

The Contribution of the Beef Industry to the Arizona Economy

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Executive Summary

What Is the Issue?

- Cattle ranching remains an important part of Arizona agriculture, making a variety of economic contributions to Arizona county economies and to the state economy as a whole.
- The beef industry extends beyond production by cow-calf ranches and feedlot operations. It also includes cattle processing in slaughter and leather and hide tanning and finishing operations. The beef industry purchases inputs from other sectors of Arizona's economy, while earnings from the industry (profits and wages) are spent on Arizona goods and services. This means that the beef industry has impacts that extend to many different sectors of the state's economy.
- In order to determine the contribution of the beef industry to the Arizona economy, one must take a comprehensive look at the industry, incorporating the economic activities of industries directly and indirectly related to the beef industry.

What Did the Study Find?

- The total market **value of capital assets of Arizona beef cattle operations is more than \$5.2 billion.** These assets include land, buildings, and machinery.
- The value of these **capital assets average more than \$1.2 million per ranching operation.**
- In addition to these capital assets, **the Arizona beef industry manages 71 percent of the state's cattle and calf inventory, which is valued at more than \$1 billion** (with the dairy sector managing the remaining 29 percent). These inventories represent valuable assets that can be placed at risk by prolonged drought or weather extremes.
- Grazing is the dominant land use in Arizona. **Grazing land makes up 73 percent of Arizona's total land area** and approximately 98 percent of Arizona's total agricultural land, with cropland accounting for the remaining 2 percent of agricultural land.
- **In 2011, Arizona cattle and calf sales surpassed \$800 million.**
- Direct cattle and calf sales represent only part of beef industry output. Input-output analysis was used to estimate the contribution of the entire beef industry to Arizona's economy. **The total contribution to state output of the beef industry was \$1.7 billion** (\$1.2 billion in beef industry sales and \$0.5 billion in sales stimulated in other sectors of the Arizona economy).
- **The beef industry contributed \$431 million to Arizona's GDP** (or value added).
- **Every 100 workers hired by the beef industry create 62 additional jobs in other industries in Arizona.** Beef industry proprietors' contribution to total state employment was 8,758 hired jobs—5,411 jobs directly related to the beef industry and an additional 3,347 jobs created throughout the state in other industries.
- **Approximately 21 percent of all farms in Arizona specialize in beef production.** By specialize, we mean that more than half of farm sales come from the sale of beef cattle. Farms specializing in beef production are the third most numerous type of all agricultural operations in Arizona.

- Of all Arizona operations with sales in 2012 (the most recent Census of Agriculture data available), there were 3,364 operations with sales of cattle. This ranks operations with cattle sales as the second most numerous type of agricultural operation in the state. Operations with cattle sales were the most numerous agricultural operation in seven of Arizona's 15 counties.
- **In 2012, cattle and calf sales accounted for 18.8 percent of total agricultural sales in Arizona, ranking third in sales among all agricultural commodities.** In five of 15 counties, however, the sale of cattle and calves ranked first in agricultural sales.
- **In 2011, the total number of cattle commercially slaughtered in Arizona was 565,000 head,** producing a total live weight of more than 721 million pounds.
- Economic base analysis identifies which industries are basic: industries that generate relatively more jobs than the national average and bring money from outside the region into the local area. Outside of the urbanized, metropolitan areas (Maricopa and Pima counties) and Mohave County, where specialization in mining is important, ranching remains a basic sector in Arizona county economies. **Arizona's remaining 12 counties are more specialized in cattle production than the nation as whole and employ relatively more people in ranching.** Looking only at state averages can understate the continuing importance of ranching in Arizona's rural counties.

How Was the Study Conducted?

- Using data primarily from the *2012 Census of Agriculture* and *2011 Arizona Agricultural Statistics Bulletin*, we conducted an overview of the beef industry in Arizona, tracing the stages of production from cow-calf and feedlot operations to processing operations (including slaughter plants and leather and hide tanning and finishing operations).
- The importance of the beef industry at the state and county levels were determined by conducting an economic base analysis. This analysis allows for the identification of industries that serve as part of the economic base as well as highlights whether the industry employs more people in the region than the national average.
- The economic contribution of the beef industry to the state of Arizona was estimated using input-output modeling and the premiere software for this type of analysis, IMPLAN. The beef industry's contribution to total output, value added (GDP), employment, and labor income was estimated.
- **Individual profiles were developed for each Arizona county, estimating the economic contribution of cattle ranching and the beef industry to local county economies.**

Introduction

The United States is the largest producer of beef¹ and the second largest beef exporter in the world (USDA, 2014a). As such, the U.S. beef industry is an integral part of American agriculture. According to the 2012 Census of Agriculture, cattle and calf sales of \$76.4 billion accounted for 19.4 percent of all U.S. agricultural sales. Furthermore, operations that specialize² in beef production accounted for 30 percent of all agricultural operations, making cattle ranching and feedlots the most numerous type of operation in the United States (USDA, 2014b: Table 2).

