
Impact of the Agricultural Sector on the Arkansas Economy



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Gina Vickery, and Z. Clayton-Niederman*

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Impact of the Agricultural Sector on the Arkansas Economy

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Impact of the Agricultural Sector on the Arkansas Economy

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Executive Summary

Agriculture historically has been one of the primary sectors of the Arkansas economy. Agriculture is defined as the sum of agricultural, forestry, and fisheries production and processing activities unless otherwise specified. Not only does agriculture contribute to the economy through direct agricultural production and added value processing, it also plays an important role through the economy's other sectors. Utilizing data from the United States Bureau of Economic Affairs and the State of Arkansas, the economic impact of agriculture on the Arkansas economy was estimated for the latest year available, 1999. Gross State Product (GSP) information for Arkansas was compared with that of other states in the southeastern U.S. to give a measure of the relative importance of agriculture in Arkansas compared with other states. The total impact of agriculture (direct, indirect, and induced effects) on added value, employment, and wage income was estimated by employing the Impact Analysis for Planning System (IMPLAN). Economic impacts of agricultural production and processing were estimated for agriculture as a whole and also separately for the crop sector, the livestock sector, and the forestry sector. Key findings of the IMPLAN analysis follow below.

- The Arkansas agricultural sector contributes a larger percentage to total economic activity in the state than is contributed by any other state in the southeastern US – 12.3 percent of the state GSP of \$64.8B.
- The total impact of Arkansas agriculture (direct, indirect and induced effects) on value added in the state is \$13.6 B – more than \$0.22 of every \$1 generated.
- Agriculture accounted for 327,146 jobs – more than one of every five jobs in the state. Direct employment in agriculture is 192,160, 12.8 percent of state employment.
- Poultry production and processing alone provide 16 percent of the state's agricultural jobs.
- Agriculture pays \$8.7B in wages, 15 percent of the state's total payroll. Directly, agricultural payrolls total \$5.2B, 9 percent of the state total.
- Agriculture generates added value income, employment,

and wages in all 51 of the study sectors, but much of what is gained goes to wholesale and retail trades, financial/real estate, miscellaneous services, transportation and communication services and health services.

- The crop sector (including government payments) creates \$4.5B in value, 101,569 jobs, and \$2.6B in wages. Direct impacts are greatest in food grain, miscellaneous food processing, hay and pasture, miscellaneous services, and oil-bearing crops. Indirect and induced impacts are greatest in financial/real estate, health services, miscellaneous services, transportation, communication services, and wholesale and retail trade.
- The livestock sector generates \$4.1B in added value, 118,641 jobs and \$2.9B in wages. Poultry production and processing alone account for \$1.8B in added value, 52,867 jobs, and \$1.5B in wages, or 80 percent of direct added value, 75 percent of direct employment and 81 percent of direct wages in the livestock sector. Primary sectors impacted by livestock are health services, miscellaneous services, and wholesale and retail trade. Agricultural, forestry, and fishery service and the farm inputs and machinery sectors receive large employment and wage impacts and the financial/real estate sector receives large added value effects.
- Forestry generates \$4.8B in added value, 98,753 jobs, and \$3B in wages. From these total impacts, wood processing and paper processing account for 48 percent of added value, 40 percent of jobs, and 48 percent of wages. Sectors receiving the largest contributions of added value, employment and wages are wholesale and retail trade, transportation and communication services, miscellaneous services, health services, and financial/real estate.

The total impact of agriculture on the Arkansas economy has remained relatively constant in the past several years despite depressed agricultural commodity prices and market imbalances in supply and demand. There have been some shifts within agriculture as a whole between production and processing and among the crop, livestock, and forestry sectors. The vital importance to Arkansas' economy, particularly rural areas of the state with limited alternatives for economic activity and growth, is highlighted by the strong indirect and induced impacts on associated industrial and human-service sectors.

Impact of the Agricultural Sector on the Arkansas Economy

Introduction

Agriculture has been a primary stimulus of economic growth in Arkansas since statehood. While agriculture contributes to the economy through direct agricultural production and added value processing, 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, thereby allowing agriculture to remain a vital part of the Arkansas state economy.

This report

- compares the relative size of Arkansas' agricultural sector to 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;
- examines components of agricultural production and agricultural processing, including a review of historical sales trends for raw and processed agricultural output; and
- discusses the overall impact of agriculture on Arkansas' economy, considering the direct, indirect, and induced effects of the agricultural sector.

This report builds upon a similar report by Miller and Sato (1999). This report utilizes data for 1999, the most recent year for which all relevant data are available. All dollar values are expressed in 1999 constant terms, unless otherwise noted¹.

Agriculture - The Regional Context

In the following regional analysis of the southern U.S., the agricultural sector is defined as the sum of agricultural production and processing, unless otherwise described. Gross State Product (GSP) data², published by the Bureau of Economic Analysis (BEA), are used to measure agricultural production and processing. GSP is a measurement of economic activity in the state economy. The BEA defines agricultural production as Agriculture, Forestry and Fisheries. They define agricultural processing as Lumber and Wood; Furniture and Fixtures; Food and Kindred Products; Tobacco Products; Textile Mill Products; and Paper Products.

Arkansas' agricultural sector impact, expressed as a percentage of total GSP, has exceeded those of contiguous states since at least 1969 when the BEA began publishing regional GSP information (Miller, 2002). The agricultural sector also accounts for a larger percentage of GSP in Arkansas' economy than do the agricultural sectors of the southeast region³ and the nation in their respective economies. In 1999 for example, the state's agricultural sector accounted for more than 12 percent of Arkansas' GSP (Table 1). In addition, Arkansas' agricultural sector as a percentage of its GSP was more than double that of the United States' (US) agricultural

Table 1. The agricultural sector as a percentage of Gross State Product, 1999^a

State/Region	Percent of GSP
Arkansas	12.3
Mississippi	10.1
Tennessee	5.7
Missouri	5.6
Oklahoma	4.4
Louisiana	4.4
Texas	3.4
Southeast ^b	7.1
U.S.	4.6 ^c

Source: USDC, BEA, Regional Accounts Data (2001).

^a Current 1999 dollars

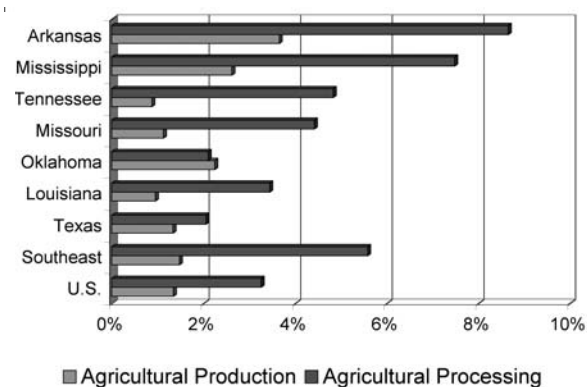
^b The BEA (2001) includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the southeast region.

^c Agriculture is measured as a percent of GDP for the U.S. GDP is the equivalent measure of GSP used for the nation.

sector as a percentage of its Gross Domestic Product (GDP)⁴ in 1999.

The individual contributions of agricultural production and processing also contribute a greater percentage of GSP to Arkansas' economy than agricultural production and processing sectors in neighboring states and the nation contribute to their own economies (Fig. 1). For example, in 1999, the state's agricultural production contributed 3.7 percent to Arkansas' GSP, while agricultural production in

Fig. 1. Production/processing as percent of GSP, 1999^a



Source: USDC, BEA^b, Regional Accounts Data (2001).

^a Current 1999 dollars

^b The BEA includes AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV in the southeast region.

Mississippi contributed only 2.6 percent to Mississippi's GSP. Similarly agricultural processing, the largest component of Arkansas' agricultural sector, contributed 8.7 percent to total GSP, while agricultural processing in Mississippi contributed only 7.6 percent of total GSP in Mississippi.

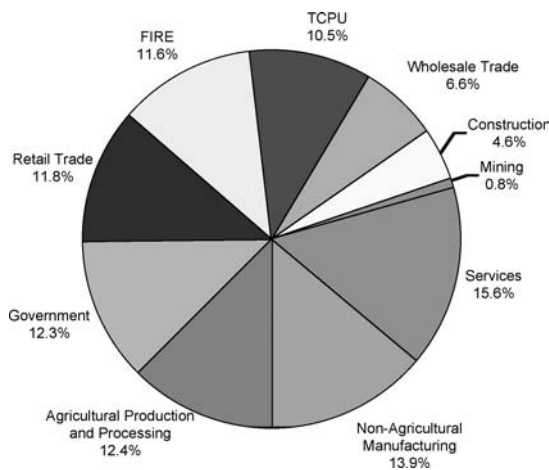
The diversity of Arkansas' agricultural sector fosters its strength. Arkansas' varied climate and terrain allow for row crops in the east, livestock in the west, and forestry in the south. Arkansas is one of the top fifteen states in the production of fifteen different agricultural products (Justice, 2002). In the nation, Arkansas is the leading producer of rice, the second largest producer of broilers, and the third largest pro-

ducer of both catfish and turkey (Farm Bureau, 2002). Arkansas also has a large percentage of forestland that is equal to 56 percent of its total land base. In the forestry sector, relatively low-valued timber is processed to produce higher valued products (e.g., lumber, paper, and furniture). Note that in Figure 1, states that are more than 50 percent forested, including Arkansas, Mississippi, and Tennessee, tend to have high values of agricultural processing. Oklahoma, the only state contiguous to Arkansas with a lower value of agricultural processing than production, is only 17 percent forested (American Forest and Paper Association, 2001).

Agriculture and the Arkansas Economy

In 1999, Arkansas' total GSP was equal to \$64.8B (current dollars) (USDC, BEA, 2001). The agricultural sector contributed 12.3 percent to Arkansas' GSP. Agricultural production contributed \$2.4B (current dollars) or 3.7 percent to Arkansas' GSP (Fig. 2). Agricultural processing contributed \$5.6B (current dollars) or 8.7 percent of GSP. Food and kin-

Fig. 2. Sector percentages of Arkansas' Gross State Product, 1999^a



Source: USDC, BEA, Regional Accounts Data (2001).

^a Current dollars

dred products, paper products, lumber and other wood products account for most of Arkansas' processed agricultural goods. These industries are discussed further in the "Processed Agricultural Products" section.

Although historically agricultural processing has been a major component of Arkansas' manufacturing sector, its percentage of total manufacturing has declined 19.8 percent since 1995 (Fig. 3). The decline in value is primarily due to the falling prices of processed agricultural goods and is further discussed in the "Processed Agricultural Products" section of this report.

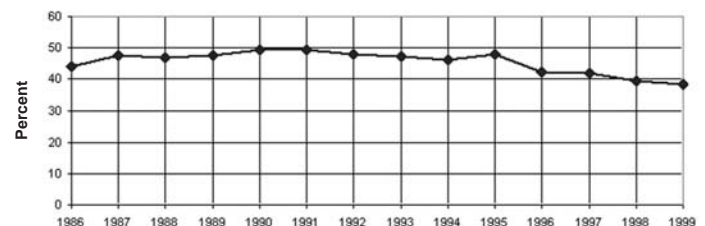
In Arkansas, the expanding electronic equipment and primary metal sectors have propelled the growth in overall manufacturing, making up for the recent slight decline of agricultural processing as a percentage of the manufacturing

sector. The manufacturing sector's GSP increased 72.6 percent between 1986 and 1999. During the same time period, the GSP of electronic equipment, which includes household appliances, electric lighting equipment, and communication equipment, grew 216.9 percent, and the GSP of primary metals, which includes iron, steel, aluminum, and copper, grew 242.8 percent.

The contribution of the agricultural sector to Arkansas' GSP has remained relatively stable over time (Fig. 4). From 1986 to 1999, total Arkansas GSP increased by 57.5 percent, whereas GSP in Arkansas' agricultural sector increased by 57.9 percent. Individually, agricultural production GSP increased 78.6 percent and agricultural processing GSP increased 50.5 percent.

