and regions that contain a range of different economic activities.

Measuring the economic importance of an industry using output can be misleading. Output represents the dollar value of an industry’s total production, but can also be thought of as the sum of the goods and services used to provide a product. Economic contribution analyses estimate the contribution of production (output) by including purchases from other industries to produce the inputs required to create this output; therefore, output includes the production of intermediate goods which are included in another industry’s output. Summing the output of all industries would include multiple counting of some goods and services. Gross sales receipts overestimate the economic size of an industry because the values of inputs are recounted at each succeeding stage of production. As a result, output should not be used as a measure of economic contribution, and therefore is not reported here.

The Aggregate Agricultural Sector

In 2008, agriculture made large contributions to the Arkansas economy in terms of employment, labor income, wages, and value added (see Box 1). The Aggregate Agricultural Sector provided 261,101 jobs, or almost 17%, of state employment (Table 2). That is, more than one in six Arkansas jobs can be attributed to agriculture. In that same year, agricul-

ture paid \$9.6B, or almost 16% of state labor income. Wages accounted for nearly \$8.0B, or 84% of total labor income generated by agriculture. Additionally, the Aggregate Agricultural Sector added \$16.3B of value to the state economy, or 17% of state value added. That is, more than \$1 out of every \$6 in value added can be attributed to agriculture. Details of these contributions are presented in Appendix C, Table 1 and are summarized in Tables 2-4 below.

Agriculture generates employment in all 20 of the 2-digit NAICS sectors. Three-quarters of all agriculture-generated jobs are in five sectors (Box 2). The poultry industry (comprised of *Poultry Processing* and *Poultry and Egg Production*) alone provides 42,595 jobs, or 27% of all agricultural generated jobs in Arkansas (Box 8). *Poultry Processing* employed 31,033 of these work-

ers. The remaining 11,562 workers are employed in *Poultry and Egg Production*.

The far-reaching contributions of agriculture are seen in the distribution of agriculture-generated value added throughout the economy. Box 3 shows

Box 1. Total Contribution to Arkansas Agriculture, 2008^a

Employment

261,101 jobs
(over 1 out of 6 Arkansas jobs)

Wages

\$8.0B
(15% of Arkansas wages)

Labor Income

\$9.6B
(16% of Arkansas labor income)

Value-Added

\$16.3B
(over \$1 of every \$6 of added value)

^aCurrent dollars.

Box 2. Employment Generated by Agriculture, 2008 Top Five NAICS Sectors^a

Manufacturing

86,033 jobs
(96% of the jobs are in agricultural processing)

Agriculture, Forestry, Fishing and Hunting

75,425 jobs
(87% of the jobs are in agricultural production)

Retail Trade

12,785 jobs

Health and Social Services

11,808 jobs

Wholesale Trade

10,216 jobs

Top Five Total

196,268 jobs
(75% of all jobs generated by Agriculture)

^aBased on 2-Digit NAICS aggregation (USCB, 2006).

Table 2. The Aggregate Agriculture Sector's Contribution to Arkansas' Economy, 2008.

	Employment ^a			Labor Income ^b			Value-Added ^c		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million \$ ^d	% Total Impact	% Total Arkansas Labor Income	Million \$	% Total Impact	% Total Arkansas Value Added
Production ^e	65,495	25.1	4.2	1,243	13.0	2.0	3,339	20.4	3.5
Processing ^f	82,221	31.5	5.2	3,694	38.6	6.0	5,088	31.1	5.3
Ag-Related ^g	9,930	3.8	0.6	340	3.5	0.6	250	1.5	0.3
Direct Impact	157,646	60.4	10.0	5,276	55.2	8.6	8,677	53.1	9.0
Indirect Effects	48,469	18.6	3.1	2,483	26.0	4.0	4,338	26.6	4.5
Direct + Indirect Impact	206,115	78.9	13.1	7,759	81.1	12.6	13,015	79.7	13.5
Induced Effects	54,985	21.1	3.5	1,806	18.9	2.9	3,323	20.3	3.5
Total Impact	261,101	100.0	16.6	9,565	100.0	15.6	16,338	100.0	17.0

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000)

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

^e Appendix A, Table 3 lists sectors of direct agricultural production in terms of IMPLAN sectors

^f Appendix A, Table 3 lists sectors of direct agricultural processing in terms of IMPLAN sectors

^g Ag-related sectors include agricultural sectors not categorized as agricultural production or processing. These sectors are: Fishing, Hunting and Trapping, Agriculture and Forestry Support Activities, and New Farm Housing Units and Additions and Alterations

Box 3. Value Added Generated by Agriculture, 2008^a Top Five NAICS Sectors^b	
Manufacturing	\$5.4B
(93% of the value added is in agricultural processing)	
Agriculture, Forestry, Fishing and Hunting	\$3.6B
(93% of the value added is in agricultural production)	
Wholesale Trade	\$1.1B
Real Estate and Rental	\$1.1B
Transportation and Warehousing	\$827M
Top Five Total	\$12.1B
(74% of all value added generated by Agriculture)	

^aCurrent dollars.

^bBased on 2-Digit NAICS aggregation (USCB, 2006).

Box 4. Labor Income Generated by Agriculture, 2008^a Top Five NAICS Sectors^b	
Manufacturing	\$3.9B
(94% of labor income is in agricultural processing)	
Agriculture, Forestry, Fishing and Hunting	\$1.6B
(79% of labor income is in agricultural production)	
Wholesale Trade	\$655M
Transportation and Warehousing	\$536M
Health and Social Services	\$510M
Top Five Total	\$7.2B
(75% of all labor income generated by Agriculture)	

^aCurrent dollars.

^bBased on 2-Digit NAICS aggregation (USCB, 2006).

the five sectors that benefit most from value added generated by agriculture. Note that three of those sectors (Real Estate and Rental, Wholesale Trade, and Transportation and Warehousing) lie outside of the agriculture sector as defined here. While almost half (48%) of all agriculture-generated value added accrues outside agricultural sectors, these sectors are closely tied to agriculture. For instance, Wholesale Trade contains businesses such as grain and livestock whole-

salers as well as farm supply wholesalers.

Within the Crops Sector, *Grain Farming*, *Oilseed Farming*, and *Cotton Farming* add the largest amount of value, while in the Animal Agriculture Sector, the poultry industry (*Poultry and Egg Production* and *Poultry Processing*) contributes the largest value. In the Forestry Sector, the top contributors to value in the economy are *Sawmills*, *Logging*, *Paper Mills*, and *Paperboard Mills*. About 20% (\$3.3B) of value added by agriculture accrues in

Crops, 16% (\$2.6B) in Animal Agriculture, and 16% (\$2.6B) in Forestry.

As with value added, much of the income attributable to agricultural activity is generated outside of agricultural sectors. Box 4 shows the five sectors that generate the most income as the result of agricultural activity in Arkansas. In 2008, \$4.6B, or 48% of all labor income, went to workers in non-agricultural sectors. Within the agricultural sectors, the top three crops production sectors, the poultry industry, and the top four forestry sectors received \$2.9B, or 30% of all labor income generated.

Agriculture's direct contribution on the state economy is measured by the sum of the contributions of farm production, the processing of farm products and agriculture related sectors. There were 157,646 workers employed by the agricultural production, processing and agriculture related sectors. In production, the crops industries employed more than

Table 3. The Contribution of Major Agricultural Sectors to Agricultural Production, 2008.

	Employment^a		Labor Income^b		Value-Added^c	
	(Number of Jobs)	(% Ag. Prod.)	(Million \$) ^d	(% Ag. Prod.)	(Million \$)	(% Ag. Prod.)
Crops	38,608	58.9	533	42.9	1,897	56.8
Animal Agriculture	20,227	30.9	456	36.6	976	29.2
Forestry	6,660	10.2	254	20.5	466	14.0
Total	65,495	100.0	1,243	100.0	3,339	100.0

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000)

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000).

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

Table 4. The Contribution of Major Agricultural Sectors to Agricultural Processing, 2008.

	Employment^a		Labor Income^b		Value-Added^c	
	(Number of Jobs)	(% Ag. Proc.)	(Million \$) ^d	(% Ag. Proc.)	(Million \$)	(% Ag. Proc.)
Crops	17,443	21.2	847	22.9	1,358	26.7
Animal Agriculture	37,373	45.5	1,373	37.2	1,577	31.0
Forestry	27,405	33.3	1,474	39.9	2,152	42.3
Total	82,221	100.0	3,694	100.0	5,088	100.0

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000)

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000).

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

half (59%) of these workers, while the animal agriculture industries employed 31% and the forestry industries, 10% (Table 3). In processing, animal agriculture employed the majority, 46%, while crops and forestry employed 21% and 33%, respectively (Table 4). The owners, operators and workers of these farms and businesses received nearly \$5.3B in labor income (Table 2); 70% of the labor income went to workers and business owners in processing industries. Agricultural production, processing, and agriculture-related industries directly added value of \$8.7B to the Arkansas economy, of which 59% was from processing industries.