In addition to being the largest producer of beef, the United States holds a globally competitive position in the industry, receiving a premium price for live cattle. The latest Rabobank international outlook on the global beef market (Vernooij and Close, 2013) illustrates that U.S. producers receive one of the highest average live cattle prices, second only to Canada (Table 1).

Table 1. Global Average Live Cattle Prices, 2013

Live Cattle Prices (USD/kg)					
	Nov 2013	Q3 2013	Nov 2012	% Nov 2013 x Q3 2013	% Nov 2013 x Nov 2012
Uruguay	1.87	1.97	2.02	-5%	-7%
Australia	1.54	1.50	1.79	3%	-14%
Brazil	1.63	1.60	1.57	2%	4%
United States	2.92	2.72	2.82	7%	4%
Argentina	1.89	1.71	1.63	11%	16%
Canada	3.12	3.09	2.83	1%	10%
New Zealand	1.98	1.92	1.94	3%	2%

Source: Bloomberg, CEPEA, INAC, IPCVA, MLA, NZX Agrifax, OCA, USDA, 2013

Source: Vernooij and Close, 2013, *Rabobank Beef Quarterly, Q4*.

While the beef industry's contribution to national agriculture is widely recognized, few studies have estimated the importance of the industry to the state of Arizona. This study begins by comparing and contrasting the Arizona beef industry with that of the nation. It then provides a comprehensive review of the structure of the beef industry in Arizona, tracing through the stages of production from cattle production on cow-calf ranches and in feedlot operations to cattle processing in slaughter establishments and leather and hide tanning and finishing establishments. Included in this section are descriptions of Arizona's beef industry by county. Finally, this report describes the importance of the beef industry by determining whether the industry is part of the state's economic base and estimating the industry's contribution to the Arizona economy (including the multiplier effects from input purchases and spending from profits and salaries). As the beef industry is often an important part of rural economies, individual profiles were developed for each Arizona county (located in the Appendix).

¹ Primarily high quality, grain-fed for domestic and export use.

² Specialization is defined by the North American Industry Classification System (NAICS), where an agricultural operation is categorized as specialized when the commodity constitutes the majority (greater than 50%) of the total sales of the operation (Personal communication Steve Manheimer, USDA, National Agricultural Statistics Service, Phoenix, AZ, Nov. 26, 2013).

How Does Arizona's Beef Industry Compare to the Nation?

Percentage of Total Agricultural Sales

Arizona's beef industry is similar to the nation's in terms of the share of cattle and calf sales to total agricultural sales. In 2012, sales of cattle and calves³ accounted for 18.8 percent of total agricultural sales in Arizona, placing these sales as the 3rd highest agricultural commodity sold at \$700 million (Table 2). This is comparable to sales at the national level where the sale of cattle and calves accounted for 19.4 percent of total U.S. agricultural sales.

Table 2. Ranking of Market Value of Arizona Agricultural Products Sold, 2012

Agricultural Product	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	20,005	3,732,113	100.0%
Vegetables, melons, potatoes, and sweet potatoes	1,750	764,062	20.5%
Milk and other dairy products from cows	104	762,957	20.4%
Cattle and calves	3,364	700,307	18.8%
Other crops and hay	1,287	425,203	11.4%
Nursery, greenhouse, floriculture, and sod	453	315,548	8.5%
Cotton and cottonseed	388	224,486	6.0%
Horses, ponies, mules, burros, and donkeys	1,954	31,801	0.9%
Sheep, goats, and their products	4,250	11,276	0.3%
Aquaculture	34	5,363	0.1%
Grains, oilseeds, dry beans, and dry peas	2,015	(D)	(D)
Fruits, tree nuts, and berries	966	(D)	(D)
Poultry and eggs	922	(D)	(D)
Hogs and pigs	354	(D)	(D)
Other animals and other animal products	660	(D)	(D)
Cut Christmas trees and short rotation woody crops	3	(D)	(D)
Tobacco	-	-	-

- Represents zero; (D) Data withheld to avoid disclosing data for individual farms.