In 1995, Arkansas' agricultural sector's GSP peaked at \$8.4B and then remained steady near \$8B (Fig. 5). From 1995 to 1999, agricultural processing's GSP declined 13.3 percent, while agricultural production's GSP increased 23.8 percent (Fig. 6). As will be discussed, the decline in agricultural processing's GSP can be attributed to falling prices for processed agricultural goods. Typically, in a period of normal inflation, the constant dollars series in Fig. 5 should not fall below the current dollars series. The fact that constant dollars fell below current dollars between 1995 and 1997 during a time period of normal inflation reveals an environment of depressed prices specific to the agricultural sector in the late 1990s.

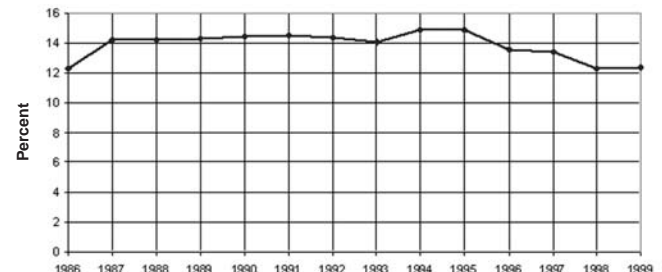
Fig. 3. Agricultural processing's share of manufacturing GSP, 1986 – 1999^a



Source: Computed using USDC, BEA Regional Accounts Data (2001).

^a Constant dollars (1999 base year)

Fig. 4. The agricultural sector's share of Arkansas' Gross State Product, 1986 – 1999^a



Source: Computed using USDC, BEA Regional Accounts Data (2001).

^a Constant dollars (1999 base year)

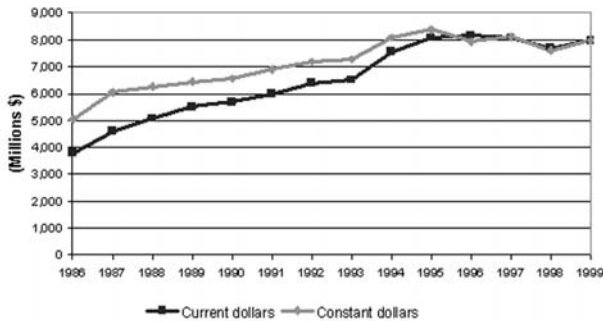
Agricultural Production

Crop and livestock production, forestry, aquaculture and horticulture are the primary agricultural production industries found in Arkansas. The GSP of agricultural production grew steadily from 1986 to 1999. As shown in Figure 6, agricultural production's GSP increased from \$1.3B in 1986 to \$2.4B in 1999, its highest GSP on record. The growth of agricultural production's GSP, however, stalled in recent years due to low agricultural prices in the world market, especially in the crop sector.

Crop Production

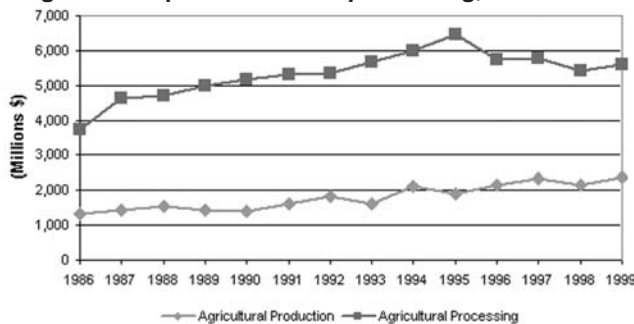
While crop production continues to be an important part of Arkansas' economy, the sales value of crop production is declining. This trend for rice, soybeans, cotton, hay, wheat, corn, sorghum, and oats in aggregate is shown in Figure 7 (USDA, NASS, 2002). Crop production sales peaked in 1996 at \$2.7B and then declined 41.8 percent over the next three years to \$1.6B. From 1986 to 1999, sales values of Arkansas' three most valuable crops – rice, soybeans, and cotton – declined by 28.0 percent, 47.7 percent, and 43.3 percent, respectively, despite acres harvested remaining nearly constant. As discussed below, the decline in crop production's value can be attributed to the low prices for many crops on a global scale.

Fig. 5. Arkansas' agricultural sector Gross State Product, 1986-1999



Source: Computed using USDC, BEA Regional Accounts Data (2001).

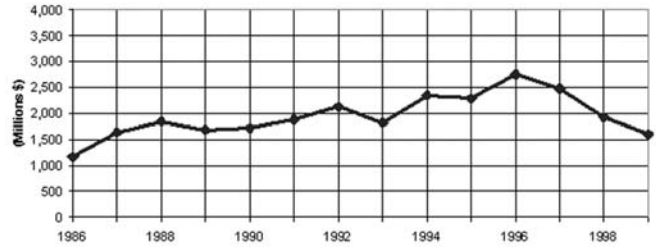
Fig. 6. Gross State Product for Arkansas' agricultural production and processing, 1986-1999^a



Source: Computed using USDC, BEA Regional Accounts Data (2001).

^a Constant dollars (1999 base year)

Fig. 7. Arkansas' crop production sales, 1986 – 1999^a



Source: Computed using data from the USDA, NASS (2002).

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

^a Constant 1999 data (1999 base year)

Over the last several years, Asian countries in particular have increased their level and quality of rice exports (Wailes, 2002). Demand for rice on the world market has not kept pace with the increase in world supply. As a result, prices for rice on the world market have fallen. Furthermore, the US has lost some market share in global rice exports. This loss of market share, combined with falling prices, has had a large impact in the US where approximately 40 percent of rice production is allocated to exports (Childs and Hoffman, 1999). Not surprisingly, decreasing rice exports also have a significant impact in Arkansas, the number one producer of rice in the US.

More and more nations are affected by the agricultural policies of individual countries. This is particularly true in the rice market, which is characterized by a high level of government intervention such as producer subsidies and barriers to trade. Agricultural policies in many Asian countries have traditionally protected domestic producers from lower-priced imports (Childs and Hoffman, 1999). The Uruguay Round Agreement on Agriculture (URAA) and the subsequent formation of the World Trade Organization (WTO) in 1995 have tried to minimize the effects of such agricultural policies on global prices. Since the URAA, Japan has become one of the largest export markets for US rice with sales increasing from \$31 million in 1995 to \$120 million in 2000 (USDA, FAS, 2001).

In recent years, the US has faced similar changes in market share in the soybean market. Latin American countries, such as Argentina and Brazil, have captured a substantial share of the soybean export market in recent years. Argentina and Brazil have improved their agricultural infrastructures to allow for better transportation of soybean stock from rural farms to seaports (Popp, 2002). Brazilian soybean exports have also increased as a result of the elimination of Brazil's export tax on soybeans in 1996 (George, 1999). Such increases in global soybean exports have led to a surplus of soybeans in the US.

In the future, alternative markets for soybean production may alleviate a portion of the US' excess soybean supply. Many countries, especially in the European Union, are experimenting with the use of soybean oil as a diesel fuel source. If

such experiments prove successful, the global demand for soybeans may rise. In addition, as a result of the URAA, countries such as South Korea and the Philippines have agreed to reduce their tariffs on certain soybean products over the next several years. Soybean sales to these countries have since increased and soybean exports may continue to rise as tariffs are reduced (USDA, FAS, 2001).

Finally, much of the same can be said about the US position in the global market for cotton. New export competitors, such as China, have contributed to an increase in the supply of cotton on the world market that has not been met with similar increases in demand. In the mid to late 1990s, cotton production in China rapidly expanded as a result of governmental support policies and the release of bollworm-resistant cotton in certain regions of China (Hsu and Gale, 2001). In 2001, China was the largest producer and consumer of cotton in the world (Hsu and Gale, 2001). At the same time, China experienced tremendous growth in textile production. Throughout the 1990s, China depended upon its increasing local production of cotton, possible through producer subsidies, to satisfy the demands of its growing textile industry. China's accession to the WTO in December, 2001 should lead to decreasing government production subsidies. In turn, imports of cotton into China should increase (Hsu and Gale, 2001).

It is evident that the declining value of rice, soybean, and cotton production in Arkansas is an international phenomenon. As globalization leads to increased agricultural production throughout the world, the US must prepare for a declining share of the agricultural export market. However, reductions in trade barriers and subsidies may help to offset the price effects of increasing global supply. The viability of alternative-crop markets may also provide new export opportunities.

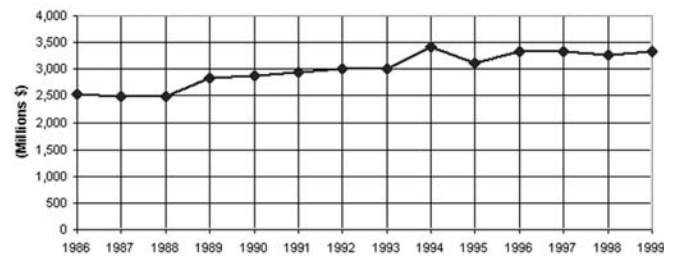
Livestock Production

Livestock production is also a major component of Arkansas' agricultural production. The value of livestock production from 1986 to 1999 is tracked in Fig. 8. The value of livestock production was computed using cash receipts data (USDA, ERS, 2002). Cash receipts data measure income from sales and marketing. The values of broilers, cattle and calves, eggs, turkeys, hogs and pigs, milk, catfish, farm chickens, and honey production are found in Fig. 8.

As shown in Fig. 8, livestock production remained stable during the late 1990s, the same time period in which the value of crop production declined. As a result, livestock production is replacing a portion of crop production's agricultural share of the Arkansas economy. From 1986 to 1999, cash receipts for livestock production increased 31.8 percent, and in 1999, the current value of livestock production was nearly \$2B greater than that of crop production.

Broilers are the largest component of livestock production in terms of cash receipts, followed by cattle and calves and eggs. Cash receipts for broilers increased 46.7 percent from 1986 to 1999. Increased sales (receipts) in the broiler

Fig. 8. The value of Arkansas' livestock production, 1986 – 1999^a



Source: Computed using data from the USDA, ERS (2002).

For selected livestock: Broilers, Cattle and Calves, Eggs, Turkeys, Hogs and Pigs, Milk, Catfish, Farm Chickens, and Honey.

^a Constant dollars (1999 base year)

industry are partially due to the declining prices of feed crops in the late 1990s. In addition, broiler production in Arkansas has expanded to meet increasing domestic and foreign demand. Increased broiler demand has also increased egg production in Arkansas, two-thirds of which is devoted to broiler hatching. Finally, beef cattle inventories have decreased across the US, increasing the value of cattle production (Ahrendsen et al., 2001).

Arkansas' livestock sector is also susceptible to changes in global agricultural policies. The dominant industry within the sector, poultry, has exported roughly 20 percent of production internationally since the mid 1990s. The top export market, Russia, has exhibited instability in recent years, most notably in 1998 and 2002, when trade and food-safety disputes negatively impacted exports through import bans. Additionally, unstable economic conditions in Asia (Hong Kong and Japan are also major export markets for the US) and Russia have also negatively impacted trade. Thus, careful attention to the global markets and international agricultural policies is also necessary in the livestock sector. The US hopes to benefit from China's accession to the WTO in the form of more stable trade relations (USDA, FAS, 2000).

Forestry Production

The state of Arkansas does not require sawmills to disclose the price paid for timber (Levins, 2002); therefore, it is not possible to produce an accurate representation of the value of the forestry industry. Forestry production, however, 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 largest component of direct processed agricultural goods in terms of employment, labor income, and added value.

Other Production

Other production consists of agricultural, forestry, and fishery services (e.g., crop dusting); landscape and horticultural services (e.g., lawn and garden services); aquaculture, and commercial fishing. The largest component is agricul-

tural, forestry, and fishery services. Reliable historical estimates of employment and added value are not available for each of the other production components and therefore have not been included in this report⁵.