Indirect contributions result when agricultural firms purchase raw materials and services from other Arkansas busi-

Box 5. Direct Contribution to the Crops Sector, 2008^a	
Employment	56,051 jobs
Wages	\$0.9B
Labor Income	\$1.4B
Value-Added	\$3.3B

^aCurrent dollars.

nesses to produce their products. In 2008, there were 48,469 workers employed by industries supplying goods and services to the farm production and processing industries. These workers and the owners of those establishments received \$2.5B in labor income and these industries added value of over \$4.3B to the state economy (Table 2).

Box 6. Top Crops Production Sectors Grain Farming, Oilseed Farming, and Cotton Farming	
63% of the jobs in the Crops Sector	
32% of the income in the Crops Sector	
54% of the value added in the Crops Sector	

Induced contributions result when employees of agricultural firms and employees of the raw material and service firms spend a portion of their income on local purchases. There were 54,985 workers employed by businesses providing goods and services to the employees in agriculture and its supplying industries. These employees and the proprietors of these businesses received roughly \$1.8B in labor income and added value of over \$3.3B to the Arkansas economy.

The Crops Sector

The Crops Sector includes all enterprises engaged in the production and processing of cotton, food and feed grains, oil bearing crops, fruits, nuts and vegetables, and hay and pasture (Appendix A, Table 1). The Crops Sector's direct contribution on the state economy is measured by the sum of the contributions of crop produc-

tion and processing of crops products.

In 2008, the Crops Sector provided 56,051 jobs within the Aggregate Agriculture Sector, or almost 4% of state employment (Box 5 and Table 5). The workers and business owners received \$1.4B in labor income (\$910M of that in wages), or 2% of state labor income.

The Crops Sector added \$3.3B, or over 3% of state value-added. *Grain Farming, Oilseed Farming* and *Cotton Farming* together represented 63% of jobs, 32% of labor income, and 54% of value added in the overall Crops Sector (Box 6). Details are provided in Table 5 and Appendix C, Table 2.

Table 5. The Crop Sector's Direct Contribution to Arkansas' Economy, 2008.

	<u>Employment</u> ^a			<u>Labor Income</u> ^b			<u>Value-Added</u> ^c		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million \$ ^d	% Total Impact	% Total Arkansas Labor Income	Million \$	% Total Impact	% Total Arkansas Value Added
Production ^e	38,608	68.9	2.5	533	38.6	0.9	1,897	58.3	2.0
Processing ^f	17,443	31.1	1.1	847	61.4	1.4	1,358	41.7	1.4
Direct Impact	56,051	100.0	3.6	1,380	100.0	2.2	3,255	100.0	3.4

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000)

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

^e Appendix A, Table 3 lists sectors of direct agricultural production in terms of IMPLAN sectors

^f Appendix A, Table 3 lists sectors of direct agricultural processing in terms of IMPLAN sectors

The Animal Agriculture Sector

The Animal Agriculture Sector includes all enterprises engaged in the production and processing of animals, including poultry and egg, cattle, dairy farm, hogs and pigs, other animal agriculture, processed meat, and dairy processing industries (Appendix A, Table 2). The Animal Agriculture Sector's direct contribution on the state economy is mea-

sured by the sum of the contributions of animal production and processing of animal products. This sector accounted for 57,601 jobs in 2008, or almost 4% of state employment, and these workers received \$1.8B in labor income, or 3% of state labor income. In 2008, the Animal Agriculture Sector added \$2.6B of value to the state economy, or almost 3% of state

value added (Table 6 and Box 7). Table 6 provides a summary of the Animal Agriculture Sector's total contribution on Arkansas' economy; details can be found in Appendix C, Table 3. *Poultry and Egg Production and Poultry Processing*¹⁰ provided 74% of jobs, 83% of income and 75% of value added in the Animal Agriculture Sector in 2008 (Box 8).

Box 7. Direct Contribution to the Animal Agriculture Sector, 2008^a	
Employment	57,601 jobs
Wages	\$1.6B
Labor Income	\$1.8B
Value-Added	\$2.6B

^aCurrent dollars.

Box 8. The Poultry Industry (Poultry and Egg Production and Poultry Processing) Contributes^a:	
Employment	42,595 jobs (over 1 in 4 Agriculture jobs)
Wages	\$1.24B (29% of Agriculture wages)
Labor Income	\$1.52B (\$1 in \$4 of Agriculture labor income)
Value-Added	\$1.92B (\$1 in \$5 of Agriculture value added)
74% of Animal Agriculture Jobs, 80% of Wages, 83% of Income and 75% of Value Added are in the Poultry Industry	

^aCurrent dollars.

Table 6. The Animal Agriculture Sector's Direct Contribution to Arkansas' Economy, 2008.

	<u>Employment</u> ^a			<u>Labor Income</u> ^b			<u>Value-Added</u> ^c		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million \$ ^d	% Total Impact	% Total Arkansas Labor Income	Million \$	% Total Impact	% Total Arkansas Value Added
Production ^e	20,227	35.1	1.3	456	24.9	0.7	976	38.2	1.0
Processing ^f	37,373	64.9	2.4	1,373	75.1	2.2	1,577	61.8	1.6
Direct Impact	57,601	100.0	3.7	1,828	100.0	3.0	2,553	100.0	2.7

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000).

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

^e Appendix A, Table 3 lists sectors of direct agricultural production in terms of IMPLAN sectors

^f Appendix A, Table 3 lists sectors of direct agricultural processing in terms of IMPLAN sectors

The Forestry Sector

The Forestry Sector is primarily comprised of commercial logging, forest products, furniture and wood and paper processing enterprises (Appendix A, Table 3). The Forestry Sector's direct contribution to the state economy is measured by the sum of the contributions of forestry production and process-

ing. There were 34,065 jobs (2% of state employment) in the Forestry Sector in 2008, and these workers and business owners received \$1.7B in labor income, or almost 3% of state labor income. The Forestry Sector added \$2.6B of value to the state economy, or almost 3% of total state value-added (Table 7 and Box 9).

Within this sector, *Sawmills, Logging, Paper Mills, and Paperboard Mills* comprise 47% of forestry jobs, and 51% and 52% of forestry income and value added, respectively (Box 10). Details can be found in Appendix C, Table 4. These contributions are summarized in Table 7.

Box 9. Direct Contribution to the Forestry Sector, 2008^a	
Employment	34,065 jobs
Wages	\$1.6B
Labor Income	\$1.7B
Value-Added	\$2.6B

^aCurrent dollars.

Box 10. Top Four Forestry Sectors Sawmills, Logging, and Paper and Paperboard Mills Contribute^a:	
Employment	15,938 jobs (47% of all forestry jobs)
Wages	\$1.56B (48% of Forestry wages)
Labor Income	\$878.08M (51% of Forestry labor income)
Value-Added	\$2.62B (52% of Forestry value added)

^aCurrent dollars.

Table 7. The Forestry Sector's Direct Contribution to Arkansas' Economy, 2008.

	<u>Employment</u> ^a			<u>Labor Income</u> ^b			<u>Value-Added</u> ^c		
	Number of Jobs	% Total Impact	% Total Arkansas Jobs	Million \$ ^d	% Total Impact	% Total Arkansas Labor Income	Million \$	% Total Impact	% Total Arkansas Value Added
Production ^e	6,660	19.6	0.4	254	14.7	0.4	466	17.8	0.5
Processing ^f	27,405	80.4	1.7	1,474	85.3	2.4	2,152	82.2	2.2
Direct Impact	34,065	100.0	2.2	1,728	100.0	2.8	2,618	100.0	2.7

Source: Computed using the 2008 Arkansas database from MIG (2009)

^a Equivalent to full- and part-time jobs (MIG, 2000).

^b Labor income represents all forms of employment income; it is the sum of employee compensation and proprietor income (MIG, 2000)

^c Value-added is the sum of employee compensation, proprietary income, and indirect business taxes

^d Current dollars

^e Appendix A, Table 3 lists sectors of direct agricultural production in terms of IMPLAN sectors

^f Appendix A, Table 3 lists sectors of direct agricultural processing in terms of IMPLAN sectors

Summary

The GDP by State data from BEA indicates that Arkansas' Agriculture and Food Sector continues to contribute a larger share of GDP by State to the overall Arkansas state economy than does Agriculture and Food in other states of the southeastern U.S. According to 2008 IMPLAN data and subsequent analyses, about \$0.17 of every \$1 of the total state value added and 1 in 6 jobs can be attrib-

uted to agriculture. One in six dollars of labor income can be attributed to agriculture as well.

IMPLAN data and the analysis indicate that the Arkansas Aggregate Agriculture Sector plays a significant role in generating jobs, income and value added throughout the state's economy. World and domestic price stability and associated agricultural and food policies will

continue to have a significant impact on Arkansas agriculture and its contribution to the Arkansas economy. Continued strength of agriculture is of paramount importance if the social and economic fabric of rural Arkansas communities is to be retained and if the essential infrastructure and services that translate into an acceptable quality of life for its residents are to be maintained.