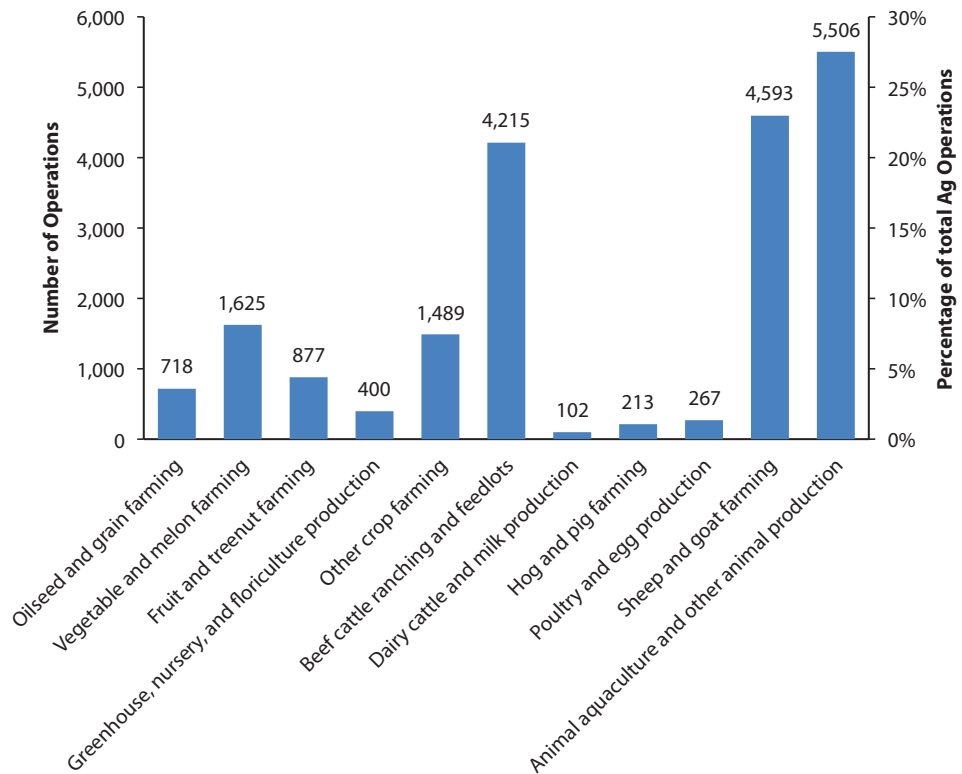
Source: USDA, 2014c. 2013 Census of Agriculture: Arizona State and County Data: Table 2.

³ The value of all cattle and calf sales includes the sale of beef and dairy cattle for breeding stock, cattle on feed, beef and dairy cull animals, stockers and feeders, veal calves, and other cattle associated with sales for the slaughter market (Personal communication Steve Manheimer, USDA, National Agricultural Statistics Service, Phoenix, AZ, Nov. 26, 2013).

Specialization in Beef Cattle Production

Ranches specialized⁴ in beef cattle production are the third most numerous type of agricultural operation in Arizona, accounting for 21 percent of all operations. The number of operations specializing in beef cattle ranching (4,215 operations) falls behind agricultural operations specializing in sheep and goat farming as well as operations specializing in animal aquaculture and other animal production (Figure 1). According to USDA, however, the “other animal production” category includes “establishments primarily engaged in raising a combination of animals with no one animal or family of animals accounting for one-half of the establishment’s agricultural production” (USDA, 2014b: Appendix B B-9). Therefore, the number of operations with beef cattle may be understated in this statistic. For example, an operation with beef cattle accounting for 49 percent (or less) of its production would be counted in this “other animal production” category. To demonstrate this, the animal aquaculture and other animal production category includes 358 operations with beef cow inventories, while 365 operations specializing in sheep and goat production also have beef cow inventories.

Figure 1. Number of Arizona Agricultural Operations by Specialization, 2012



Source: USDA, 2014c. Census of Agriculture: Arizona State and County Data: Table 68. The category “Animal aquaculture and other animal production” includes operations where no single animal product accounts for more than half of gross sales. Many of these operations have beef cattle inventories and sales.