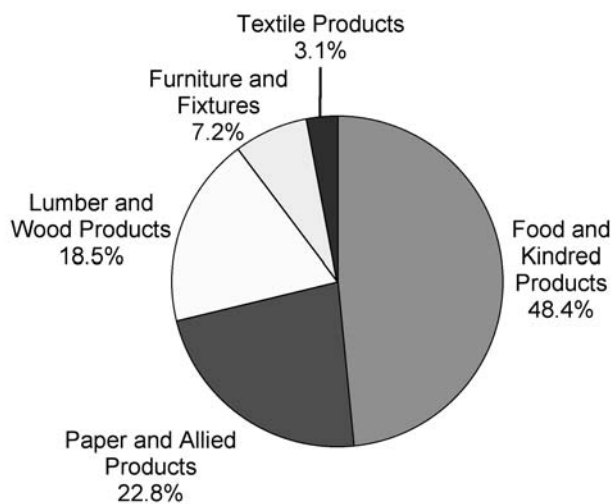
Agricultural Processing

Processed crop, livestock, forestry, and other agricultural products are an integral part of agriculture in Arkansas. Arkansas' manufacturing sector depends upon raw materials from the crop, livestock, 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. Relatively stronger markets for processed goods enabled agricultural processing's GSP to equal more than twice the GSP of agricultural production in 1999.

Agricultural processing's GSP grew 50.5 percent from 1986 to 1999, from a value of \$3.7B to \$5.6B (Fig. 6). In the late 1990s, agricultural processing lost much of the value it had gained in the late 1980s and early 1990s. During that time, the agricultural processing industry faced a declining price market. As was the case with declining crop prices, increases in demand could not match greater increases in supply of processed agricultural goods on the world market; therefore, global prices in the agricultural processing industry fell. The GSP of agricultural processing peaked in 1995 at \$6.5B before falling 10.9 percent in 1996 to \$5.8B. Agricultural processing experienced a modest decline thereafter (Fig. 6).

The contribution of individual agricultural processing industries to agricultural processing is shown in Fig. 9. Although prices for agricultural processed goods fell overall,

Fig. 9. Components of Arkansas' agricultural processing sector and percentage of GSP, 1999^a



Source: USDC, BEA Regional Accounts Data (2001).

^a Current dollars

each processing industry faced a different price environment, and certain processing industries managed to increase in value during the late 1990s. A discussion of each industry's value over time, as a percentage of GSP, follows Fig. 9.

Food and Kindred Products

The food and kindred products sector is the largest processing sector in Arkansas, accounting for 48.4 percent of agricultural processing's GSP. The GSP of the food processing sector increased 81.6 percent from 1986 to 1999 (Fig. 10). In 1995, the GSP of the food processing sector peaked at \$3.2B. The value of the food processing sector fell 15.5 percent over the next year but quickly regained stability in 1996, remaining around \$2.7B from 1996 to 1999.

Paper and Allied Products

The paper and allied products sector is consistently one of the three largest processing industries in Arkansas. In 1999, its GSP was \$1.3B, almost twice that of its 1986 GSP (Fig. 11). Despite the industry's growth, pulp and paper manufacturers in North America were strongly affected by the Asian financial crisis during the mid to late 1990s (Simard, 1999). Fig. 11 shows a substantial decline in the industry's value from 1995 to 1999, with the sharpest price decline from 1997 to 1998.

Lumber and Wood Products

The lumber and wood sector remained stable throughout the late 1980s and early 1990s. In 1995, lumber and wood's GSP began to decline, similar to that of food processing, but the GSP of lumber and wood did not stabilize (Fig. 12). From 1995 to 1999, domestic lumber production increased faster than domestic demand, which weakened lumber prices. In 1999, the lumber and wood sector's GSP was at \$1.0B constant, 7.1 percent lower than its 1986 GSP and 26.2 percent lower than its 1995 GSP. The decline of the lumber and wood sector contributed heavily to the decline of agricultural processing's GSP from 1995 to 1999 (R.E. Taylor and Associates Ltd., 2000).

Furniture and Fixtures

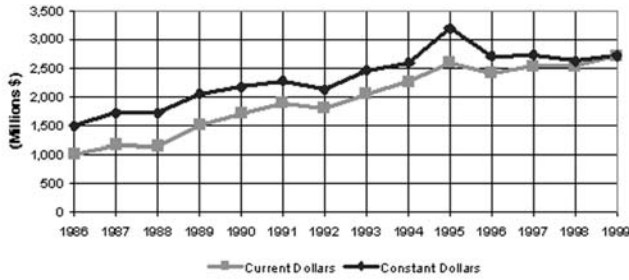
During the period in which most agricultural processing sectors experienced a decline in GSP, the furniture and fixtures sector managed to increase its GSP from \$0.3B in 1996 to \$0.4B in 1999 (Fig. 13). Furniture and fixtures benefited from a strong resale housing market throughout the 1990s. The resale housing market is a leading indicator of demand for the furniture industry (Schuler, Taylor and Araman, 2001).

Textile Mill Products

The textile sector is the fastest growing agricultural processing sector in Arkansas. While its GSP amounted to less than one percent of agricultural processing's GSP in 1999, textile's GSP in 1999 was nearly 130 percent greater than its GSP in 1986 (\$170M vs. \$75M) (Fig. 14). Several economic studies (USCC, 2002; USDA, 2001; Wall, 2000) attribute the rise in value to the North American Free Trade Agreement

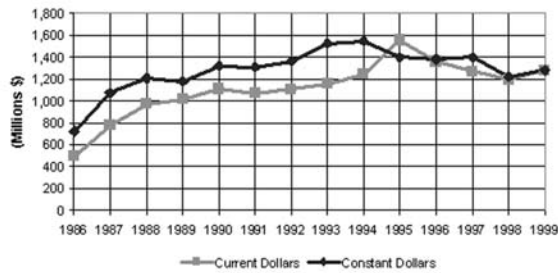
(NAFTA). Although the overall effect of NAFTA on the US economy is controversial, many studies find that NAFTA has spurred demand for U.S. textiles in Mexico and Canada. Fig. 14 suggests that the post-1994 increase in the textile sector's GSP may be a result of NAFTA's implementation in the same year.

Fig. 10. The Gross State Product of food and kindred products, 1986 – 1999



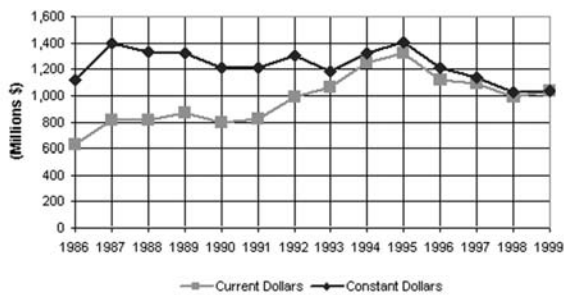
Source: Computed using USDC, BEA Regional Accounts Data (2001).

Fig. 11. The Gross State Product of paper and allied products, 1986 – 1999



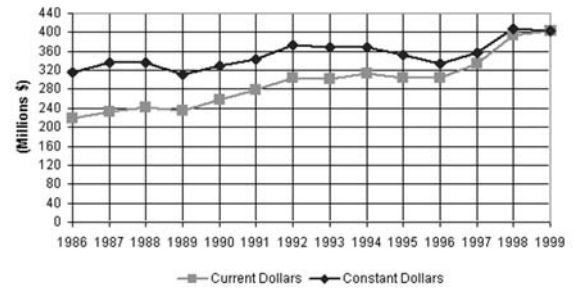
Source: Computed using USDC, BEA Regional Accounts Data (2001).

Fig. 12. The Gross State Product of lumber and wood products, 1986 – 1999



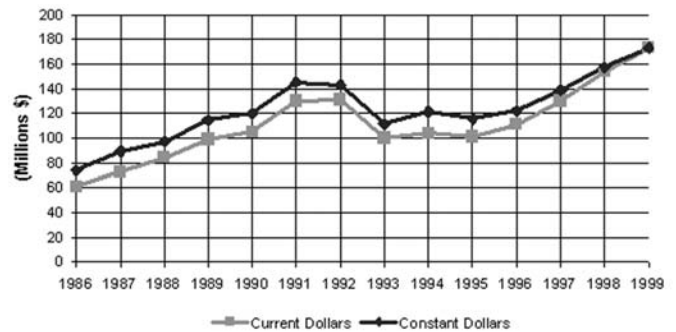
Source: Computed using USDC, BEA Regional Accounts Data (2001).

Fig. 13. The Gross State Product of furniture and fixtures, 1986 – 1999



Source: Computed using USDC, BEA Regional Accounts Data (2001).

Fig. 14. The Gross State Product of textile goods, 1986 – 1999



Source: Computed using USDC, BEA Regional Accounts Data (2001).

The Economic Impact of Agriculture in Arkansas

The economic impact of the agricultural sector in Arkansas is much more than the direct impact of agricultural production and processing. To measure agriculture's total economic impact, the indirect and induced impacts of agriculture must also be taken into consideration. Indirect impacts occur when the agricultural sector purchases goods and services from local businesses. The production of certain farm machinery and equipment, for example, is an indirect impact of agricultural production. Agriculture's induced impacts are measured by increases in economic activity to satisfy the personal consumption by employees of the agricultural sector or by employees of firms that provide inputs to the agricultural sector. The sum of direct, indirect, and induced agricultural effects provides a measure for the total economic impact of agriculture.

Methods

The economic impacts of Arkansas' agricultural sector were modeled using the Impact Analysis for Planning (or IMPLAN) System (MIG, 2000). IMPLAN is a computerized database used to construct regional economic input-output (I-O) models. The IMPLAN model uses a 528 sector input-output transactions table, based upon the Bureau of Economic Analysis' National I-O table⁶. Using methods similar to Barnett and Reinschmiedt (1996), the 528 sectors are combined in this study to form 51 aggregated sectors (noted in italics throughout this text) – 29 agricultural sectors and 22 non-agricultural sectors (see Appendix A, Table 1).

The impacts of agriculture were evaluated four ways: crop agriculture, livestock agriculture, forestry agriculture and aggregate agriculture. The agricultural sectors used to calculate the impacts in each scenario are documented in Appendix A, Table 2. Note that the impacts of the crop, livestock, and forestry scenarios do not sum up to the impacts of aggregate agriculture as certain agricultural enterprises were added to the aggregate agricultural scenario that were not included in the crop, livestock, or forestry scenarios. In some cases, results are presented as production and processing impacts. The sectors that contributed to these impacts are listed in Appendix A, Table 3. IMPLAN Arkansas data for 1999, the most recent data available, were used to calculate all impacts. Total employment, wages and added value impacts for each aggregated sector for each scenario are detailed in Appendix B and are summarized below. All wages and added value figures are reported in 1999 dollars unless otherwise noted.

The Aggregate Agricultural Sector

In 1999, the agricultural sector made large contributions to the economy in terms of employment, wages and added value. The agricultural sector provided 327,146 jobs, or 21.9 percent of state employment. That is, more than one in five

Arkansas jobs can be attributed to agriculture. In that same year, agriculture paid \$8.7B in wages or 15.3 percent of total state labor income. Additionally, the agricultural sector added \$13.6B of value to the state economy, or 22.2 percent of state added value. That is, more than \$1 out of every \$5 in added value can be attributed to agriculture. Details of these impacts are presented in Appendix B, Table 1 and are summarized in Tables 2 through 4 below.

Agriculture generates employment in all of the 51 aggregated sectors. Almost half, or 43 percent, of all agriculture-generated jobs are in five sectors. The poultry sector (Comprised of Poultry Processing and Poultry and Eggs) alone provides 52,867 jobs or 16 percent of all agriculturally generated jobs in Arkansas. Poultry Processing, part of Processed Meat/Eggs, employed 37,601 of these workers. The remainder, 15,266 workers, is employed in Poultry and Eggs.