End Notes

- 1 This report presents two economic analyses of the agricultural sector in Arkansas. The analyses have separate and distinct scopes, definitions, and methodologies and the results of each analysis should not be compared as they are different measures of economic contribution. Please see the Definitions, Methods and Styles section for more.
- 2 GDP by State data are for years 1997-2007. IMPLAN data for Arkansas are for the years 2007 and 2008. The value of production data from USDA, ERS, and NASS used in Figs. 6 and 7 are for 1993-2009.
- 3 Throughout this report, all numerical references to agricultural trends are calculated using constant dollars, unless noted otherwise. The use of constant dollars factors in the effects of inflation, other economic fluctuations on price, and changes in the costs of inputs and allows for a value comparison over time. Constant dollars are derived from BEA's 2000 chained-dollar series, adjusted to a base year of 2007. The BEA uses industry-specific deflators to adjust current dollars to constant dollars.
- 4 GDP by State is a measurement of economic activity in the state economy. GDP by State is a similar measure to value added as defined by MIG, or the sum of employee compensation, proprietary income (e.g., rent payments), and indirect business taxes (e.g., sales taxes paid by individuals to firms). GDP by State is also equivalent to gross output minus the cost of intermediate output. However, GDP by State and value added are based on different data and estimated using different methodologies. Thus, while they are essentially the same measure, the estimated values are different.
- 5 SIC definitions, used to categorize GDP by State and IMPLAN data in some previous reports, were based upon what was produced. It paid particular attention to manufacturing industries, as was appropriate for the economy of the 1930s when these definitions were created. The service sector of the economy has since developed in inconceivable ways. NAICS is designed to focus on how products and services are created resulting in major differences in industry groupings. NAICS categorizes data into one of two domains: goods producing or service providing. These domains are further divided into 12 super sectors and then broken into 20 industry sectors designated by two digits, compared with the 11 alphabetically designated divisions of SIC. Because of its increased number of sectors, NAICS allows for greater precision in data assignment and analyses. Only six of the twenty NAICS sectors had changes during the 2007 revision of NAICS. The sectors with changes in 2007 had no impact on the analyses presented here and the only sector of interest with any revision was: Sector 11 Agriculture, Forestry, Fishing and Hunting, in which sweet potato and yam farming was moved to sub-sector *Potato Farming* and algae, seaweed, and other plant aquaculture were moved to sub-sector *Other Aquaculture*. These were simply re-allocations within super sectors and had no impact on overall totals.
- 6 The BEA defines agricultural production as Agriculture, Forestry, and Fishing and Hunting. They define agricultural processing as: Wood Product Manufacturing; Furniture and Related Products Manufacturing; Food Manufacturing; Textile and Textile Product Mills; Apparel, Leather, and Allied Products Manufacturing; and Paper Manufacturing.
- 7 The BEA includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the Southeast region.
- 8 For forestry reporting, the South includes 13 states: Alabama, Arkansas,

Florida, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, North Carolina, South Carolina, Tennessee, Texas, and Virginia; it is not equivalent to BEA's definition of the Southeast region.

9 GDP by State is reported for agricultural retail but the output from this sector is not included in the economic contribution analysis and is not used to calculate direct contributions of the agriculture sector. However, this

sector does represent an important contribution through the purchases made from direct agricultural sectors and these contributions are captured in the indirect contributions analysis.

10 One important change in recent years occurred in the poultry production sector where large productivity gains have been experienced. The amount of labor required to produce the same output on poultry farms has decreased

and the majority of poultry output is increasingly produced on fewer acres. This is reflected in the employment number associated with poultry production in this report which has decreased since the 2001 report. The reason for such a drop reflects productivity gains occurring over the past 10 or more years that were only recently adjusted for in the IMPLAN data set.

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Appendix A

Description of IMPLAN Sectors and Aggregation Schemes

Table 1. Major Components of the Crops Sector as Defined by IMPLAN Sectors, 2008.

Aggregate Sector	Sector ID	IMPLAN Sector
CROPS PRODUCTION	1	Oilseed farming
	2	Grain farming
	3	Vegetable and melon farming
	4	Fruit farming
	5	Tree nut farming
	6	Greenhouse, nursery, and floriculture production
	7	Tobacco farming
	8	Cotton farming
	9	Sugarcane and sugar beet farming
	10	All other crop farming
CROPS PROCESSING	43	Flour milling and malt manufacturing
	44	Wet corn milling
	45	Soybean and other oilseed processing
	46	Fats and oils refining and blending
	47	Breakfast cereal manufacturing
	48	Sugar cane mills and refining
	49	Beet sugar manufacturing
	50	Chocolate and confectionery manufacturing from cacao beans
	51	Confectionery manufacturing from purchased chocolate
	52	Nonchocolate confectionery manufacturing
	53	Frozen food manufacturing
	54	Fruit and vegetable canning, pickling, and drying
	62	Bread and bakery product manufacturing
	63	Cookie, cracker, and pasta manufacturing
	64	Tortilla manufacturing
	65	Snack food manufacturing
	66	Coffee and tea manufacturing
	67	Flavoring syrup and concentrate manufacturing
	68	Seasoning and dressing manufacturing
	69	All other food manufacturing
	70	Soft drink and ice manufacturing
	71	Breweries
	72	Wineries
	73	Distilleries
	74	Tobacco product manufacturing
	75	Fiber, yarn, and thread mills
	76	Broadwoven fabric mills
	77	Narrow fabric mills and schiffli machine embroidery
	78	Nonwoven fabric mills
	79	Knit fabric mills
	80	Textile and fabric finishing mills
	81	Fabric coating mills
	82	Carpet and rug mills
83	Curtain and linen mills	

Table 1. (Continued).

Aggregate Sector	Sector ID	IMPLAN Sector
	84	Textile bag and canvas mills
	85	All other textile product mills
	86	Apparel knitting mills
CROPS PROCESSING	87	Cut and sew apparel contractors
	88	Men's and boys' cut and sew apparel manufacturing
	89	Women's and girls' cut and sew apparel manufacturing
	90	Other cut and sew apparel manufacturing
	91	Apparel accessories and other apparel manufacturing

Table 2. Major Components of the Animal Agriculture Sector as Defined by IMPLAN Sectors, 2008.

Aggregated Sector	Sector ID	IMPLAN Sector
	11	Cattle ranching and farming
ANIMAL PRODUCTION	12	Dairy cattle and milk production
	13	Poultry and egg production
	14	Animal production, except cattle and poultry and eggs
	41	Dog and cat food manufacturing
	42	Other animal food manufacturing
	55	Fluid milk and butter manufacturing
	56	Cheese manufacturing
	57	Dry, condensed, and evaporated dairy product manf.
ANIMAL PROCESSING	58	Ice cream and frozen dessert manufacturing
	59	Animal (except poultry) slaughtering, rendering, & proc.
	60	Poultry processing
	61	Seafood product preparation and packaging
	92	Leather and hide tanning and finishing
	93	Footwear manufacturing
	94	Other leather and allied product manufacturing

Table 3. Major Components of the Forestry Sector as Defined by IMPLAN Sectors, 2008.

Aggregated Sector	Sector ID	IMPLAN Sector
FORESTRY PRODUCTION	15	Forestry, forest products, and timber tract production
	16	Commercial logging
FORESTRY PROCESSING	95	Sawmills and wood preservation
	96	Veneer and plywood manufacturing
	97	Engineered wood member and truss manufacturing
	98	Reconstituted wood product manufacturing
	99	Wood windows and doors and millwork manufacturing
	100	Wood container and pallet manufacturing
	101	Manufactured home (mobile home) manufacturing
	102	Prefabricated wood building manufacturing
	103	All other miscellaneous wood product manufacturing
	104	Pulp mills
	105	Paper mills
	106	Paperboard mills
	107	Paperboard container manufacturing
	108	Coated and laminated paper, packaging paper and plastics film manf.
	109	All other paper bag and coated and treated paper manufacturing
	110	Stationery product manufacturing
	111	Sanitary paper product manufacturing
112	All other converted paper product manufacturing	
295	Wood kitchen cabinet and countertop manufacturing	
296	Upholstered household furniture manufacturing	
297	Nonupholstered wood household furniture manufacturing	
300	Wood television, radio, and sewing machine cabinet manufacturing	
301	Office furniture and custom archit. woodwork and millwork manf.	

Table 4. Major Components of the Agriculture-Related Sector as Defined by IMPLAN Sectors, 2008.

Aggregated Sector	Sector ID	IMPLAN Sector
AGRICULTURE RELATED	17	Commercial Fishing
	18	Commercial hunting and trapping
	19	Support activities for agriculture and forestry

Table 5. Major Components of Agricultural Production and Agriculture-Related as Defined by IMPLAN Sectors, 2008.

Aggregated Sector	IMPLAN Sector
CROPS PRODUCTION	Oilseed farming; Grain farming; Vegetable and melon farming; Tree nut farming; Fruit farming; Greenhouse and nursery production; Tobacco farming; Cotton farming; Sugarcane and sugar beet farming; All other crop farming
ANIMAL PRODUCTION	Cattle ranching and farming; Poultry and egg production; Animal production- except cattle and poultry and egg
FORESTRY PRODUCTION	Forest nurseries- forest products- and timber track; Logging
AGRICULTURE RELATED	Fishing; Hunting and trapping; Agriculture and forestry support activities

Table 6. Major Components of Agricultural Processing as Defined by IMPLAN Sectors, 2008.