⁴ Specialization is defined by the North American Industry Classification System (NAICS), where a farm is categorized as specialized in a particular commodity when that commodity constitutes the majority (greater than 50%) of the total sales of the operation (Personal communication Steve Manheimer, USDA, National Agricultural Statistics Service, Phoenix, AZ, Nov. 26, 2013).

Size and Type of Operations

A distinction between the nation and Arizona are the sizes and types of operations. According to the 2012 Census of Agriculture, 88 percent of all U.S. ranches with sales of cattle and calves were operations with sales of less than 100 head of cattle. Ten percent had sales of 100 to 499 head of cattle and only 2 percent had sales of more than 500 head of cattle (USDA, 2014b: Table 13). This is in comparison to Arizona, where 85 percent had sales less than 100 head, 11 percent had sales more than 100 but less than 499, and 4 percent had sales more than 500 head (USDA, 2014c: Table 13). This result suggests that there are more large-scale cow-calf operations in Arizona and that there may be more commercial cow-calf operations in Arizona than there are nationally.

Consistent with the nation, cattle production has become more concentrated, with a smaller number of producers accounting for a larger share of total inventory and sales. This is particularly the case when looking at the organization type (or legal status) of the operation. While family ranches are the most prevalent (accounting for approximately 89 percent of all U.S. operations), they account for only 61 percent of the U.S. inventory and 43 percent of U.S. sales. Corporations, on the other hand, only make up 4 percent of all operations, but account for over 18 percent of inventory and 33 percent of sales (USDA, 2014b: Table 67).

The same phenomenon occurs in Arizona, but the difference between organization types is more pronounced. In Arizona, approximately 87 percent of operations are individual or family operations and they account for only 34 percent of Arizona inventory and 15 percent of Arizona sales. In contrast, corporations make up only 5 percent of operations but account for 46 percent of Arizona inventory and 76 percent of Arizona sales (USDA, 2014c: Table 67). This result demonstrates that, in comparison to the nation, a larger share of inventory and sales is generated by ranches and feedlots owned by corporations in Arizona. However, a large majority (92 percent) of cattle ranching corporations in Arizona are family-owned. A family held corporation is the official legal status used for federal tax purposes and is designated by the presence of stockholders (USDA, 2014c: Appendix B-8).

Market Value of Capital Assets

Another distinction between Arizona and the nation is the total estimated market value of capital assets managed by beef cattle ranches and feedlots. In the state of Arizona, beef cattle ranches (including feedlots) had an average of \$1.2 million in capital assets per operation (USDA, 2014c: Table 51). The capital assets included in this figure are the land and buildings located on the property as well as the assets in machinery and equipment. This is in comparison to the nation where capital assets were approximately \$877,000 per ranch (USDA, 2014b: Table 51). The total market value of capital assets in land, buildings, and machinery of beef cattle operations across the state is more than \$5.2 billion.

Grazing: Public Lands Component

Another factor that sets Arizona ranchers (and other Western ranchers) apart from the rest of the nation is their unique relationship with public lands. Both ranchers and public land managers benefit from grazing cattle on public lands. From the rancher's point of view, land available for grazing is an important production consideration. Land and forage available for livestock grazing is an important factor for productivity and arid conditions in the region necessitate large tracts of land. Approximately 45 percent of Arizona's total land (72,750,000 acres) is federal and state public trust land (USDA, NASS, 2011) managed by either the United States Forest Service (USFS), the Bureau of Land Management (BLM), or the Arizona State Land Department

(ASLD) (with a significant portion of the remaining characterized as tribal land). It is no surprise then that most grazing is done on public lands. In fact, the composition of land in Arizona ranches can be quite complicated with most operations having a core of private land, but also having grazing allotments on federal land, state land, or both. To emphasize this point, in 1982, approximately one-third of all Arizona ranches had a combination of two or more agency-administered grazing allotments (Ruyle, et al., 2000). Although this number has likely changed over time, public lands play an important role in Arizona cattle production and ranchers are “largely dependent on the use of state and federal land for livestock grazing” (Ruyle, et al., 2000).

The state of Arizona and public land managers, however, also depend on ranchers to help manage the large area of public land. Grazing, one of the earliest uses of public lands, is still an important use of land today. In fact, grazing land makes up nearly 75 percent of Arizona’s total land area and 98 percent of Arizona’s agricultural land (USDA, ERS, 2014). The BLM recognizes that, “well-managed grazing provides numerous environmental benefits such as managing vegetation to reduce fuels that contribute to wildfire, controlling some invasive plant species, and preserving open space” (DOI, BLM, 2014). While aligning private ranch interests and public values in land management can be difficult, ranchers have a financial interest in being good stewards of the land in order to maintain their long-term productivity. Programs have been established, based on the payment for ecosystem service approach, where ranchers are compensated to manage land in order to promote healthy rangelands that provide ecosystem services such as wildlife habitat, water purification, carbon sequestration, and recreational opportunities (Goldstein, et al., 2011).