The far-reaching impacts of agriculture are seen in the distribution of agriculture-generated added value throughout the economy. Roughly \$5.5B or 42 percent of all agriculture-generated added value accrues outside agricultural sectors (e.g., Wholesale and Retail Trade, Financial/Real Estate). Within the agricultural sectors, Processed Meats/Eggs, Paper Processing, and Wood Processing add the largest amount of value to the economy. Over 20 percent of the added value within agriculture is generated from forestry production and processing. Poultry production and processing contribute \$1.83B in value or 13.5 percent of all agriculture-generated added value in the economy.

Almost 10 percent are paid to workers in Wholesale and Retail Trade areas alone. This sector includes both agricultural and non-agricultural businesses. Twelve percent of all agriculture-generated wages are paid to workers in the Processed Meat/Eggs sectors. Nearly \$1 out of every \$5 dollars in agriculture-generated wages goes to workers in Poultry Processing and to the Poultry and Egg industries.

The agricultural sector's direct impact on the state economy is measured by the sum of the impacts of farm production and processing of farm products. There were 192,610 workers employed by the agricultural production and processing sectors in 1999. The livestock industry employed more than one out of every three (or 36 percent) of these workers (Tables 3 and 4). Crop industries employed nearly 29 percent and forestry nearly 26 percent. These workers, and owners of these farms and businesses, received over \$5B in wages. Two-thirds of these wages went to workers in processing industries. Crop, livestock and forestry industries directly added value of \$7.5B⁷ to the Arkansas economy, two thirds of which came from processing industries.

Indirect impacts result when agricultural firms purchase raw materials and services from other Arkansas businesses to produce their products. In 1999, there were 67,540 workers employed by industries supplying goods and services to the farm production and processing industries. These workers and the owners of those establishments received nearly \$2B in wages and salaries and these industries added value of over \$3B to the state economy.

Table 2. The aggregate agricultural sector's impact on Arkansas' economy, 1999

	<u>Employment^a</u>			<u>Labor income^b</u>			<u>Added value^c</u>		
	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	81,456	24.9	5.4	1,741	20.0	3.1	2,547	18.7	4.1
Processing ^f	110,704	33.8	7.4	3,419	39.3	6.0	5,268	38.6	8.6
Direct impact	192,160	58.7	12.8	5,160	59.3	9.1	7,816	57.3	12.7
Indirect effects ^g	67,540	20.6	4.5	1,992	22.9	3.5	3,194	23.4	5.2
Direct + indirect impact	259,700	79.4	17.3	7,152	82.2	12.6	11,010	80.7	17.9
Induced effects	67,446	20.6	4.5	1,549	17.8	2.7	2,626	19.3	4.3
Total impact	327,146	100.0	21.9	8,701	100.0	15.3	13,636	100.0	22.2

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value 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 Apart from the trickle-down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors are considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, N.E.C.; New Farm Structures; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

Table 3. Contribution of major agricultural sectors to agricultural production, 1999

	<u>Employment^a</u>		<u>Labor Income^b</u>		<u>Added Value^c</u>	
	(Number of jobs)	(% Ag. prod.)	(Million \$) ^d	(% Ag. prod.)	(Million \$)	(% Ag. prod.)
Crop	34,833	42.8	760	43.6	1,236	48.5
Livestock	28,889	35.5	761	43.7	963	37.8
Forestry	1,464	1.8	25	1.5	87	3.4
Other	16,270	20.0	195	11.2	261	10.2
Total	81,456	100.0	1,741	100.0	2,547	100.0

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value is the sum of employee compensation, proprietary income, and indirect business taxes.

^d Current dollars.

Table 4. Contribution of major agricultural sectors to agricultural processing, 1999

	<u>Employment</u> ^a		<u>Labor income</u> ^b		<u>Added value</u> ^c	
	(Number of jobs)	(% Ag. proc.)	(Million \$) ^d	(% Ag. proc.)	(Million \$)	(% Ag. proc.)
Crop	20,714	18.7	679	19.9	1,326	25.2
Livestock	41,125	37.1	1,054	30.8	1,304	24.7
Forestry	48,176	43.5	1,673	48.9	2,622	49.8
Other	688	0.6	13	0.4	17	0.3
Total	110,704	100.0	3,419	100.0	5,268	100.0

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value is the sum of employee compensation, proprietary income, and indirect business taxes.

^d Current dollars.

Table 5. The crop sector's impact on Arkansas' economy, 1999

	<u>Employment</u> ^a			<u>Labor income</u> ^b			<u>Added Value</u> ^c		
	Number of jobs	% Total impact	% Total Arkansas jobs	Million \$ ^d	% Total impact	% Total Arkansas labor income	Million \$	% Total impact	% Total Arkansas added value
Production ^e	34,833	34.3	2.3	760	28.8	1.3	1,236	27.2	2.0
Processing ^f	20,714	20.4	1.4	679	25.8	1.2	1,326	29.2	2.2
Direct impact	55,548	54.7	3.7	1,439	54.6	2.5	2,562	56.4	4.2
Indirect effects ^g	25,497	25.1	1.7	726	27.5	1.3	1,181	26.0	1.9
Direct + indirect impact	81,045	79.8	5.4	2,164	82.1	3.8	3,744	82.4	6.1
Induced effects	20,524	20.2	1.4	471	17.9	0.8	798	17.6	1.3
Total impact	101,569	100.0	6.8	2,635	100.0	4.6	4,542	100.0	7.4

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value 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 Apart from the trickle-down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors are considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, N.E.C.; New Farm Structures; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

Induced impacts result when employees of agricultural firms and employees of the raw material and service firms make local purchases. There were 67,446 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 over \$1.5B in wages and salaries and added value of roughly \$2.6B to the Arkansas economy.

The Crop Sector

The crop 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 3). These enterprises were responsible for 101,569 jobs, or 6.8 percent of state employment. Those workers received \$2.6B in wages, or 4.6 percent of state labor income. The crop sector added \$4.5B, or 7.4 percent of state added value. Over half of the jobs, wages and value created by the crop sector went to the Food Grains, Miscellaneous Food Processing, Hay and Pasture, Miscellaneous Services, Oil-bearing Crops, and Wholesale and Retail Trade sectors. Details of these impacts are presented in Appendix B, Table 2 and are summarized in Table 5.

The crop sector's direct impact on the economy is the sum of the impacts of production and processing of crop products. Crop production provided more than half of the direct jobs and wages; however, processing accounted for a larger share of direct added value. There were 55,548 workers. These workers and owners of these farms and businesses received over \$1.4B in wages, and these industries added value of nearly \$2.6B to the Arkansas economy.

Additional jobs, wages and value were created in supporting industries (such as Wholesale and Retail Trade, Transportation and Communication Services, Miscellaneous Services, Financial/Real Estate, and Health Services) by the crop sector. There were 46,021 additional jobs created in supporting industries. These workers and the owners of those establishments received \$1,196 million in wages and salaries and these industries added value of over \$1.8B to the state economy.

The Livestock Sector

The livestock sector includes all enterprises engaged in the production and processing of livestock, including poultry and eggs, cattle, dairy farms, hogs and pigs, other livestock, processed meat, and dairy processing industries (Appendix A, Table 3). The livestock sector accounted for 118,641 Arkansas jobs in 1999, or 7.9 percent of state employment. These workers received close to \$3B in wages, or 5.2 percent of state labor income. In 1999, the livestock sector added \$4.1B of value to the state economy, or 6.6 percent of state added value. Table 6 provides a summary of the livestock sector's total impact on Arkansas' economy. Details can be found in Appendix B, Table 3.

The livestock sector's direct impact on the state economy is measured by the sum of the impacts of both animal pro-

duction and the processing of crop products. There were 70,014 workers employed by the livestock production and processing sectors. Workers and owners of these farms and businesses received over \$1.8B in wages and these industries added value of nearly \$2.3B to the Arkansas economy. The poultry industry (comprised of Poultry and Egg and Poultry Processing industries) alone created 52,867 jobs, paid \$1.47B in wages and added \$1.83B in value to the economy. These represent 75 percent of direct livestock employment, 81 percent of direct wages and 80 percent of direct added value. Many rural communities have poultry production and processing as their primary economic engine, supporting either directly or indirectly their local infrastructures and businesses. In addition, much of the economic activity associated with cattle production is directly tied to poultry production as the majority of poultry producers also have cow/calf operations in conjunction with broiler and turkey operations. An additional 48,626 workers are employed by industries supplying goods and services to the livestock production and processing industries. These workers and the owners of those establishments received \$1.14B in wages and salaries, and these industries added value of over \$1.81B to the state economy. Most of these people are employed in Miscellaneous Service, Agricultural, Forestry and Fisheries Services, Wholesale and Retail Trade, Health Services, and Farm Inputs and Machinery sectors. Added value is generated in Financial/Real Estate, Wholesale and Retail Trade, Transportation and Communication, Health Services and Miscellaneous Services sectors.

The Forestry Sector

The forestry sector is primarily comprised of forest products, furniture and wood, and paper processing enterprises (Appendix A, Table 2). The forestry sector was responsible for 98,753 jobs in 1999, or 6.6 percent of state employment, and \$3.0B in labor income, or 5.3 percent of state labor income. In 1999, the forestry sector added \$4.8B of value to the state economy, or 7.8 percent of state added value. Within this sector, Wood Processing and Paper Processing contributed nearly half of all jobs, wages and added value. Details can be found in Appendix B, Table 4. These impacts are summarized in Table 7.

The forestry sector's direct impact on the state economy is measured by the sum of the impacts of timber production and processing. There were 49,640 workers employed by the forestry production and processing sectors. Workers on and owners of these farms and businesses received nearly \$1.7B in wages and these industries added value of nearly \$2.7B to the Arkansas economy. The Wood Processing and Paper Processing sectors provide 39,551 jobs, paid \$1.44B wages, and added \$2.32B in value. This represents nearly 80 percent of direct employment, 85 percent of direct wages, and 86 percent of direct added value.

In 1999, there were 49,113 workers employed by industries supplying goods and services to the forestry production and processing industries. These workers and the owners of

Table 6. The livestock sector's impact on Arkansas' economy, 1999

	Employment ^a		Labor income ^b			Added value ^c			
	Number of jobs	% Total impact	% Total Arkansas employment	Million \$ ^d	% Total impact	% Total Arkansas labor income	Million \$	% Total impact	% Total Arkansas added value
Production ^e	28,889	24.4	1.9	761	25.8	1.3	963	23.6	1.6
Processing ^f	41,125	34.7	2.7	1,054	35.7	1.9	1,304	31.9	2.1
Direct impact	70,014	59.0	4.7	1,815	61.5	3.2	2,266	55.5	3.7
Indirect effects ^g	25,636	21.6	1.7	609	20.6	1.1	921	22.6	1.5
Direct + indirect impact	95,650	80.6	6.4	2,423	82.1	4.3	3,187	78.1	5.2
Induced effects	22,990	19.4	1.5	527	17.9	0.9	894	21.9	1.5
Total impact	118,641	100.0	7.9	2,950	100.0	5.2	4,081	100.0	6.6

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value 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 Apart from the trickle-down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors are considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, N.E.C.; New Farm Structures; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

Table 7. The forestry sector's impact on Arkansas' economy, 1999

	Employment ^a		Labor income ^b			Added value ^c			
	Number of jobs	% Total impact	Million \$ ^d	% Total impact	% Total Arkansas labor income	Million \$	% Total impact	% Total Arkansas added value	
Production ^e	1,464	1.5	25	0.8	0.0	87	1.8	0.1	
Processing ^f	48,176	48.8	1,673	56.1	2.9	2,622	54.6	4.3	
Direct impact	49,640	50.3	1,698	56.9	3.0	2,709	56.4	4.4	
Indirect effects ^g	25,895	26.2	752	25.2	1.3	1,193	24.8	1.9	
Direct + indirect impact	75,535	76.5	2,450	82.2	4.3	3,902	81.2	6.3	
Induced effects	23,218	23.5	532	17.8	0.9	902	18.8	1.5	
Total impact	98,753	100.0	2,982	100.0	5.3	4,805	100.0	7.8	

Source: Computed using the 1999 Arkansas database from MIG (2002).