Aggregate Sector	IMPLAN Sector
CROPS PROCESSING	<p>Flour milling; Rice milling; Malt manufacturing; Wet corn milling; Soybean processing; Other oilseed processing; Fats and oils refining and blending; Breakfast cereal manufacturing; Sugar manufacturing; Confectionery manufacturing from cacao beans; Confectionery manufacturing from purchased chocolate; Nonchocolate confectionery manufacturing; Frozen food manufacturing; Fruit and vegetable canning and drying; Frozen cakes and other pastries manufacturing; Bread and bakery product- except frozen- manufacturing; Cookie and cracker manufacturing; Mixes and dough made from purchased flour; Dry pasta manufacturing; Tortilla manufacturing; Roasted nuts and peanut butter manufacturing; Other snack food manufacturing; Coffee and tea manufacturing; Flavoring syrup and concentrate manufacturing; Mayonnaise- dressing- and sauce manufacturing; Spice and extract manufacturing; All other food manufacturing; Soft drink and ice manufacturing; Breweries; Wineries; Distilleries; Tobacco stemming and redrying; Cigarette manufacturing; Other tobacco product manufacturing; Fiber-yarn- and thread mills; Broadwoven fabric mills; Narrow fabric mills and schiffli embroidery; Nonwoven fabric mills; Knit fabric mills; Textile and fabric and tire fabric mills; Other miscellaneous textile product mills; Sheer hosiery mills; Other hosiery and sock mills; Other apparel knitting mills; Cut and sew apparel manufacturing; Accessories and other apparel manufacturing</p>
ANIMAL PROCESSING	<p>Dog and cat food manufacturing; Other animal food manufacturing; Fluid milk manufacturing; Creamery butter manufacturing; Cheese manufacturing; Dry- condensed- and evaporated dairy products; Ice cream and frozen dessert manufacturing; Animal- except poultry- slaughtering; Meat processed from carcasses; Rendering and meat byproduct processing; Poultry processing; Seafood product preparation and packaging; Leather and hide tanning and finishing; Footwear manufacturing; Other leather and allied product manufacturing</p>
FORESTRY PROCESSING	<p>Sawmills; Wood preservation; Reconstituted wood product manufacturing; Veneer and plywood manufacturing; Engineered wood member and truss manufacturing; Wood windows and door manufacturing; Cut stock- resawing lumber- and planning; Other millwork- including flooring; Wood container and pallet manufacturing; Prefabricated wood building manufacturing; Miscellaneous wood product manufacturing; Pulp mills; Paper and paperboard mills; Paperboard container manufacturing; Surface-coated paperboard manufacturing; Coated and laminated paper and packaging materials; Coated and uncoated paper bag manufacturing; Die-cut paper office supplies manufacturing; Envelope manufacturing; Stationery and related product manufacturing; Sanitary paper product manufacturing; All other converted paper product manufacturing; Wood kitchen cabinet and countertop manufacturing; Upholstered household furniture manufacturing; Non-upholstered wood household furniture manufacturing; Wood office furniture manufacturing; Custom architectural woodwork and millwork; Manufactured home, mobile home, manufacturing; Wood office furniture manufacturing; Office furniture, except wood, manufacturing</p>

Appendix B

SIC and NAICS Classification Related to Agricultural Manufacturing

Table 1. Comparison of SIC and NAICS Manufacturing Components.

Industry	1997 SIC Description	1997 NAICS Description
WOOD PRODUCT MANUFACTURING	Logging was part of wood product manufacturing	Logging is now a part of ag production; portion of the old sector 3131 Boot and Shoe Cut Stock and Findings (wood heels) is now included
FURNITURE AND RELATED PRODUCTS MANUFACTURING	Sector used to contain value that are now a part of sector 33636 Motor Vehicle Seating and Interior Trim Manufacturing (pt) and 339111 Laboratory Apparatus and Furniture Manufacturing (pt)	This industry now contains the full value of what was classified by SIC as 2434 Wood Kitchen Cabinets; *5712 Furniture Stores (custom wood cabinets); *5712 Furniture (custom made upholstered household furniture except cabinets); *3952 Lead Pencils, Crayons, and Artist's Materials (drafting tables and boards); *3999 Manufacturing Industries, NEC (beauty and barber chairs); *3089 Plastics Products, NEC (finished plastics furniture parts); *3429 Hardware, NEC (convertible bed sleeper mechanisms, chair glides); *3499 Fabricated Metal Products, NEC (metal furniture frames)
FOOD MANUFACTURING		This industry now is defined with whole and portions of sectors that either did not exist in the SIC industries or was elsewhere classified or both. This industry now contains Tobacco products manufacturing; now includes a portion of what used to be *0723 Crop Production Services for Market, Except Cotton Ginning (custom grain grinding); *5441 Candy, Nut, and Confectionery Stores (chocolate candy stores, preparing on premises); *0751 Livestock Services, Except Veterinary (custom slaughtering); *5147 Meat and Meat Products (boxed beef); *5461 Retail Bakeries (bread, cake and related products baked and sold on premise).

Table 1. (Continued).

Industry	1997 SIC Description	1997 NAICS Description
TOBACCO PRODUCTS		Now a part of food products
TEXTILE AND TEXTILES PRODUCT MILLS	This used to contain: 315111 Sheer Hosiery Mills (pt); 315119 Other Hosiery and Sock Mills ; 315192 Underwear and Nightwear Knitting Mills (pt); 315191 Outerwear Knitting Mills (pt);	315 Apparel Manufacturing and 316 Leather and Allied Product Manufacturing are now combined into one sector, "Apparel Manufacturing"; this now contains portions of the following sectors: *5131 Piece Goods and Notions (broadwoven piece good converters); *7389 Business Services, NEC (sponging fabric for tailors and dressmakers); *3069 Fabricated Rubber Products, NEC (rubberizing fabric or purchased textile products);*5714 Drapery, Curtain, and Upholstery Stores (custom drapes); *5714 Drapery, Curtain, and Upholstery Stores (custom slipcovers); *3569 General Industrial Machinery and Equipment, NEC (textile fire hose); *7389 Business Services, NEC (embroidery of advertising on shirts and rug binding for the trade).
PAPER MANUFACTURING	Contained sector 326112 Unsupported Plastics Packaging Film and Sheet Manufacturing; 326111 Unsupported Plastics Bag Manufacturing	Now a portion of what used to be "Fabricated Metal Products" sector 3497 Metal Foil and Leaf (laminated aluminum foil rolls and sheets for flexible packaging uses) is part of Paper Manufacturing

Appendix C

Agriculture-Generated Activity by Sector

Table 1. Agriculture-Generated Activity by Sector, 2008.

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
60	Poultry processing	31,033	1,096.758	1,170.787
2	Grain farming	23,660	215.825	1,020.460
13	Poultry and egg production	11,562	417.774	751.951
319	Wholesale trade businesses	10,216	654.648	1,127.404
19	Support activities for agriculture and forestry	9,890	338.083	245.974
1	Oilseed farming	8,694	142.392	492.303
413	Food services and drinking places	8,118	126.818	190.112
335	Transport by truck	6,338	306.234	409.194
360	Real estate establishments	6,168	98.750	469.797
16	Commercial logging	6,033	221.835	363.073
95	Sawmills and wood preservation	5,578	251.727	313.807
53	Frozen food manufacturing	4,683	209.925	270.841
14	Animal production, except cattle and poultry and eggs	4,455	14.965	119.422
11	Cattle ranching and farming	3,949	21.560	89.950
105	Paper mills	3,094	294.445	510.650
394	Offices of physicians, dentists, and other health practitioners	3,078	214.993	249.573
397	Private hospitals	3,008	146.197	153.534
107	Paperboard container manufacturing	2,893	173.532	183.611
99	Wood windows and doors and millwork manufacturing	2,803	101.718	118.229
381	Management of companies and enterprises	2,758	263.877	353.160
8	Cotton farming	2,677	88.786	252.874
10	All other crop farming	2,566	47.743	82.768
39	Maintenance and repair construction of nonresidential structures	2,248	93.731	98.298
62	Bread and bakery product manufacturing	2,219	101.201	117.311
382	Employment services	2,140	39.064	42.229
329	Retail Stores - General merchandise	2,092	51.688	76.878
59	Animal (except poultry) slaughtering, rendering, and processing	2,045	92.868	103.910
398	Nursing and residential care facilities	2,041	55.155	57.200
96	Veneer and plywood manufacturing	2,034	101.149	147.725
354	Monetary authorities and depository credit intermediation activities	1,896	89.818	235.780
93	Footwear manufacturing	1,797	55.933	66.403
324	Retail Stores - Food and beverage	1,791	43.699	66.586
388	Services to buildings and dwellings	1,720	35.737	43.571
426	Private household operations	1,647	9.581	10.980
109	All other paper bag and coated and treated paper manufacturing	1,623	85.529	93.969
320	Retail Stores - Motor vehicle and parts	1,608	64.203	81.843
111	Sanitary paper product manufacturing	1,579	106.759	262.195
43	Flour milling and malt manufacturing	1,552	78.369	140.073
414	Automotive repair and maintenance, except car washes	1,479	39.510	58.262
295	Wood kitchen cabinet and countertop manufacturing	1,302	45.288	44.436
400	Individual and family services	1,268	24.431	27.279
340	Warehousing and storage	1,263	50.431	68.419
106	Paperboard Mills	1,232	110.073	175.912
330	Retail Stores - Miscellaneous	1,226	21.497	31.009
65	Snack food manufacturing	1,211	64.775	169.844
425	Civic, social, professional, and similar organizations	1,189	30.034	17.499
367	Legal services	1,178	63.425	81.772
331	Retail Nonstores - Direct and electronic sales	1,165	9.828	32.981