Structure of the Beef Industry

While practices vary significantly across the nation and individual operations, cattle production for both the beef and dairy industries typically begin with cow-calf operations, where cattle are born and raised on range or pastureland. Aside from nursing, the calf gains weight through some form of grazing forage—with hay, silage, or other alternative forages as supplements. The cattle can then be finished by either becoming “fed beef” or “non-fed beef.” According to the USDA Economic Research Service, approximately 80 percent of U.S. commercial beef production is from fed beef, where cattle are sent to a feedlot and fed a diet high in grains. This method promotes maximum weight gain and the beef typically reach a higher quality grade (Prime, Choice, and Select). The other 20 percent of commercial beef production is non-fed beef, which rarely reaches the lowest grade of Select. While non-fed beef typically comes from older cows and bulls that are not fed feedlot rations, culled dairy cows are the exception. Dairy cows are fed grains most of their lives to enhance milk production, but do not produce a Select grade due to their age (Mathews, Jr., et al., 2013). Cash receipts from marketing of cattle are the first component of the beef industry’s contribution to the economy.

Boxed beef is then produced after the slaughter and processing of fed steers and heifers (fed beef), culled beef cows, culled bulls, and culled dairy cattle at animal slaughter and processing plants. Cattle can be slaughtered at federal or state inspected plants and on-farm (known as custom slaughter). However, only beef processed at federally inspected operations can cross state lines.⁵ While a large percentage of commercial beef production is the slaughter of steers and heifers, the slaughter of dairy cows is an important contributor to beef production. About 47 percent of U.S. commercial cow slaughter is from dairy cows (Mathews, Jr., et al., 2013). By taking the process beyond

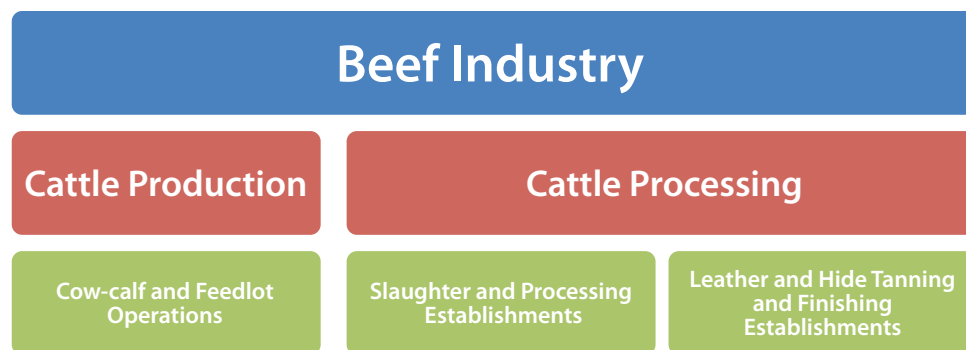
⁵ Personal communication Trent Teegerstrom, University of Arizona, Cooperative Extension, Nov. 12, 2013.

the farm gate and processing beef for consumption, there are further value-added economic activities that generate the beef industry’s contribution to the economy.

In addition to the production of beef products for consumption both locally and abroad, the production and sale of animal byproducts is another contribution to the economy. Animal byproducts are defined as all parts of the live animal that are not part of the dressed carcass. In cattle, this is estimated to be about 44 percent of the live weight. These animal byproducts can account for more than 10 percent of the value of cattle and can be sold in three different categories: hides, inedible offal, and edible offal. As cattle hides account for 75 percent of the byproduct value for a beef animal (Marti, et al., 2011), we focus on the contribution of the leather and hide tanning and finishing sector to the Arizona economy.

As illustrated in Figure 2, we define the beef industry to include cattle production (cow-calf and feedlot operations) and processing sectors (slaughter and hide tanning and finishing establishments). The following two sections of this report describe the beef industry in Arizona, characterizing both cattle production and processing throughout the state.