^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 Added value 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 Apart from the trickle-down indirect agricultural activity that is a portion of the indirect impact of agriculture, 100 percent of the following IMPLAN sectors are considered indirect agricultural activity: Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, N.E.C.; New Farm Structures; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; and Food Products Machinery.

those establishments received \$1.28B in wages and salaries, and these industries added value of nearly \$2.1B to the state economy. Over 70 percent of the jobs, 90 percent of wages, and 73 percent of added value went to the Wholesale and Retail Trade, Transportation and Communication Services, Miscellaneous Services, Health Services, and Financial/Real Estate sectors.

Summary

Data from the Bureau of Economic Affairs indicate that Arkansas' agricultural sector is more important to the state's economy than it is to other states' economies in the southeastern U.S. According to 1999 IMPLAN data and subsequent analyses, just over one dollar in five of the total state added value and one job in five can be attributed to agriculture and its indirect and induced impacts. About one in seven dollars of wage income can be attributed to agriculture as well.

After a period of rapid growth in the 1980s, the GSP attributable to agriculture in Arkansas stabilized at around \$8B in the mid 1990s. This phenomenon is primarily due to price pressures for agricultural commodities and an oversup-

ply of processed agricultural goods relative to demand. In addition, growth in other economic sectors has occurred such that the overall importance of agriculture has leveled off relative to the total state economy. Contrariwise, the size of Arkansas' agricultural processing industry results in a relative vulnerability to the price swings of processed agricultural goods. These swings are precipitated not only by world market supply and demand, but also by world political dynamics and subsequent food and agricultural policies that impact trade.

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. Careful attention must be paid to price trends and policies to allow Arkansas to maintain a vibrant and stable agricultural industry. 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 Throughout this report, all numerical references to agricultural trends are calculated using constant dollars. The use of constant dollars factors in the effects of inflation and other economic fluctuations on price and allows for a value comparison over time. Constant dollars are derived from the Bureau of Economic Analysis' (BEA's) 1996 chained-dollar series, adjusted to a base year of 1999. The BEA uses industry-specific deflators to adjust current dollars to constant dollars.
- ² GSP is equivalent to added value, 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). GSP is also equivalent to gross output minus the cost of intermediate output.
- ³ The BEA includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia in the southeast region.
- ⁴ GDP is the national equivalent to GSP.
- ⁵ Spotty information (selected years) is available for most of the Other Production components. But this information is insufficient to accurately gauge the level of these activities in Arkansas or to compare the value of these activities over time.
- ⁶ Agricultural sectors in IMPLAN may represent one or more production/processing enterprises. For example, cotton production in IMPLAN is the sole enterprise captured in an IMPLAN sector called "Cotton." Rice, however, is captured with wheat in an IMPLAN sector called "Food Grains." The structure of the IMPLAN model makes it very difficult to separate the contributions of grouped enterprises, such as wheat and cotton. Therefore their contributions are reported together in various tables in Appendix B.
- ⁷ This figure, \$7.5B, differs from that reported by BEA on page X. This is to be expected as BEA and IMPLAN define "agriculture" differently.

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Appendix A

Description of IMPLAN Sectors and Aggregation Schemes

Table 1. Major components of the agricultural sector as defined by BEA industries.

Aggregated sector	BEA industry
AGRICULTURAL PRODUCTION	Agriculture, Forestry, and Fisheries
AGRICULTURAL PROCESSING	Lumber and Wood; Furniture and Fixtures; Food and Kindred Products; Tobacco Products; Textile Mill Products; Paper Products

Table 2. Major components of agricultural production as defined by IMPLAN sectors.

Aggregated sector	IMPLAN sector
CROP PRODUCTION	Cotton; Food Grains; Feed Grains; Hay and Pasture; Grass Seeds; Tobacco; Fruits; Tree Nuts; Vegetables; Sugar Crops; Miscellaneous Crops; Oil Bearing Crops
LIVESTOCK PRODUCTION	Dairy Farm Products; Poultry and Eggs; Ranch Fed Cattle; Range Fed Cattle; Cattle Feedlots; Sheep, Lambs, and Goats; Hogs, Pigs, and Swine; Other Meat Animal Products; Miscellaneous Livestock
FORESTRY PRODUCTION	Forest Products; Forestry Products
OTHER PRODUCTION	Greenhouse and Nursery Products; Commercial Fishing; Aquaculture; Agricultural, Forestry, and Fishery Services; Landscape and Horticultural Services

Table 3. Major components of agricultural processing as defined by IMPLAN sectors.

Aggregated sector	IMPLAN sector
CROP PROCESSING	Canned Specialties; Canned Fruits and Vegetables; Dehydrated Food Products; Pickles, Sauces, and Salad Dressings; Frozen Fruits, Juices, and Vegetables; Frozen Specialties; Flour and Other Grain Mill Products; Cereal Preparations; Rice Milling; Blended and Prepared Flour; Wet Corn Milling; Prepared Feeds, N.E.C.; Bread, Cake, and Related Products; Cookies and Crackers; Sugar; Confectionary Products; Chocolate and Cocoa Products; Chewing Gum; Salted and Roasted Nuts and Seeds; Cottonseed Oil Mills; Soybean Oil Mills; Vegetable Oil Mills, N.E.C.; Shortening and Cooking Oils; Malt Beverages; Malt; Wines, Brandy, and Brandy Spirits; Distilled Liquor, Except Brandy; Bottled and Canned Soft Drinks and Water; Flavoring Extracts and Syrups, N.E.C.; Roasted Coffee; Potato Chips and Similar Snacks; Macaroni and Spaghetti; Food Preparations, N.E.C.; Broadwoven Fabric Mills and Finishing; Narrow Fabric Mills; Women's Hosiery, Except Socks; Hosiery, N.E.C.; Knit Outerwear Mills; Knit Underwear Mills; Knit Fabric Mills; Knitting Mills, N.E.C.; Yarn Mills and Finishing of Textiles, N.E.C.; Carpets and Rugs; Thread Mills; Coated Fabrics, Not Rubberized; Tire Cord and Fabric; Nonwoven Fabrics; Cordage and Twine; Textile Goods, N.E.C.
LIVESTOCK PROCESSING	Meat Packing Plants; Sausages and Other Prepared Meats; Poultry Processing; Creamery Butter; Cheese, Natural and Processed; Condensed and Evaporated Milk; Ice Cream and Frozen Desserts; Fluid Milk; Dog, Cat, and Other Pet Food; Animal and Marine Fats and Oils
FORESTRY PROCESSING	Logging Camps and Logging Contractors; Sawmills and Planing Mills, General; Hardwood Dimension and Flooring Mills; Special Product Sawmills, N.E.C.; Millwork; Wood Kitchen Cabinets; Veneer and Plywood; Structural Wood Members, N.E.C.; Wood Containers; Wood Pallets and Skids; Mobile Homes; Prefabricated Wood Buildings; Wood Preserving; Reconstituted Wood Products; Wood Products, N.E.C.; Wood Household Furniture; Upholstered Household Furniture; Wood TV and Radio Cabinets; Household Furniture, N.E.C.; Wood Office Furniture; Public Building Furniture; Wood Partitions and Fixtures; Blinds, Shades, and Drapery Hardware; Furniture and Fixtures, N.E.C.; Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; Paperboard Containers and Boxes; Paper Coated and Laminated Packaging; Paper Coated and Laminated, N.E.C.; Bags, Paper; Die-cut Paper and Board; Sanitary Paper Products; Envelopes; Stationery Products; Converted Paper Products, N.E.C.
OTHER PROCESSING	Canned and Cured Sea Foods; Prepared Fresh or Frozen Fish or Seafood; Manufactured Ice

Table 4. Major components of the agricultural sector as defined by IMPLAN sectors¹.

Aggregated sector	IMPLAN sector
AGRICULTURAL/FORESTRY/ FISHERY SERVICES (Other)	Agricultural, Forestry, Fishery Services; Commercial Fishing; Canned and Cured Sea Foods; Prepared Fresh or Frozen Fish or Seafood
FARM INPUTS AND MACHINERY (Other)	Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, Not Elsewhere Classified ("N.E.C."); New Farm Structures; Manufactured Ice; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; Food Products Machinery
DAIRY FARM PRODUCTS (Livestock)	Dairy Farm Products
POULTRY AND EGGS (Livestock)	Poultry and Eggs
CATTLE (Livestock)	Ranch-Fed Cattle; Range-Fed Cattle; Cattle Feedlots
OTHER LIVESTOCK (Livestock)	Sheep, Lambs, and Goats; Other Meat Animal Products; Miscellaneous Livestock
HOGS, PIGS, AND SWINE (Livestock)	Hogs, Pigs, and Swine
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Food Grains
FEED GRAINS (Crop)	Feed Grains; Prepared Feeds, N.E.C.
HAY AND PASTURE (Crop)	Hay and Pasture
FRUITS (Crop)	Fruits
VEGETABLES (Crop)	Vegetables
TREE NUTS (Crop)	Tree Nuts
OTHER CROPS (Crop)	Tobacco; Sugar Crops; Miscellaneous Crops
OIL BEARING CROPS (Crop)	Oil Bearing Crops
HORTICULTURE/NURSERY (Crop)	Grass Seeds; Greenhouse and Nursery Products
LANDSCAPE AND HORTICULTURAL SERVICES (Other)	Landscape and Horticultural Services
FOREST PRODUCTS (Forestry)	Forest Products; Forestry Products
PROCESSED MEAT/EGGS (Livestock)	Meat Packing Plants; Sausages and Other Prepared Meats; Poultry Processing; Dog, Cat, and Other Pet Food; Animal and Marine Fats and Oils

Table 4. Continued...

Aggregated sector	IMPLAN sector
DAIRY PROCESSING (Livestock)	Creamery Butter; Cheese, Natural and Processed; Condensed and Evaporated Milk; Ice Cream and Frozen Desserts; Fluid Milk
MISCELLANEOUS FOOD PROCESSING (Crop)	Canned Specialties; Canned Fruits and Vegetables; Dehydrated Food Products; Pickles, Sauces, and Salad Dressings; Frozen Fruits, Juices, and Vegetables; Frozen Specialties; Bread, Cake, and Related Products; Cookies and Crackers; Sugar; Confectionary Products; Chocolate and Cocoa Products; Chewing Gum; Salted and Roasted Nuts and Seeds; Roasted Coffee; Potato Chips and Similar Snacks; Macaroni and Spaghetti; Food Preparations, N.E.C.; Cigarettes; Cigars; Chewing and Smoking Tobacco; Tobacco Stemming and Redrying
GRAIN/FLOUR MILLING (Crop)	Flour and Other Grain Mill Products; Cereal Preparations; Rice Milling; Blended and Prepared Flour; Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Cottonseed Oil Mills; Soybean Oil Mills; Vegetable Oil Mills, N.E.C.; Shortening and Cooking Oils
SOFT DRINKS AND LIQUOR (Crop)	Malt Beverages; Malt; Wines, Brandy, and Brandy Spirits; Distilled Liquor, Except Brandy; Bottled and Canned Soft Drinks and Water; Flavoring Extracts and Syrups, N.E.C.
FABRIC MILLS (Crop)	Broadwoven Fabric Mills and Finishing; Narrow Fabric Mills; Women's Hosiery, Except Socks; Hosiery, N.E.C.; Knit Outerwear Mills; Knit Underwear Mills; Knit Fabric Mills; Knitting Mills, N.E.C.; Yarn Mills and Finishing of Textiles, N.E.C.; Carpets and Rugs; Thread Mills; Coated Fabrics, Not Rubberized; Tire Cord and Fabric; Nonwoven Fabrics; Cordage and Twine; Textile Goods, N.E.C.
WOOD PROCESSING (Forestry)	Logging Camps and Logging Contractors; Sawmills and Planing Mills, General; Hardwood Dimension and Flooring Mills; Special Product Sawmills, N.E.C.; Millwork; Veneer and Plywood; Structural Wood Members, N.E.C.; Wood Containers; Wood Pallets and Skids; Mobile Homes; Prefabricated Wood Buildings; Wood Preserving; Reconstituted Wood Products; Wood Products, N.E.C.
PAPER PROCESSING (Forestry)	Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; Paperboard Containers and Boxes; Paper Coated and Laminated Packaging; Paper Coated and Laminated, N.E.C.; Bags, Paper; Die-cut Paper and Board; Sanitary Paper Products; Envelopes; Stationery Products; Converted Paper Products, N.E.C.
FURNITURE (Forestry)	Wood Kitchen Cabinets; Wood Household Furniture; Upholstered Household Furniture; Wood TV and Radio Cabinets; Household Furniture, N.E.C.; Wood Office Furniture; Public Building Furniture; Wood Partitions and Fixtures; Blinds, Shades, and Drapery Hardware; Furniture and Fixtures, N.E.C.