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
367	Legal services	1,160	59.065	78.328
100	Wood container and pallet manufacturing	1,141	30.871	41.203
368	Accounting, tax preparation, bookkeeping, and payroll services	1,121	46.851	51.145
85	All other textile product mills	1,090	55.426	82.537
42	Other animal food manufacturing	1,071	64.804	89.089
323	Retail Stores - Building material and garden supply	1,030	30.311	51.221
333	Transport by rail	987	87.957	169.319
327	Retail Stores - Clothing and clothing accessories	964	14.682	28.942
70	Soft drink and ice manufacturing	961	63.491	66.736
399	Child day care services	925	13.247	18.867
411	Hotels and motels, including casino hotels	910	16.488	29.046
369	Architectural, engineering, and related services	906	47.794	48.155
432	Other state and local government enterprises	906	44.390	63.447
356	Securities, commodity contracts, investments, and related activities	873	41.129	40.445
296	Upholstered household furniture manufacturing	812	27.667	30.483
325	Retail Stores - Health and personal care	793	23.478	33.297
326	Retail Stores - Gasoline stations	745	15.712	30.081
86	Apparel knitting mills	733	22.483	26.060
386	Business support services	680	13.901	16.932
297	Nonupholstered wood household furniture manufacturing	677	21.896	27.127
97	Engineered wood member and truss manufacturing	668	24.228	37.219
15	Forestry, forest products, and timber tract production	652	31.757	208.983
427	US Postal Service	648	52.108	53.774
149	Other plastics product manufacturing	634	23.554	33.596
396	Medical and diagnostic labs and outpatient and other ambulatory care se	622	26.068	43.032
98	Reconstituted wood product manufacturing	600	35.137	90.084
374	Management, scientific, and technical consulting services	583	30.305	32.649
20	Extraction of oil and natural gas	574	50.823	119.996
357	Insurance carriers	573	30.142	46.555
339	Couriers and messengers	573	18.566	24.430
391	Private elementary and secondary schools	569	9.200	9.358
18	Commercial hunting and trapping	566	3.653	16.356
328	Retail Stores - Sporting goods, hobby, book and music	557	8.307	12.956
88	Men's and boys' cut and sew apparel manufacturing	546	12.531	14.532
355	Nondepository credit intermediation and related activities	519	27.454	47.059
401	Community food, housing, and other relief services, including rehabilita	513	10.256	10.801
63	Cookie, cracker, and pasta manufacturing	513	27.523	41.210
6	Greenhouse, nursery, and floriculture production	505	20.642	29.266
419	Personal care services	490	6.007	9.223
417	Commercial and industrial machinery and equipment repair and mainten	490	16.458	26.266
142	Plastics packaging materials and unlaminated film and sheet manufactur	482	25.711	46.168
338	Scenic and sightseeing transportation and support activities for transport	469	24.825	31.701
392	Private junior colleges, colleges, universities, and professional schools	460	11.077	11.422
393	Other private educational services	448	10.452	13.490
395	Home health care services	433	13.771	16.156
421	Dry-cleaning and laundry services	429	7.103	10.489
321	Retail Stores - Furniture and home furnishings	427	14.713	23.457
387	Investigation and security services	416	9.387	9.962

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
31	Electric power generation, transmission, and distribution	1,155	140.153	508.515
54	Fruit and vegetable canning, pickling, and drying	1,123	66.377	116.272
100	Wood container and pallet manufacturing	1,121	33.469	46.532
368	Accounting, tax preparation, bookkeeping, and payroll services	1,088	46.535	55.760
333	Transport by rail	1,063	101.677	237.038
42	Other animal food manufacturing	1,052	59.094	103.960
323	Retail Stores - Building material and garden supply	1,024	32.846	53.169
432	Other state and local government enterprises	1,017	50.112	65.490
327	Retail Stores - Clothing and clothing accessories	952	16.434	33.578
296	Upholstered household furniture manufacturing	920	32.975	45.578
70	Soft drink and ice manufacturing	910	66.757	73.625
369	Architectural, engineering, and related services	905	52.747	53.498
399	Child day care services	892	14.694	24.657
411	Hotels and motels, including casino hotels	889	18.105	32.996
356	Securities, commodity contracts, investments, and related activities	844	44.989	45.822
85	All other textile product mills	830	46.513	55.319
34	Construction of new nonresidential commercial and health care structure	830	31.212	35.440
97	Engineered wood member and truss manufacturing	817	30.388	30.836
86	Apparel knitting mills	787	23.088	30.039
325	Retail Stores - Health and personal care	778	27.520	43.109
37	Construction of new residential permanent site single- and multi-family :	762	25.342	25.843
63	Cookie, cracker, and pasta manufacturing	743	38.144	65.237
326	Retail Stores - Gasoline stations	724	17.741	40.350
297	Nonupholstered wood household furniture manufacturing	721	23.311	37.554
98	Reconstituted wood product manufacturing	673	39.401	79.193
20	Extraction of oil and natural gas	672	62.235	171.313
6	Greenhouse, nursery, and floriculture production	656	21.570	23.772
15	Forestry, forest products, and timber tract production	626	32.660	102.820
386	Business support services	613	15.566	20.851
149	Other plastics product manufacturing	605	23.902	35.260
339	Couriers and messengers	602	19.365	31.534
396	Medical and diagnostic labs and outpatient and other ambulatory care se	601	28.591	50.378
357	Insurance carriers	596	36.893	67.699
328	Retail Stores - Sporting goods, hobby, book and music	573	9.680	15.946
391	Private elementary and secondary schools	568	10.266	10.562
374	Management, scientific, and technical consulting services	534	31.112	35.586
379	Veterinary services	531	14.758	16.179
401	Community food, housing, and other relief services, including rehabilita	502	11.039	8.697
392	Private junior colleges, colleges, universities, and professional schools	495	11.984	12.823
338	Scenic and sightseeing transportation and support activities for transport	490	34.889	45.815
351	Telecommunications	475	38.112	102.904
41	Dog and cat food manufacturing	469	20.852	59.581
88	Men's and boys' cut and sew apparel manufacturing	457	12.261	16.634
419	Personal care services	457	7.522	12.045
393	Other private educational services	457	11.172	13.941
142	Plastics packaging materials and unlaminated film and sheet manufactur	453	26.375	50.200
321	Retail Stores - Furniture and home furnishings	451	14.369	23.116
417	Commercial and industrial machinery and equipment repair and mainten	449	18.544	38.201

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
427	US Postal Service	435	29.489	27.201
355	Nondepository credit intermediation and related activities	433	26.395	41.167
40	Maintenance and repair construction of residential structures	422	13.294	19.654
395	Home health care services	419	14.905	18.880
322	Retail Stores - Electronics and appliances	401	14.509	17.805
387	Investigation and security services	378	9.426	10.964
421	Dry-cleaning and laundry services	368	7.401	11.129
377	Advertising and related services	364	16.592	20.068
91	Apparel accessories and other apparel manufacturing	358	9.356	9.511
409	Amusement parks, arcades, and gambling industries	351	6.142	8.105
372	Computer systems design services	351	23.547	19.133
403	Spectator sports companies	345	3.165	3.726
424	Grantmaking, giving, and social advocacy organizations	342	9.985	4.151
407	Fitness and recreational sports centers	317	4.632	4.968
36	Construction of other new nonresidential structures	312	11.756	12.427
380	All other miscellaneous professional, scientific, and technical services	308	9.299	45.098
410	Other amusement and recreation industries	297	6.356	11.173
32	Natural gas distribution	277	28.607	66.385
45	Soybean and other oilseed processing	271	14.681	25.058
55	Fluid milk and butter manufacturing	269	14.988	23.924
341	Newspaper publishers	268	9.042	10.604
108	Coated and laminated paper, packaging paper and plastics film manufact	267	17.578	23.834
12	Dairy cattle and milk production	262	1.219	14.542
64	Tortilla manufacturing	262	9.169	12.140
103	All other miscellaneous wood product manufacturing	261	7.729	11.569
418	Personal and household goods repair and maintenance	254	7.916	16.666
68	Seasoning and dressing manufacturing	248	8.732	10.365
362	Automotive equipment rental and leasing	245	11.209	23.845
3	Vegetable and melon farming	243	13.395	20.381
38	Construction of other new residential structures	238	6.173	6.539
416	Electronic and precision equipment repair and maintenance	234	10.844	18.679
348	Radio and television broadcasting	228	49.427	37.456
390	Waste management and remediation services	221	10.041	16.068
301	Office furniture and custom architectural woodwork and millwork manu	205	7.193	13.696
358	Insurance agencies, brokerages, and related activities	201	9.384	11.963
389	Other support services	195	7.937	16.272
404	Promoters of performing arts and sports and agents for public figures	194	2.546	3.514
94	Other leather and allied product manufacturing	193	8.037	11.664
376	Scientific research and development services	186	11.557	10.355
56	Cheese manufacturing	185	8.709	11.802
46	Fats and oils refining and blending	179	7.732	19.054
113	Printing	178	8.787	12.094
336	Transit and ground passenger transportation	174	3.003	4.307
58	Ice cream and frozen dessert manufacturing	173	9.589	16.176
47	Breakfast cereal manufacturing	168	9.812	31.951
420	Death care services	166	3.714	4.194
110	Stationery product manufacturing	166	6.634	7.465
415	Car washes	162	2.169	3.715