Figure 2. Components of Arizona Beef Industry



Arizona’s Cattle Production: Cow-calf and Feedlot Operations

Number of Operations

Arizona’s cattle production sector is comprised of cow-calf and feedlot operations. Estimates of the number of cattle producing establishments in Arizona depend on the definition used. According to the 2012 Census of Agriculture, Arizona has 6,029 operations with an inventory of cattle and calves⁶ (USDA, 2014c: Table 11). This, however, includes both dairy and beef cattle. The number of operations with an inventory of beef cows was 4,851.⁷ Finally, when we define the number of operations by the number of ranches specialized⁸ in beef production, Arizona has 4,215 operations. Of this figure, 4,201 were categorized as beef cattle ranching (cow-calf) operations while 14 were classified as cattle feedlot operations (USDA, 2014c: Table 44).⁹ When looking at the number of operations that reported sales of cattle in 2012, there were 3,364

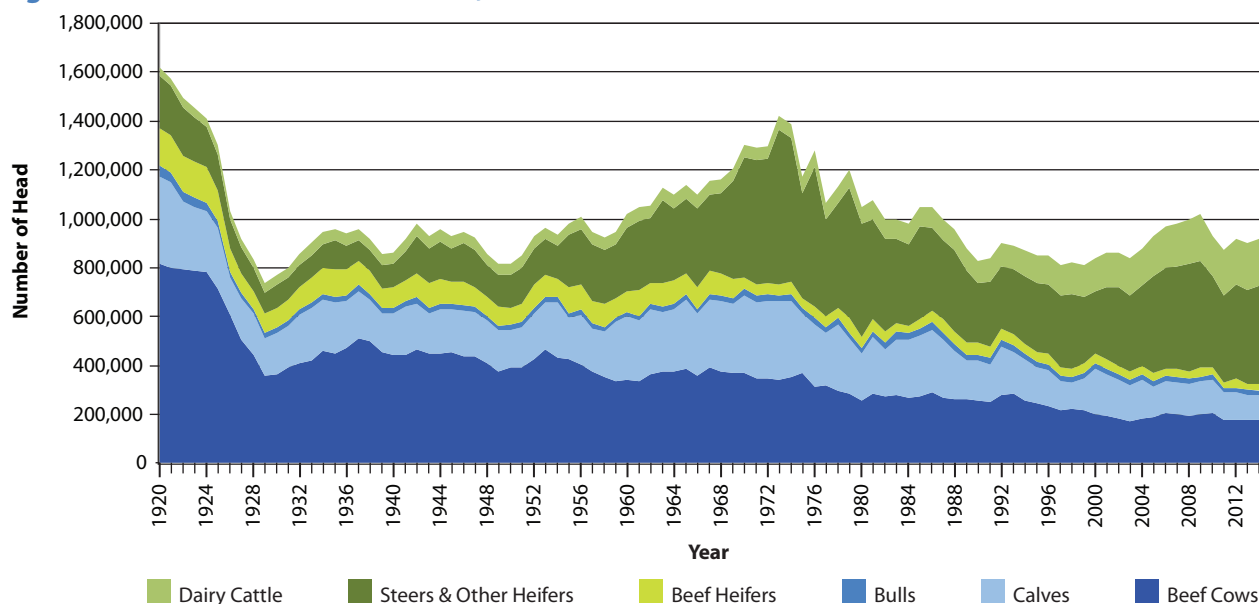
⁶ This figure categorizes all operations that have at least one of the following: cow or heifer that has calved (includes both beef and milk cows), heifer that has not calved, steer, calf, or bull.

⁷ This figure categorizes the number of operations that have beef cow inventory of at least one beef cow.

⁸ As defined by NAICS; see footnote 2 for definition.

⁹ Beef cattle ranching and farming (112111) is comprised of establishments primarily engaged in raising cattle (including cattle for dairy herd replacements). Pastureland-only farms, those with only 100 or more acres of pastureland, were classified as “All other animal production farming (11299).” Cattle feedlots (112112) are comprised of establishments primarily engaged in feeding cattle for fattening.

Figure 3. Arizona Livestock Numbers, 1920–2014



Source: Russell Tronstad, numerous years of NASS Arizona Agricultural Statistics Bulletin.

operations (USDA, 2014c: Table 12). A couple of factors could explain these differences. First, not all specialized operations may have had sales in 2012. Second, operations that were not specialized still may have had cattle sales. As stated previously, ranches specialized in cattle production are the third most numerous type of all operations in Arizona, accounting for 21 percent of all agricultural operations. However, when defining the number of operations by those with cattle sales in 2012, operations with cattle sales are the second most common type of Arizona agricultural operation.