¹This aggregation scheme is based upon a similar scheme used in Barnett and Reinschmiedt (1996) with input-output analysis of agriculture in the Mississippi economy. The placement of certain individual sectors has been modified to allow for each of the major categories to be designated as either crop, livestock, forestry, or other. In addition, the Fabric Mills and Leather category in the Barnett and Reinschmiedt (1996) study has been divided into two categories to separate out leather processing from the agricultural sector based upon the belief that there is a weak relationship between the production of livestock in Arkansas and the production of leather goods in Arkansas (Miller, 2002).

Table 5. Aggregation scheme for an IMPLAN input-output analysis of the agricultural sector's impact on the Arkansas economy, 1999.

Aggregated sector	IMPLAN sector
AGRICULTURAL/FORESTRY/ FISHERY SERVICES	Agricultural, Forestry, Fishery Services; Commercial Fishing; Canned (Other)and Cured Sea Foods; Prepared Fresh or Frozen Fish or Seafood
FARM INPUTS AND MACHINERY (Other)	Potash, Soda, and Borate Minerals; Phosphate Rock; Chemical, Fertilizer Mineral Mining, Not Elsewhere Classified ("N.E.C."); New Farm Structures; Manufactured Ice; Nitrogenous and Phosphatic Fertilizers; Fertilizers, Mixing Only; Agricultural Chemicals, N.E.C.; Farm Machinery and Equipment; Food Products Machinery
DAIRY FARM PRODUCTS (Livestock)	Dairy Farm Products
POULTRY AND EGGS (Livestock)	Poultry and Eggs
CATTLE (Livestock)	Ranch-Fed Cattle; Range-Fed Cattle; Cattle Feedlots
OTHER LIVESTOCK (Livestock)	Sheep, Lambs, and Goats; Other Meat Animal Products; Miscellaneous Livestock
HOGS, PIGS, AND SWINE (Livestock)	Hogs, Pigs, and Swine
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Food Grains
FEED GRAINS (Crop)	Feed Grains; Prepared Feeds, N.E.C.
HAY AND PASTURE (Crop)	Hay and Pasture
FRUITS (Crop)	Fruits
VEGETABLES (Crop)	Vegetables
TREE NUTS (Crop)	Tree Nuts
OTHER CROPS (Crop)	Tobacco; Sugar Crops; Miscellaneous Crops
OIL BEARING CROPS (Crop)	Oil Bearing Crops
HORTICULTURE/NURSERY (Crop)	Grass Seeds; Greenhouse and Nursery Products
LANDSCAPE AND HORTICULTURAL SERVICES (Other)	Landscape and Horticultural Services
FOREST PRODUCTS (Forestry)	Forest Products; Forestry Products
PROCESSED MEAT/EGGS (Livestock)	Meat Packing Plants; Sausages and Other Prepared Meats; Poultry Processing; Dog, Cat, and Other Pet Food; Animal and Marine Fats and Oils
DAIRY PROCESSING (Livestock)	Creamery Butter; Cheese, Natural and Processed; Condensed and Evaporated Milk; Ice Cream and Frozen Desserts; Fluid Milk

Table 5. Continued...

Aggregated sector	IMPLAN sector
MISCELLANEOUS FOOD PROCESSING (Crop)	Canned Specialties; Canned Fruits and Vegetables; Dehydrated Food Products; Pickles, Sauces, and Salad Dressings; Frozen Fruits, Juices, and Vegetables; Frozen Specialties; Bread, Cake, and Related Products; Cookies and Crackers; Sugar; Confectionary Products; Chocolate and Cocoa Products; Chewing Gum; Salted and Roasted Nuts and Seeds; Roasted Coffee; Potato Chips and Similar Snacks; Macaroni and Spaghetti; Food Preparations, N.E.C.; Cigarettes; Cigars; Chewing and Smoking Tobacco; Tobacco Stemming and Redrying
GRAIN/FLOUR MILLING (Crop)	Flour and Other Grain Mill Products; Cereal Preparations; Rice Milling; Blended and Prepared Flour; Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Cottonseed Oil Mills; Soybean Oil Mills; Vegetable Oil Mills, N.E.C.; Shortening and Cooking Oils
SOFT DRINKS AND LIQUOR (Crop)	Malt Beverages; Malt; Wines, Brandy, and Brandy Spirits; Distilled Liquor, Except Brandy; Bottled and Canned Soft Drinks and Water; Flavoring Extracts and Syrups, N.E.C.
FABRIC MILLS (Crop)	Broadwoven Fabric Mills and Finishing; Narrow Fabric Mills; Women's Hosiery, Except Socks; Hosiery, N.E.C.; Knit Outerwear Mills; Knit Underwear Mills; Knit Fabric Mills; Knitting Mills, N.E.C.; Yarn Mills and Finishing of Textiles, N.E.C.; Carpets and Rugs; Thread Mills; Coated Fabrics, Not Rubberized; Tire Cord and Fabric; Nonwoven Fabrics; Cordage and Twine; Textile Goods, N.E.C.
WOOD PROCESSING (Forestry)	Logging Camps and Logging Contractors; Sawmills and Planing Mills, General; Hardwood Dimension and Flooring Mills; Special Product Sawmills, N.E.C.; Millwork; Veneer and Plywood; Structural Wood Members, N.E.C.; Wood Containers; Wood Pallets and Skids; Mobile Homes; Prefabricated Wood Buildings; Wood Preserving; Reconstituted Wood Products; Wood Products, N.E.C.
PAPER PROCESSING (Forestry)	Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; Paperboard Containers and Boxes; Paper Coated and Laminated Packaging; Paper Coated and Laminated, N.E.C.; Bags, Paper; Die-cut Paper and Board; Sanitary Paper Products; Envelopes; Stationery Products; Converted Paper Products, N.E.C.
FURNITURE (Forestry)	Wood Kitchen Cabinets; Wood Household Furniture; Upholstered Household Furniture; Wood TV and Radio Cabinets; Household Furniture, N.E.C.; Wood Office Furniture; Public Building Furniture; Wood Partitions and Fixtures; Blinds, Shades, and Drapery Hardware; Furniture and Fixtures, N.E.C.
LEATHER	Leather Tanning and Finishing; Leather Gloves and Mittens; Personal Leather Goods; Leather Goods, N.E.C.
FOOD STORES	Food Stores
EATING AND DRINKING	Eating and Drinking
MINING	Iron Ores; Copper Ores; Lead and Zinc Ores; Gold Ores; Silver Ores; Ferroalloy Ores, Except Vanadium; Metal Mining Services; Uranium-Radium-Vanadium Ores; Metal Ores, N.E.C.; Coal Mining; Natural Gas and Crude Petroleum; Natural Gas Liquids; Dimension Stone; Sand and Gravel; Clay, Ceramic, and Refractory Minerals; Nonmetallic Minerals (Except Fuels) Service; Nonmetallic Minerals, N.E.C.

Table 5. Continued...

Aggregated sector	IMPLAN sector
CONSTRUCTION	New Residential Structures; New Industrial and Commercial Buildings; New Utility Structures; New Highways and Streets; New Mineral Extraction Facilities; New Government Facilities; Maintenance and Repair, Residences; Maintenance and Repair, Other Facilities; Maintenance and Repair, Oil and Gas Wells
PETROLEUM AND CHEMICALS	Alkalies and Chlorine; Industrial Gases; Inorganic Pigments; Inorganic Chemicals, N.E.C.; Cyclic Crudes, Interm. and Indus. Organic Chemicals; Plastic Materials and Resins; Synthetic Rubber; Cellulosic Man-made Fibers; Organic Fibers, Noncellulosic; Drugs; Soap and Other Detergents; Polishes and Sanitation Goods; Surface Active Agents; Toilet Preparations; Paints and Allied Products; Gum and Wood Chemicals; Adhesives and Sealants; Explosives; Printing Ink; Carbon Black; Chemical Preparations, N.E.C.; Petroleum Refining; Paving Mixtures and Blocks; Asphalt Felts and Coatings; Lubricating Oils and Greases; Petroleum and Coal Products, N.E.C.; Tires and Inner Tubes; Rubber and Plastics Footwear; Rubber and Plastics Hose and Belting; Gaskets, Packing and Sealing; Fabricated Rubber Products, N.E.C.; Miscellaneous Plastics Products; Bags, Plastic
METAL INDUSTRIES	Blast Furnaces and Steel Mills; Electrometallurgical Products; Steel Wire and Related Products; Cold Finishing of Steel Shapes; Steel Pipe and Tubes; Iron and Steel Foundries; Primary Copper; Primary Aluminum; Primary Nonferrous Metals, N.E.C; Secondary Nonferrous Metals; Copper Rolling and Drawing; Aluminum Rolling and Drawing; Nonferrous Rolling and Drawing, N.E.C.; Nonferrous Wire Drawing and Insulating; Aluminum Foundries; Brass, Bronze, and Copper Foundries; Nonferrous Castings, N.E.C.; Metal Heat Treating; Primary Metal Products, N.E.C.; Metal Cans; Metal Barrels, Drums and Pails; Cutlery; Hand and Edge Tools, N.E.C.; Hand Saws and Saw Blades; Hardware, N.E.C.; Metal Sanitary Ware; Plumbing Fixture Fittings and Trim; Heating Equipment, Except Electric; Fabricated Structural Metal; Metal Doors, Sash, and Trim; Fabricated Plate Work (Boiler Shops); Sheet Metal Work; Architectural Metal Work; Prefabricated Metal Buildings; Miscellaneous Metal Work; Screw Machine Products and Bolts, Etc.; Iron and Steel Forgings; Nonferrous Forgings; Automotive Stampings; Crowns and Closures; Metal Stampings, N.E.C.; Plating and Polishing; Metal Coating and Allied Services; Small Arms Ammunition; Ammunition, Except For Small Arms, N.E.C.; Small Arms; Other Ordnance and Accessories; Industrial and Fluid Valves; Steel Springs, Except Wire; Pipe, Valves, and Pipe Fittings; Miscellaneous Fabricated Wire Products; Metal Foil and Leaf; Fabricated Metal Products, N.E.C.
GLASS, STONE, AND CLAY	Glass and Glass Products, Except Containers; Glass Containers; Cement, Hydraulic; Brick and Structural Clay Tile; Ceramic Wall and Floor Tile; Clay Refractories; Structural Clay Products, N.E.C.; Vitreous Plumbing Fixtures; Vitreous China Food Utensils; Fine Earthenware Food Utensils; Porcelain Electrical Supplies; Pottery Products, N.E.C.; Concrete Block and Brick; Concrete Products, N.E.C.; Ready Mixed Concrete; Lime; Gypsum Products; Cut Stone and Stone Products; Abrasive Products; Asbestos Products; Minerals, Ground or Treated; Mineral Wool; Nonclay Refractories; Nonmetallic Mineral Products, N.E.C.

Table 5. Continued...