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
73	Distilleries	153	10,368	52,341
384	Office administrative services	148	8,115	10,785
141	All other chemical product and preparation manufacturing	146	12,361	16,211
87	Cut and sew apparel contractors	145	2,521	4,021
84	Textile bag and canvas mills	143	6,684	8,283
35	Construction of new nonresidential manufacturing structures	142	5,369	6,475
69	All other food manufacturing	141	5,520	7,115
365	Commercial and industrial machinery and equipment rental and leasing	141	11,243	22,271
71	Breweries	141	13,240	56,236
402	Performing arts companies	138	1,256	1,450
431	State and local government electric utilities	137	10,745	19,164
33	Water, sewage and other treatment and delivery systems	135	6,757	11,577
422	Other personal services	133	3,137	9,335
78	Nonwoven fabric mills	132	10,831	16,001
344	Directory, mailing list, and other publishers	131	5,885	14,900
423	Religious organizations	131	2,810	7,139
363	General and consumer goods rental except video tapes and discs	122	5,610	6,220
44	Wet corn milling	116	8,337	14,576
359	Funds, trusts, and other financial vehicles	113	2,808	1,841
283	Motor vehicle parts manufacturing	109	5,635	6,224
346	Motion picture and video industries	108	2,163	3,348
158	Glass container manufacturing	107	5,456	10,551
195	Machine shops	106	4,769	6,245
412	Other accommodations	104	2,152	4,309
61	Seafood product preparation and packaging	103	2,236	2,500
371	Custom computer programming services	101	5,708	5,921
4	Fruit farming	100	2,834	3,308
76	Broadwoven fabric mills	100	5,941	7,451
370	Specialized design services	98	4,495	6,481
207	Other industrial machinery manufacturing	97	5,801	7,017
29	Support activities for oil and gas operations	95	6,529	11,990
373	Other computer related services, including facilities management	90	16,609	20,611
364	Video tape and disc rental	90	1,541	2,412
337	Transport by pipeline	86	11,567	16,715
246	Printed circuit assembly (electronic assembly) manufacturing	83	3,259	3,456
375	Environmental and other technical consulting services	83	5,075	6,202
115	Petroleum refineries	81	9,630	13,841
148	Plastics bottle manufacturing	81	4,930	10,278
125	All other basic inorganic chemical manufacturing	80	8,127	12,285
204	Lawn and garden equipment manufacturing	76	2,293	3,648
302	Showcase, partition, shelving, and locker manufacturing	75	3,553	5,135
80	Textile and fabric finishing mills	72	2,954	3,554
332	Transport by air	71	5,082	6,559
72	Wineries	68	6,132	9,410
203	Farm machinery and equipment manufacturing	66	2,542	4,815
429	Other Federal Government enterprises	65	6,995	7,345
143	Unlaminated plastics profile shape manufacturing	63	3,624	5,912
126	Other basic organic chemical manufacturing	62	7,593	12,665

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
190	Metal can, box, and other metal container (light gauge) manufacturing	60	3.520	7.068
147	Urethane and other foam product (except polystyrene) manufacturing	57	3.578	6.093
28	Drilling oil and gas wells	56	4.732	22.545
131	Pesticide and other agricultural chemical manufacturing	52	3.998	17.154
52	Nonchocolate confectionery manufacturing	51	1.500	2.058
57	Dry, condensed, and evaporated dairy product manufacturing	50	3.368	6.155
334	Transport by water	48	3.446	6.889
112	All other converted paper product manufacturing	47	2.226	2.600
130	Fertilizer manufacturing	46	4.056	6.059
228	Material handling equipment manufacturing	45	2.235	2.946
50	Chocolate and confectionery manufacturing from cacao beans	45	1.511	2.063
51	Confectionery manufacturing from purchased chocolate	44	1.029	1.818
352	Data processing, hosting, ISP, web search portals and related services	44	2.551	3.815
145	Laminated plastics plate, sheet (except packaging), and shape manufactu	44	1.919	3.205
197	Coating, engraving, heat treating and allied activities	42	1.634	2.511
383	Travel arrangement and reservation services	42	1.384	2.738
101	Manufactured home (mobile home) manufacturing	42	1.644	1.497
405	Independent artists, writers, and performers	39	2.158	2.860
83	Curtain and linen mills	34	0.986	1.352
267	Motor and generator manufacturing	34	1.833	3.916
146	Polystyrene foam product manufacturing	33	1.563	3.202
430	State and local government passenger transit	33	0.903	0.048
139	Toilet preparation manufacturing	32	2.952	9.114
309	Dental laboratories manufacturing	31	1.616	1.725
378	Photographic services	31	0.639	1.000
18	Commercial hunting and trapping	30	0.938	3.593
220	Cutting tool and machine tool accessory manufacturing	29	1.663	2.008
308	Ophthalmic goods manufacturing	29	1.488	2.120
140	Printing ink manufacturing	29	1.925	2.085
122	Synthetic dye and pigment manufacturing	28	1.770	2.332
342	Periodical publishers	27	1.197	1.506
185	Handtool manufacturing	26	1.241	1.965
247	Other electronic component manufacturing	26	0.645	0.672
305	Surgical and medical instrument, laboratory and medical instrument mar	24	1.565	2.033
366	Lessors of nonfinancial intangible assets	24	1.906	21.487
144	Plastics pipe and pipe fitting manufacturing	23	1.320	2.567
240	Audio and video equipment manufacturing	23	1.021	1.139
243	Semiconductor and related device manufacturing	21	1.180	1.348
213	Other commercial and service industry machinery manufacturing	20	1.281	1.727
242	Bare printed circuit board manufacturing	20	1.105	1.130
270	Storage battery manufacturing	20	1.466	2.198
385	Facilities support services	20	0.466	0.508
132	Medicinal and botanical manufacturing	19	1.370	2.012
314	Sign manufacturing	19	0.933	1.027
102	Prefabricated wood building manufacturing	18	0.782	0.928
307	Dental equipment and supplies manufacturing	15	0.738	1.102
137	Adhesive manufacturing	15	1.800	2.119
219	Special tool, die, jig, and fixture manufacturing	15	0.738	0.818

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
350	Internet publishing and broadcasting	15	0.535	1.773
353	Other information services	14	0.524	1.399
198	Valve and fittings other than plumbing manufacturing	14	0.805	1.628
81	Fabric coating mills	14	0.732	0.923
280	Truck trailer manufacturing	14	0.631	0.653
66	Coffee and tea manufacturing	14	0.453	0.805
266	Power, distribution, and specialty transformer manufacturing	14	0.716	1.512
299	Institutional furniture manufacturing	13	0.601	1.118
5	Tree nut farming	13	0.517	1.242
303	Mattress manufacturing	13	0.405	0.878
279	Motor vehicle body manufacturing	12	0.630	0.782
278	Heavy duty truck manufacturing	12	0.842	0.903
408	Bowling centers	12	0.182	0.251
21	Mining coal	11	1.091	2.115
306	Surgical appliance and supplies manufacturing	11	0.860	1.373
135	Biological product (except diagnostic) manufacturing	11	0.690	1.451
118	Petroleum lubricating oil and grease manufacturing	11	0.714	1.257
406	Museums, historical sites, zoos, and parks	10	2.957	3.388
17	Commercial Fishing	10	0.522	0.562
282	Travel trailer and camper manufacturing	10	0.363	0.264
26	Mining and quarrying sand, gravel, clay, and ceramic and refractory min	9	0.623	0.841
225	Other engine equipment manufacturing	9	0.471	0.792
75	Fiber, yarn, and thread mills	9	0.353	0.372
67	Flavoring syrup and concentrate manufacturing	9	0.791	5.730
117	Asphalt shingle and coating materials manufacturing	9	1.194	1.861
27	Mining and quarrying other nonmetallic minerals	8	0.486	0.992
193	Hardware manufacturing	8	0.340	0.611
298	Metal and other household furniture (except wood) manufacturing	8	0.448	0.790
116	Asphalt paving mixture and block manufacturing	8	0.448	0.694
317	All other miscellaneous manufacturing	8	0.310	0.401
196	Turned product and screw, nut, and bolt manufacturing	8	0.340	0.537
159	Glass product manufacturing made of purchased glass	7	0.388	0.530
231	Packaging machinery manufacturing	7	0.380	0.437
25	Mining and quarrying stone	7	0.502	0.926
272	Communication and energy wire and cable manufacturing	7	0.607	1.231
300	Wood television, radio, and sewing machine cabinet manufacturing	7	0.189	0.301
229	Power-driven handtool manufacturing	7	0.319	0.546
138	Soap and cleaning compound manufacturing	7	0.508	1.643
248	Electromedical and electrotherapeutic apparatus manufacturing	7	0.395	0.419
284	Aircraft manufacturing	7	0.644	1.003
127	Plastics material and resin manufacturing	7	0.664	1.076
343	Book publishers	7	0.387	0.720
275	All other miscellaneous electrical equipment and component manufactur	6	0.342	0.492
199	Plumbing fixture fitting and trim manufacturing	6	0.298	0.765
174	Aluminum product manufacturing from purchased aluminum	6	0.443	0.622
245	Electronic connector manufacturing	6	0.311	0.327
120	Petrochemical manufacturing	6	0.528	2.937
244	Electronic capacitor, resistor, coil, transformer, and other inductor manuf	6	0.270	0.288