An estimate of the number of feedlots in Arizona also depends on how a feedlot is defined. If one defines cattle feedlots according to the NAICS classification, where the establishment is primarily engaged in feeding cattle for fattening, there were 14 feedlots in Arizona in 2012. If one changes the definition to the classification used by the Arizona Department of Agriculture, the number of feedlots increases to 20. The Arizona Department of Agriculture defines feedlots as operations with a capacity of greater than 500, which requires them to apply for a feedlot license. In 2012, 20 licenses for feedlots were issued (Arizona Department of Agriculture, 2012). The discrepancy could be due to a feedlot operating under one legal structure but under multiple licenses. Finally, if one defines feedlots as a commercial feedlot, or a feedlot that markets to one of the two major packing plants in the region, there are 7 feedlot operations in Arizona.¹⁰

Size of Operations: Inventory and Sales

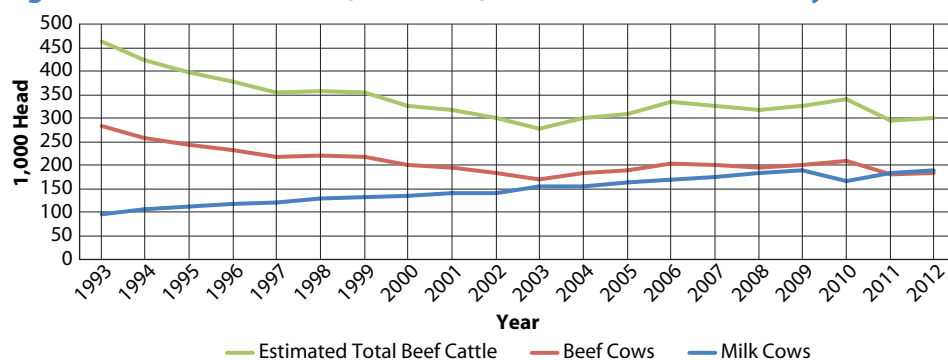
Inventory

The inventory of cattle in Arizona is comprised of beef cows, calves, bulls, beef heifers, steers and other heifers, and dairy cattle. The next section of this report describes how livestock inventory has fluctuated and changed composition over time. It also briefly describes the size of inventory in feedlots as well as the source of inventory for Arizona feedlot operations.

As can be seen in Figure 3, Arizona's livestock inventory has varied over time, with the highest estimated numbers on grass in the early part of the twentieth century.

¹⁰ Definition of commercial feedlot was developed by Bas Aja, Arizona Cattle Feeders' Association. The two major packing plants referred to are JBS Sun Land Tolleson in Tolleson, AZ, and Brawley Beef in Brawley, CA.

Figure 4. Arizona Beef Cow, Milk Cow, and Beef Cattle Inventory Over Time, 1993–2012



Source: USDA, NASS, 2011: *Arizona Agricultural Statistics Bulletin*.

Livestock numbers then peaked again in the early 1970s through expanding feedlot numbers and have since experienced a decreasing trend. However, since early 2000 there has been a slight uptick in all types of cattle. The composition of inventory has also changed over time with beef cow inventory dominating in the early part of the twentieth century, but experiencing an overall decreasing trend with some variation.

A closer look at the last twenty years shows that beef cattle inventories¹¹ in Arizona display a decreasing trend from the early 1990s to the early 2000s, but have since experienced an increasing trend over the last 10 years. The estimated annual inventory of total beef cattle has remained relatively stable around 300,000 head of cattle over the last decade (Figure 4). The inventory of milk cows has slowly but steadily increased from 82,000 in 1983 to its maximum 190,000 in 2009 and 2012. In 2011, milk cow inventory surpassed beef cow inventory for the first time in history and this trend has persisted through 2012.