Aggregated sector	IMPLAN sector
MACHINERY AND EQUIPMENT	Steam Engines and Turbines; Internal Combustion Engines, N.E.C.; Lawn and Garden Equipment; Construction Machinery and Equipment; Mining Machinery, Except Oil Field; Oil Field Machinery; Elevators and Moving Stairways; Conveyors and Conveying Equipment; Hoists, Cranes, and Monorails; Machine Tools, Metal Cutting Types; Machine Tools, Metal Forming Types; Industrial Patterns; Special Dies and Tools and Accessories; Power Driven Hand Tools; Rolling Mill Machinery; Welding Apparatus; Metalworking Machinery, N.E.C.; Textile Machinery; Woodworking Machinery; Paper Industries Machinery; Printing Trades Machinery; Special Industry Machinery N.E.C.; Pumps and Compressors; Ball and Roller Bearings; Blowers and Fans; Packaging Machinery; Power Transmission Equipment; Industrial Furnaces and Ovens; General Industrial Machinery, N.E.C.; Commercial Laundry Equipment; Refrigeration and Heating Equipment; Measuring and Dispensing Pumps; Service Industry Machines, N.E.C.; Carburetors, Pistons, Rings, Valves; Fluid Power Cylinders & Actuators; Fluid Power Pumps & Motors; Scales and Balances; Industrial Machines N.E.C.; Transformers; Switchgear and Switchboard Apparatus; Motors and Generators; Carbon and Graphite Products; Relays & Industrial Controls; Electrical Industrial Apparatus, N.E.C.; Household Cooking Equipment; Household Refrigerators and Freezers; Household Laundry Equipment; Electric Housewares and Fans; Household Vacuum Cleaners; Household Appliances, N.E.C.; Electric Lamps; Wiring Devices; Lighting Fixtures and Equipment; Storage Batteries; Primary Batteries, Dry and Wet; Engine Electrical Equipment; Magnetic & Optical Recording Media; Electrical Equipment, N.E.C.
TRANSPORTATION AND COMMUNICATION SERVICES	Railroads and Related Services; Local, Interurban Passenger Transit; Motor Freight Transport and Warehousing; Water Transportation; Air Transportation; Pipe Lines, Except Natural Gas; Arrangement of Passenger Transportation; Transportation Services; Communications, Except Radio and TV; Radio and TV Broadcasting
TECHNOLOGY INDUSTRIES	Electronic Computers; Computer Storage Devices; Computer Terminals; Computer Peripheral Equipment; Calculating and Accounting Machines; Typewriters and Office Machines N.E.C.; Automatic Merchandising Machines; Radio and TV Receiving Sets; Phonograph Records and Tape; Telephone and Telegraph Apparatus; Radio and TV Communication Equipment; Communications Equipment N.E.C.; Electron Tubes; Printed Circuit Boards; Semiconductors and Related Devices; Electronic Components, N.E.C.; Complete Guided Missiles; Tanks and Tank Components; Search & Navigation Equipment; Laboratory Apparatus & Furniture; Automatic Temperature Controls; Mechanical Measuring Devices; Instruments to Measure Electricity; Analytical Instruments; Optical Instruments & Lenses; Surgical and Medical Instruments; Surgical Appliances and Supplies; Dental Equipment and Supplies; X-Ray Apparatus; Electromedical Apparatus; Ophthalmic Goods; Photographic Equipment and Supplies
TRANSPORTATION EQUIPMENT	Industrial Trucks and Tractors; Motor Vehicles; Truck and Bus Bodies; Motor Vehicle Parts and Accessories; Truck Trailers; Motor Homes; Aircraft; Aircraft and Missile Engines and Parts; Aircraft and Missile Equipment; Ship Building and Repairing; Boat Building and Repairing; Railroad Equipment; Motorcycles, Bicycles, and Parts; Travel Trailers and Camper; Transportation Equipment, N.E.C.

Table 5. Continued...

Aggregated sector	IMPLAN sector
MISCELLANEOUS MANUFACTURING	Apparel Made from Purchased Materials; Curtains and Draperies; House furnishings, N.E.C; Textile Bags; Canvas Products; Pleating and Stitching; Automotive and Apparel Trimmings; Schiffi Machine Embroideries; Fabricated Textile Products, N.E.C.; Metal Household Furniture; Mattresses and Bedsprings; Metal Office Furniture; Metal Partitions and Fixtures; Newspapers; Periodicals; Book Publishing; Book Printing; Miscellaneous Publishing; Commercial Printing; Manifold Business Forms; Greeting Card Publishing; Blankbooks and Looseleaf Binder; Bookbinding & Related; Typesetting; Plate Making; Footwear Cut Stock; House Slippers; Shoes, Except Rubber; Luggage; Women's Handbags and Purses; Watches, Clocks, and Parts; Jewelry, Precious Metal; Silverware and Plated Ware; Jewelers Materials and Lapidary Work; Musical Instruments; Dolls; Games, Toys, and Children's Vehicles; Sporting and Athletic Goods, N.E.C.; Pens and Mechanical Pencils; Lead Pencils and Art Goods; Marking Devices; Carbon Paper and Inked Ribbons; Costume Jewelry; Fasteners, Buttons, Needles, and Pins; Brooms and Brushes; Signs and Advertising Displays; Burial Caskets and Vaults; Hard Surface Floor Coverings; Manufacturing Industries, N.E.C.
UTILITY SERVICES	Electric Services; Gas Production and Distribution; Water Supply and Sewerage Systems; Sanitary Services and Steam Supply
WHOLESALE AND RETAIL TRADE	Wholesale Trade; Building Materials & Gardening; General Merchandise Stores; Automotive Dealers & Service Stations; Apparel & Accessory Stores; Furniture & Home Furnishings Stores; Miscellaneous Retail
FINANCIAL/REAL ESTATE	Banking; Credit Agencies; Security and Commodity Brokers; Insurance Carriers; Insurance Agents and Brokers; Owner-occupied Dwellings; Real Estate
MISCELLANEOUS SERVICES	Hotels and Lodging Places; Laundry, Cleaning and Shoe Repair; Portrait and Photographic Studios; Beauty and Barber Shops; Funeral Service and Crematories; Miscellaneous Personal Services; Advertising; Other Business Services; Photofinishing, Commercial Photography; Services To Buildings; Equipment Rental and Leasing; Personnel Supply Services; Computer and Data Processing Services; Detective and Protective Services; Automobile Rental and Leasing; Automobile Parking and Car Wash; Automobile Repair and Services; Electrical Repair Service; Watch, Clock, Jewelry and Furniture Repair; Miscellaneous Repair Shops; Legal Services; Child Day Care Services; Social Services, N.E.C.; Residential Care; Other Nonprofit Organizations; Business Associations; Labor and Civic Organizations; Religious Organizations; Engineering, Architectural Services; Accounting, Auditing, and Bookkeeping; Management and Consulting Services; Research, Development, and Testing Services; Domestic Services
RECREATION AND AMUSEMENT	Motion Pictures; Theatrical Producers, Bands Etc.; Bowling Alleys and Pool Halls; Commercial Sports, Except Racing; Racing and Track Operation; Amusement and Recreation Services, N.E.C.; Membership Sports and Recreation Clubs
HEALTH SERVICES	Doctors and Dentists; Nursing and Protective Care; Hospitals; Other Medical and Health Services

Table 5. Continued...

Aggregated sector	IMPLAN sector
EDUCATION	Elementary and Secondary Schools; Colleges, Universities, and Schools; Other Educational Services; Job Trainings and Related Services; State & Local Government – Education
GOVERNMENT	Local Government Passenger Transit; State and Local Electric Utilities; Other State and Local Government Enterprises; U.S. Postal Service; Federal Electric Utilities; Other Federal Government Enterprises; Federal Government - Military; Federal Government - Non-Military; Commodity Credit Corporation; State & Local Government - Non-Education
BALANCE	Noncomparable Imports; Scrap; Used and Secondhand Goods; Rest of the World Industry; Inventory Valuation Adjustment

Table 6. Major components of the crop sector as defined by IMPLAN sectors.

Aggregated sector	IMPLAN sector
COTTON (Crop)	Cotton
FOOD GRAINS (Crop)	Food Grains
FEED GRAINS (Crop)	Feed Grains; Prepared Feeds, N.E.C.
HAY AND PASTURE (Crop)	Hay and Pasture
FRUITS (Crop)	Fruits
VEGETABLES (Crop)	Vegetables
TREE NUTS (Crop)	Tree Nuts
OTHER CROPS (Crop)	Tobacco; Sugar Crops; Miscellaneous Crops
OIL BEARING CROPS (Crop)	Oil Bearing Crops
HORTICULTURE/NURSERY (Crop)	Grass Seeds; Greenhouse and Nursery Products
MISCELLANEOUS FOOD PROCESSING (Crop)	Canned Specialties; Canned Fruits and Vegetables; Dehydrated Food Products; Pickles, Sauces, and Salad Dressings; Frozen Fruits, Juices, and Vegetables; Frozen Specialties; Bread, Cake, and Related Products; Cookies and Crackers; Sugar; Confectionary Products; Chocolate and Cocoa Products; Chewing Gum; Salted and Roasted Nuts and Seeds; Roasted Coffee; Potato Chips and Similar Snacks; Macaroni and Spaghetti; Food Preparations, N.E.C.; Cigarettes; Cigars; Chewing and Smoking Tobacco; Tobacco Stemming and Redrying
GRAIN/FLOUR MILLING (Crop)	Flour and Other Grain Mill Products; Cereal Preparations; Rice Milling; Blended and Prepared Flour; Wet Corn Milling
FATS AND OILS PROCESSING (Crop)	Cottonseed Oil Mills; Soybean Oil Mills; Vegetable Oil Mills, N.E.C.; Shortening and Cooking Oils
SOFT DRINKS AND LIQUOR (Crop)	Malt Beverages; Malt; Wines, Brandy, and Brandy Spirits; Distilled Liquor, Except Brandy; Bottled and Canned Soft Drinks and Water; Flavoring Extracts and Syrups, N.E.C.
FABRIC MILLS (Crop)	Broadwoven Fabric Mills and Finishing; Narrow Fabric Mills; Women's Hosiery, Except Socks; Hosiery, N.E.C.; Knit Outerwear Mills; Knit Underwear Mills; Knit Fabric Mills; Knitting Mills, N.E.C.; Yarn Mills and Finishing of Textiles, N.E.C.; Carpets and Rugs; Thread Mills; Coated Fabrics, Not Rubberized; Tire Cord and Fabric; Nonwoven Fabrics; Cordage and Twine; Textile Goods, N.E.C.
Portion allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (84.0 percent); Fertilizers, Mixing Only (78.1 percent); New Farm Structures (20.0 percent); Farm Machinery and Equipment (47.0 percent); Food Products Machinery (43.4 percent)

Table 7. Major components of the Livestock Sector as defined by IMPLAN sectors.

Aggregated sector	IMPLAN sector
DAIRY FARM PRODUCTS (Livestock)	Dairy Farm Products
POULTRY AND EGGS (Livestock)	Poultry and Eggs
CATTLE (Livestock)	Ranch-Fed Cattle; Range-Fed Cattle; Cattle Feedlots
OTHER LIVESTOCK (Livestock)	Sheep, Lambs, and Goats; Other Meat Animal Products; Miscellaneous Livestock
HOGS, PIGS, AND SWINE (Livestock)	Hogs, Pigs, and Swine
PROCESSED MEAT/EGGS (Livestock)	Meat Packing Plants; Sausages and Other Prepared Meats; Poultry Processing; Dog, Cat, and Other Pet Food; Animal and Marine Fats and Oils
DAIRY PROCESSING (Livestock)	Creamery Butter; Cheese, Natural and Processed; Condensed and Evaporated Milk; Ice Cream and Frozen Desserts; Fluid Milk
Portion allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (11.9 percent); Fertilizers, Mixing Only (18.5 percent); New Farm Structures (75.0 percent); Farm Machinery and Equipment (16.1 percent); Food Products Machinery (25.3 percent)

Table 8. Major components of the Forestry Sector as defined by IMPLAN sectors.