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
230	Other general purpose machinery manufacturing	6	0.279	0.371
151	Rubber and plastics hoses and belting manufacturing	6	0.315	0.493
133	Pharmaceutical preparation manufacturing	6	0.402	1.117
264	Household laundry equipment manufacturing	5	0.281	0.395
201	Fabricated pipe and pipe fitting manufacturing	5	0.266	0.483
157	Other pressed and blown glass and glassware manufacturing	5	0.226	0.312
92	Leather and hide tanning and finishing	5	0.235	0.269
194	Spring and wire product manufacturing	5	0.173	0.279
237	Telephone apparatus manufacturing	5	0.388	0.431
187	Ornamental and architectural metal products manufacturing	5	0.232	0.318
119	All other petroleum and coal products manufacturing	4	0.297	0.461
273	Wiring device manufacturing	4	0.212	0.407
222	Turbine and turbine generator set units manufacturing	4	0.273	0.647
221	Rolling mill and other metalworking machinery manufacturing	4	0.307	0.385
345	Software publishers	4	0.307	0.566
252	Totalizing fluid meters and counting devices manufacturing	4	0.227	0.243
263	Household refrigerator and home freezer manufacturing	4	0.155	0.381
121	Industrial gas manufacturing	4	0.499	1.145
171	Steel product manufacturing from purchased steel	4	0.305	0.425
349	Cable and other subscription programming	4	1.035	1.363
89	Women's and girls' cut and sew apparel manufacturing	4	0.377	0.608
347	Sound recording industries	4	0.142	0.378
268	Switchgear and switchboard apparatus manufacturing	4	0.222	0.487
170	Iron and steel mills and ferroalloy manufacturing	4	0.484	0.853
274	Carbon and graphite product manufacturing	4	0.193	0.474
24	Mining gold, silver, and other metal ore	4	0.504	1.652
311	Sporting and athletic goods manufacturing	4	0.183	0.249
218	Metal cutting and forming machine tool manufacturing	4	0.251	0.304
82	Carpet and rug mills	4	0.077	0.128
183	Crown and closure manufacturing and metal stamping	3	0.169	0.215
152	Other rubber product manufacturing	3	0.180	0.281
250	Automatic environmental control manufacturing	3	0.133	0.140
260	Lighting fixture manufacturing	3	0.161	0.282
186	Plate work and fabricated structural product manufacturing	3	0.187	0.304
172	Alumina refining and primary aluminum production	3	0.282	0.460
269	Relay and industrial control manufacturing	3	0.142	0.265
202	Other fabricated metal manufacturing	3	0.144	0.236
153	Pottery, ceramics, and plumbing fixture manufacturing	3	0.125	0.167
184	Cutlery, utensil, pot, and pan manufacturing	3	0.095	0.217
210	Vending, commercial, industrial, and office machinery manufacturing	3	0.095	0.110
224	Mechanical power transmission equipment manufacturing	2	0.097	0.133
208	Plastics and rubber industry machinery manufacturing	2	0.123	0.138
291	Boat building	2	0.102	0.113
251	Industrial process variable instruments manufacturing	2	0.132	0.137
200	Ball and roller bearing manufacturing	2	0.125	0.255
90	Other cut and sew apparel manufacturing	2	0.131	0.158
176	Primary smelting and refining of nonferrous metal (except copper and al	2	0.133	0.226
286	Other aircraft parts and auxiliary equipment manufacturing	2	0.127	0.166

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
256	Watch, clock, and other measuring and controlling device manufacturing	2	0.079	0.084
205	Construction machinery manufacturing	2	0.090	0.163
262	Household cooking appliance manufacturing	2	0.048	0.085
191	Ammunition manufacturing	2	0.101	0.237
238	Broadcast and wireless communications equipment manufacturing	1	0.102	0.107
211	Optical instrument and lens manufacturing	1	0.077	0.092
289	Railroad rolling stock manufacturing	1	0.070	0.111
249	Search, detection, and navigation instruments manufacturing	1	0.081	0.084
313	Office supplies (except paper) manufacturing	1	0.082	0.115
209	Semiconductor machinery manufacturing	1	0.123	0.168
162	Concrete pipe, brick, and block manufacturing	1	0.060	0.101
114	Support activities for printing	1	0.031	0.036
214	Air purification and ventilation equipment manufacturing	1	0.046	0.059
236	Computer terminals and other computer peripheral equipment manufactu	1	0.019	0.020
315	Gasket, packing, and sealing device manufacturing	1	0.052	0.056
192	Arms, ordnance, and accessories manufacturing	1	0.055	0.124
318	Broom, brush, and mop manufacturing	1	0.037	0.056
150	Tire manufacturing	1	0.055	0.084
134	In-vitro diagnostic substance manufacturing	1	0.040	0.041
217	Industrial mold manufacturing	1	0.029	0.032
216	Air conditioning, refrigeration, and warm air heating equipment manufac	1	0.031	0.048
180	Nonferrous metal foundries	1	0.041	0.043
261	Small electrical appliance manufacturing	0	0.019	0.042
316	Musical instrument manufacturing	0	0.022	0.023
166	Cut stone and stone product manufacturing	0	0.016	0.018
177	Copper rolling, drawing, extruding and alloying	0	0.025	0.041
206	Mining and oil and gas field machinery manufacturing	0	0.025	0.035
181	All other forging, stamping, and sintering	0	0.020	0.027
178	Nonferrous metal (except copper and aluminum) rolling, drawing, extruc	0	0.021	0.037
285	Aircraft engine and engine parts manufacturing	0	0.033	0.047
163	Other concrete product manufacturing	0	0.018	0.024
290	Ship building and repairing	0	0.020	0.023
257	Software, audio, and video media for reproduction	0	0.002	0.002
294	All other transportation equipment manufacturing	0	0.025	0.041
161	Ready-mix concrete manufacturing	0	0.018	0.027
226	Pump and pumping equipment manufacturing	0	0.021	0.032
233	Fluid power process machinery manufacturing	0	0.019	0.027
312	Doll, toy, and game manufacturing	0	0.013	0.021
188	Power boiler and heat exchanger manufacturing	0	0.010	0.016
165	Abrasive product manufacturing	0	0.010	0.020
227	Air and gas compressor manufacturing	0	0.011	0.015
189	Metal tank (heavy gauge) manufacturing	0	0.007	0.011
128	Synthetic rubber manufacturing	0	0.016	0.023
136	Paint and coating manufacturing	0	0.010	0.014
164	Lime and gypsum product manufacturing	0	0.008	0.017
253	Electricity and signal testing instruments manufacturing	0	0.005	0.005
168	Mineral wool manufacturing	0	0.004	0.007
310	Jewelry and silverware manufacturing	0	0.006	0.007