Aggregated sector	IMPLAN sector
FOREST PRODUCTS (Forestry)	Forest Products; Forestry Products
WOOD PROCESSING (Forestry)	Logging Camps and Logging Contractors; Sawmills and Planing Mills, General; Hardwood Dimension and Flooring Mills; Special Product Sawmills, N.E.C.; Millwork; Veneer and Plywood; Structural Wood Members, N.E.C.; Wood Containers; Wood Pallets and Skids; Mobile Homes; Prefabricated Wood Buildings; Wood Preserving; Reconstituted Wood Products; Wood Products, N.E.C.
PAPER PROCESSING (Forestry)	Pulp Mills; Paper Mills, Except Building Paper; Paperboard Mills; Paperboard Containers and Boxes; Paper Coated and Laminated Packaging; Paper Coated and Laminated, N.E.C.; Bags, Paper; Die-cut Paper and Board; Sanitary Paper Products; Envelopes; Stationery Products; Converted Paper Products, N.E.C.
FURNITURE (Forestry)	Wood Kitchen Cabinets; Wood Household Furniture; Upholstered Household Furniture; Wood TV and Radio Cabinets; Household Furniture, N.E.C.; Wood Office Furniture; Public Building Furniture; Wood Partitions and Fixtures; Blinds, Shades, and Drapery Hardware; Furniture and Fixtures, N.E.C.
Portion allocated from FARM INPUTS AND MACHINERY	Nitrogenous and Phosphatic Fertilizers (2.8 percent); Fertilizers, Mixing Only (2.4 percent); New Farm Structures (5.0 percent); Farm Machinery and Equipment (1.3 percent); Food Products Machinery (3.6 percent)

Appendix B

Agriculture-Generated Activity by Sector

Table 1. Agriculture-generated activity by sector, 1999.

The agricultural sector's contribution to:	Employment (number of jobs) ^a	Income (million \$)	Added value (million \$)	Output (million \$)
Processed Meat/Eggs	40,341	1,028	1,262	5,667
Miscellaneous Services	32,734	640	787	1,319
Wholesale and Retail Trade	27,444	775	1,329	1,797
Wood Processing	25,343	747	1,085	3,599
Poultry and Eggs	15,266	526	674	2,728
Paper Processing	14,208	697	1,235	3,760
Health Services	12,731	433	479	753
Food Grains	12,551	243	436	824
Transportation And Communication Services	11,300	440	659	1,405
Miscellaneous Food Processing	11,085	353	754	2,347
Hay and Pasture	11,055	74	120	175
Agricultural, Forestry, Fishery Services	10,781	133	165	322
Financial/Real Estate	10,588	270	1,001	1,458
Eating and Drinking	9,481	109	158	301
Cattle	8,636	130	160	374
Furniture	8,625	229	302	1,000
Construction	8,098	222	233	470
Oil Bearing Crops	6,213	256	392	456
Farm Inputs and Machinery	6,125	199	279	772
Landscape and Horticultural Services	6,077	73	109	175
Fabric Mills	4,159	131	214	613
Food Stores	3,868	66	104	113
Other Livestock	2,713	42	53	116
Feed Grains	2,508	98	145	720
Recreation and Amusement	2,393	28	38	89
Grain/Flour Milling	2,121	73	127	922
Cotton	2,044	114	176	394
Education	1,968	31	32	61
Miscellaneous Manufacturing	1,878	51	67	179
Government	1,743	69	97	236
Utility Services	1,592	94	343	555
Hogs, Pigs, and Swine	1,562	24	34	99
Horticulture/Nursery	1,482	19	29	39
Forest Products	1,464	25	87	136
Petroleum and Chemicals	1,067	49	97	490
Soft Drinks and Liquor	1,020	36	102	295
Dairy Processing	784	25	42	267
Dairy Farm Products	712	38	42	77
Fats and Oils Processing	684	25	42	642
Mining	551	15	42	64
Metal Industries	427	17	28	79
Machinery and Equipment	380	13	18	57
Vegetables	335	13	18	33
Glass, Stone, and Clay	277	8	12	34
Technology Industries	236	8	11	36
Transportation Equipment	187	7	10	42
Fruits	184	3	4	9
Other Crops	61	1	1	2
Tree Nuts	46	1	1	3
Leather	18	0	1	1
Balance	0	0	0	0
Total	327,146	8,701	13,636	36,105

Source: Computed using the 1999 Arkansas database from MIG (2002).

^a Full-time equivalent jobs

Table 2. Crop-generated activity by sector, 1999.

The crop sector's contribution to:	Employment (number of jobs) ^a	Income (million \$)	Added value (million \$)	Output (million \$)
Food Grains	12,551	243	436	824
Miscellaneous Food Processing	11,085	353	754	2,347
Hay and Pasture	11,055	74	121	175
Miscellaneous Services	10,182	200	245	413
Wholesale and Retail Trade	9,755	286	491	668
Oil Bearing Crops	6,213	256	392	456
Fabric Mills	4,159	131	214	614
Financial/Real Estate	3,856	91	349	506
Health Services	3,776	129	143	224
Transportation And Communication Services	3,710	151	224	478
Eating and Drinking	2,876	33	48	91
Construction	2,605	71	75	153
Feed Grains	2,508	98	145	720
Grain/Flour Milling	2,121	73	127	922
Cotton	2,044	114	176	394
Agricultural, Forestry, Fishery Services	1,869	23	28	43
Farm Inputs and Machinery	1,749	60	87	296
Horticulture/Nursery	1,482	19	29	39
Food Stores	1,178	20	32	34
Soft Drinks and Liquor	1,020	36	102	296
Miscellaneous Manufacturing	810	22	29	76
Recreation and Amusement	752	9	12	29
Fats and Oils Processing	684	25	42	642
Government	537	21	30	72
Education	525	8	8	15
Utility Services	441	26	93	159
Petroleum and Chemicals	402	19	37	189
Vegetables	335	13	18	33
Glass, Stone, and Clay	216	6	10	27
Mining	215	6	16	24
Fruits	184	3	4	9
Landscape and Horticultural Services	179	2	3	5
Machinery and Equipment	117	4	6	18
Metal Industries	89	4	6	25
Technology Industries	70	2	3	11
Other Crops	61	1	1	2
Transportation Equipment	56	2	3	13
Tree Nuts	46	1	1	3
Poultry and Eggs	14	0	1	2
Cattle	10	0	0	0
Paper Processing	8	0	1	2
Other Livestock	8	0	0	0
Leather	5	0	0	0
Wood Processing	3	0	0	0
Hogs, Pigs, and Swine	2	0	0	0
Furniture	2	0	0	0
Forest Products	2	0	0	0
Dairy Farm Products	1	0	0	0
Dairy Processing	0	0	0	0
Processed Meat/Eggs	0	0	0	0
Balance	0	0	0	0
Total	101,568	2,635	4,542	11,049

Source: Computed using the 1999 Arkansas database from MIG (2002).

^a Full-time equivalent jobs

Table 3. Livestock-generated activity by sector, 1999.

The livestock sector's contribution to:	Employment (number of jobs) ^a	Income (million \$)	Added value (million \$)	Output (million \$)
Processed Meat/Eggs	40,341	1,028	1,262	5,667
Poultry and Eggs	15,266	526	674	2,728
Miscellaneous Services	9,064	173	213	359
Cattle	8,636	130	160	374
Agricultural, Forestry, Fishery Services	7,781	94	116	180
Wholesale and Retail Trade	7,556	199	341	454
Health Services	4,496	150	167	264
Farm Inputs and Machinery	3,454	109	140	340
Financial/Real Estate	3,122	80	305	444
Eating and Drinking	3,031	35	50	96
Other Livestock	2,713	42	53	116
Transportation And Communication Services	2,672	104	159	334
Construction	2,234	61	64	130
Hogs, Pigs, and Swine	1,562	24	34	99
Food Stores	1,314	22	35	38
Recreation and Amusement	806	9	13	29
Dairy Processing	784	25	42	267
Dairy Farm Products	712	38	42	77
Education	577	9	9	17
Miscellaneous Manufacturing	520	14	18	50
Utility Services	470	28	105	158
Government	435	17	24	59
Landscape and Horticultural Services	204	2	4	6
Petroleum and Chemicals	143	6	13	75
Mining	120	3	9	14
Food Grains	119	2	4	8
Machinery and Equipment	106	3	5	17
Technology Industries	83	3	4	12
Hay and Pasture	78	1	1	1
Oil Bearing Crops	65	3	4	5
Transportation Equipment	53	2	3	12
Metal Industries	51	2	3	9
Cotton	23	1	2	4
Glass, Stone, and Clay	15	0	1	2
Forest Products	7	0	0	0
Leather	6	0	0	0
Feed Grains	6	0	0	1
Paper Processing	5	0	0	1
Horticulture/Nursery	3	0	0	0
Furniture	2	0	0	0
Vegetables	2	0	0	0
Fruits	2	0	0	0
Fabric Mills	1	0	0	0
Wood Processing	1	0	0	0
Tree Nuts	0	0	0	0
Other Crops	0	0	0	0
Grain/Flour Milling	0	0	0	0
Miscellaneous Food Processing	0	0	0	0
Fats and Oils Processing	0	0	0	0
Soft Drinks and Liquor	0	0	0	0
Balance	0	0	0	0
Total	118,641	2,950	4,081	12,450

Source: Computed using the 1999 Arkansas database from MIG (2002).

^a Full-time equivalent jobs

Table 4. Forestry-generated activity by sector, 1999.

The forestry sector's contribution to:	Employment (number of jobs) ^a	Income (million \$)	Added value (million \$)	Output (million \$)
Wood Processing	25,343	747	1,086	3,598
Paper Processing	14,208	697	1,236	3,760
Miscellaneous Services	12,985	258	316	526
Wholesale and Retail Trade	9,786	281	482	652
Furniture	8,625	229	303	1,000
Transportation And Communication Services	4,814	183	270	579
Health Services	4,272	146	163	254
Financial/Real Estate	3,470	93	335	488
Eating and Drinking	3,438	39	57	109
Construction	3,174	87	91	182
Forest Products	1,464	25	87	136
Food Stores	1,319	23	35	38
Education	839	13	14	28
Recreation and Amusement	801	9	12	29
Government	748	30	42	102
Utility Services	667	39	142	235
Miscellaneous Manufacturing	520	14	18	50
Petroleum and Chemicals	505	24	45	220
Agricultural, Forestry, Fishery Services	386	5	6	9
Metal Industries	280	11	18	45
Landscape and Horticultural Services	247	3	4	7
Farm Inputs and Machinery	242	8	10	26
Mining	210	6	16	25
Machinery and Equipment	150	5	7	21
Technology Industries	80	3	4	13
Transportation Equipment	74	3	4	17
Glass, Stone, and Clay	44	1	2	5
Food Grains	10	0	0	1
Leather	6	0	0	0
Hay and Pasture	6	0	0	0
Other Livestock	5	0	0	0
Oil Bearing Crops	5	0	0	0
Poultry and Eggs	4	0	0	1
Cattle	3	0	0	0
Cotton	1	0	0	0
Fabric Mills	1	0	0	0
Grain/Flour Milling	1	0	0	1
Feed Grains	1	0	0	0
Hogs, Pigs, and Swine	1	0	0	0
Dairy Farm Products	0	0	0	0
Horticulture/Nursery	0	0	0	0
Fruits	0	0	0	0
Vegetables	0	0	0	0
Processed Meat/Eggs	0	0	0	0
Miscellaneous Food Processing	0	0	0	0
Tree Nuts	0	0	0	0
Other Crops	0	0	0	0
Soft Drinks and Liquor	0	0	0	0
Dairy Processing	0	0	0	0
Fats and Oils Processing	0	0	0	0
Balance	0	0	0	0
Total	98,735	2,982	4,805	12,157

Source: Computed using the 1999 Arkansas database from MIG (2002)

^a Full-time equivalent jobs