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
287	Guided missile and space vehicle manufacturing	0	0.01	0.01
169	Miscellaneous nonmetallic mineral product manufacturing	0	0.00	0.01
173	Secondary smelting and alloying of aluminum	0	0.00	0.00
154	Brick, tile, and other structural clay product manufacturing	0	0.00	0.00
167	Ground or treated mineral and earth manufacturing	0	0.00	0.01
182	Custom roll forming	0	0.00	0.00
129	Artificial and synthetic fibers and filaments manufacturing	0	0.00	0.00
179	Ferrous metal foundries	0	0.00	0.00
292	Motorcycle, bicycle, and parts manufacturing	0	0.00	0.00
30	Support activities for other mining	0	0.00	0.00
160	Cement manufacturing	0	0.00	0.00
259	Electric lamp bulb and part manufacturing	0	0.00	0.00
234	Electronic computer manufacturing	0	0.00	0.00
276	Automobile manufacturing	0	0.00	0.00
124	Carbon black manufacturing	0	0.00	0.00
239	Other communications equipment manufacturing	0	0.00	0.00
232	Industrial process furnace and oven manufacturing	0	0.00	0.00
361	Imputed rental activity for owner-occupied dwellings	0	0.00	579.73
7	Tobacco farming	0	0.00	0.00
9	Sugarcane and sugar beet farming	0	0.00	0.00
48	Sugar cane mills and refining	0	0.00	0.00
49	Beet sugar manufacturing	0	0.00	0.00
74	Tobacco product manufacturing	0	0.00	0.00
77	Narrow fabric mills and schiffli machine embroidery	0	0.00	0.00
79	Knit fabric mills	0	0.00	0.00
104	Pulp mills	0	0.00	0.00
22	Mining iron ore	0	0.00	0.00
23	Mining copper, nickel, lead, and zinc	0	0.00	0.00
123	Alkalies and chlorine manufacturing	0	0.00	0.00
155	Clay and nonclay refractory manufacturing	0	0.00	0.00
156	Flat glass manufacturing	0	0.00	0.00
175	Primary smelting and refining of copper	0	0.00	0.00
212	Photographic and photocopying equipment manufacturing	0	0.00	0.00
215	Heating equipment (except warm air furnaces) manufacturing	0	0.00	0.00
223	Speed changer, industrial high-speed drive, and gear manufacturing	0	0.00	0.00
235	Computer storage device manufacturing	0	0.00	0.00
241	Electron tube manufacturing	0	0.00	0.00
254	Analytical laboratory instrument manufacturing	0	0.00	0.00
255	Irradiation apparatus manufacturing	0	0.00	0.00
258	Magnetic and optical recording media manufacturing	0	0.00	0.00
265	Other major household appliance manufacturing	0	0.00	0.00
271	Primary battery manufacturing	0	0.00	0.00
277	Light truck and utility vehicle manufacturing	0	0.00	0.00
281	Motor home manufacturing	0	0.00	0.00
288	Propulsion units and parts for space vehicles and guided missiles manuf	0	0.00	0.00
293	Military armored vehicle, tank, and tank component manufacturing	0	0.00	0.00
304	Blind and shade manufacturing	0	0.00	0.00
428	Federal electric utilities	0	0.00	0.00

Table 1. (Continued).

Sector ID	Aggregate Agriculture Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
433	*** Not an industry (Used and secondhand goods)	0	0.00	0.00
434	*** Not an industry (Scrap)	0	0.00	0.00
435	*** Not an industry (Rest of the world adjustment)	0	0.00	0.00
436	*** Not an industry (Noncomparable foreign imports)	0	0.00	0.00
437	Employment and payroll of State and Local Govt, Non-Education	0	0.00	0.00
438	Employment and payroll of State and Local Govt, Education	0	0.00	0.00
439	Employment and payroll of Federal Govt, Non-Military	0	0.00	0.00
440	Employment and payroll of Federal Govt, Military	0	0.00	0.00
Total		261,101	9,564.899	16,337.647

Note: Sorted by total number of jobs descending

Table 2. Crop Impacts by Sector, 2008.

Sector ID	Crops Sector Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
2	Grain farming	23,660	215.825	1020.460
1	Oilseed farming	8,694	142.392	492.303
53	Frozen food manufacturing	4,683	209.925	270.841
8	Cotton farming	2,677	88.786	252.874
10	All other crop farming	2,566	47.743	82.768
62	Bread and bakery product manufacturing	2,219	101.201	117.311
43	Flour milling and malt manufacturing	1,552	78.369	140.073
54	Fruit and vegetable canning, pickling, and drying	1,123	66.377	116.272
65	Snack food manufacturing	1,211	64.775	169.844
85	All other textile product mills	830	46.513	55.319
70	Soft drink and ice manufacturing	910	66.757	73.625
86	Apparel knitting mills	787	23.088	30.039
88	Men's and boys' cut and sew apparel manufacturing	457	12.261	16.634
63	Cookie, cracker, and pasta manufacturing	743	38.144	65.237
6	Greenhouse, nursery, and floriculture production	656	21.570	23.772
64	Tortilla manufacturing	262	9.169	12.140
91	Apparel accessories and other apparel manufacturing	358	9.356	9.511
45	Soybean and other oilseed processing	271	14.681	25.058
68	Seasoning and dressing manufacturing	248	8.732	10.365
46	Fats and oils refining and blending	179	7.732	19.054
4	Fruit farming	100	2.834	3.308
47	Breakfast cereal manufacturing	168	9.812	31.951
69	All other food manufacturing	141	5.520	7.115
78	Nonwoven fabric mills	132	10.831	16.001
3	Vegetable and melon farming	243	13.395	20.381
84	Textile bag and canvas mills	143	6.684	8.283
73	Distilleries	153	10.368	52.341
76	Broadwoven fabric mills	100	5.941	7.451
87	Cut and sew apparel contractors	145	2.521	4.021
44	Wet corn milling	116	8.337	14.576
71	Breweries	141	13.240	56.236
80	Textile and fabric finishing mills	72	2.954	3.554
72	Wineries	68	6.132	9.410
51	Confectionery manufacturing from purchased chocolate	44	1.029	1.818
52	Nonchocolate confectionery manufacturing	51	1.500	2.058
50	Chocolate and confectionery manufacturing from cacao beans	45	1.511	2.063
83	Curtain and linen mills	34	0.986	1.352
5	Tree nut farming	13	0.517	1.242
66	Coffee and tea manufacturing	14	0.453	0.805
81	Fabric coating mills	14	0.732	0.923
89	Women's and girls' cut and sew apparel manufacturing	4	0.377	0.608
67	Flavoring syrup and concentrate manufacturing	9	0.791	5.730
75	Fiber, yarn, and thread mills	9	0.353	0.372
82	Carpet and rug mills	4	0.077	0.128
7	Tobacco farming	0	0.000	0.000
9	Sugarcane and sugar beet farming	0	0.000	0.000
48	Sugar cane mills and refining	0	0.000	0.000
49	Beet sugar manufacturing	0	0.000	0.000

Table 2. (Continued).

Sector ID	Crops Sector Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
74	Tobacco product manufacturing	0	0.000	0.000
77	Narrow fabric mills and schiffli machine embroidery	0	0.000	0.000
79	Knit fabric mills	0	0.000	0.000
90	Other cut and sew apparel manufacturing	0	0.131	0.158
Total		56,051	1,380.425	3,255.386

Note: Sorted by total number of jobs descending

Table 3. Animal Agriculture Impacts by Sector, 2008.

Sector ID	Animal Agriculture Sector Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
60	Poultry processing	31,033	1,096.758	1,170.787
13	Poultry and egg production	11,562	417.774	751.951
14	Animal production, except cattle and poultry and eggs	4,455	14.965	119.422
11	Cattle ranching and farming	3,949	21.560	89.950
59	Animal (except poultry) slaughtering, rendering, and pr	2,045	92.868	103.910
93	Footwear manufacturing	1,797	55.933	66.403
42	Other animal food manufacturing	1,052	59.094	103.960
41	Dog and cat food manufacturing	469	20.852	59.581
55	Fluid milk and butter manufacturing	269	14.988	23.924
12	Dairy cattle and milk production	262	1.219	14.542
94	Other leather and allied product manufacturing	193	8.037	11.664
56	Cheese manufacturing	185	8.709	11.802
58	Ice cream and frozen dessert manufacturing	173	9.589	16.176
61	Seafood product preparation and packaging	103	2.236	2.500
57	Dry, condensed, and evaporated dairy product manufact	50	3.368	6.155
92	Leather and hide tanning and finishing	5	0.235	0.269
Total		57,601	1,828.183	2,552.998

Note: Sorted by total number of jobs descending

Table 4. Forestry Impacts by Sector, 2008.

Sector ID	Forestry Sector Contribution to:	Employment (Jobs)	Income (Million \$)	Value Added (Million \$)
16	Commercial logging	6,033	221.835	363.073
95	Sawmills and wood preservation	5,578	251.727	313.807
105	Paper mills	3,094	294.445	510.650
107	Paperboard container manufacturing	2,893	173.532	183.611
99	Wood windows and doors and millwork manufacturing	2,803	101.718	118.229
96	Veneer and plywood manufacturing	2,034	101.149	147.725
109	All other paper bag and coated and treated paper manu	1,623	85.529	93.969
111	Sanitary paper product manufacturing	1,579	106.759	262.195
295	Wood kitchen cabinet and countertop manufacturing	1,302	45.288	44.436
106	Paperboard Mills	1,232	110.073	175.912
100	Wood container and pallet manufacturing	1,121	33.469	46.532
296	Upholstered household furniture manufacturing	920	32.975	45.578
97	Engineered wood member and truss manufacturing	817	30.388	30.836
297	Nonupholstered wood household furniture manufacturi	721	23.311	37.554
98	Reconstituted wood product manufacturing	673	39.401	79.193
15	Forestry, forest products, and timber tract production	626	32.660	102.820
108	Coated and laminated paper, packaging paper and plast	267	17.578	23.834
103	All other miscellaneous wood product manufacturing	261	7.729	11.569
301	Office furniture and custom architectural woodwork an	205	7.193	13.696
110	Stationery product manufacturing	166	6.634	7.465
112	All other converted paper product manufacturing	47	2.226	2.600
101	Manufactured home (mobile home) manufacturing	42	1.644	1.497
102	Prefabricated wood building manufacturing	18	0.782	0.928
300	Wood television, radio, and sewing machine cabinet m:	7	0.189	0.301
104	Pulp mills	0	0.000	0.000
Total		34,065	1,728.233	2,618.008

Note: Sorted by total number of jobs descending



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