In terms of the number of cattle on feed, Arizona is ranked 10th in the nation (USDA, NASS, 2011) with 279,000 head on feed. Arizona is one of 16 states that accounts for approximately 98 percent of the cattle on feed, all of which are held in feedlots with a capacity of 1,000 or more head (USDA, NASS, 2013). These figures suggest that Arizona has very large feed yards. This is confirmed by experts in the field, who state that Arizona feedlots generally have a capacity between 35,000 to 150,000 head. Of the 7 commercial feedlot operations in Arizona, 6 have more than 16,000 head, while two of the feedlots have up to 150,000 head.¹²

Dairy cattle account for a large share of cattle supplied to Arizona feedlots. According to some experts, approximately 80 percent of feedlots' feeder cattle are from Holstein (dairy) calf sources, with some feed yards only feeding dairy cows.¹³ Other experts in the field state that the proportion of Holstein feeder cattle could be as high as 95 to 98 percent in Arizona feedlots.¹⁴

Whereas cow-calf operations typically rebuild inventory from within their own herd, feedlots often source feeder cattle from outside of the state. In fact, only about 15 percent of feeder cattle come from cow-calf operations within Arizona.¹⁵ Arizona's feedlots purchase cattle from cow-calf ranches all over the Western region including Mexico. Many feedlots in the western United States, including Arizona, have come

¹¹ Beef cattle inventory was estimated using inventory numbers for beef cows, steers, and non-replacement heifers.

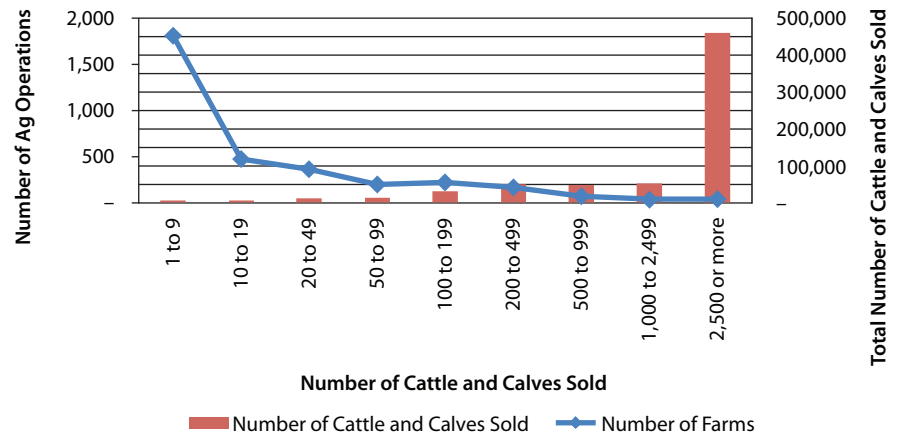
¹² Personal communication Bas Aja, Arizona Cattle Feeders' Association, Jan. 22, 2014.

¹³ Personal communication Bas Aja, Arizona Cattle Feeders' Association, Jan. 22, 2014.

¹⁴ Personal communication Dan Faulkner, University of Arizona Cooperative Extension, Jan. 14, 2014.

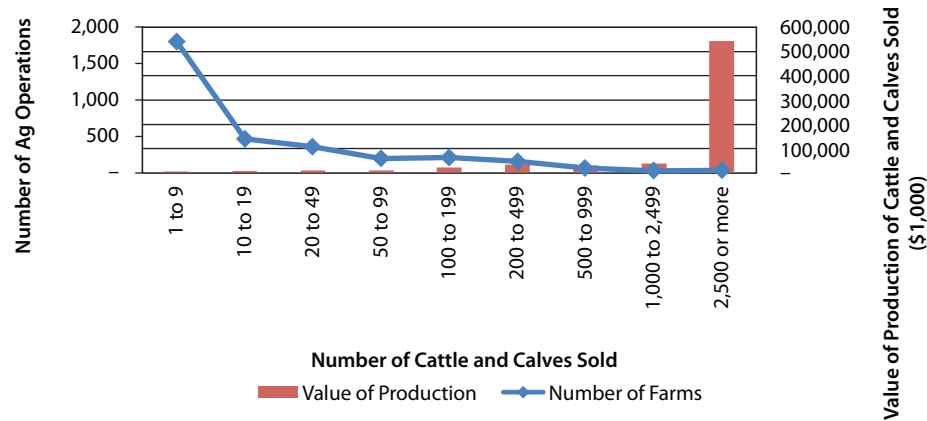
¹⁵ Personal communication Bas Aja, Arizona Cattle Feeders' Association, Jan. 22, 2014.

Figure 5. Number of Operations and Cattle Sold by Size of Producer, 2012



Source: USDA, 2014c. 2012 Census of Agriculture: Arizona State and County Data: Table 18.

Figure 6. Number of Operations and Value of Cattle Sold by Size of Producer, 2012



Source: USDA, 2014c. 2012 Census of Agriculture: Arizona State and County Data: Table 18.

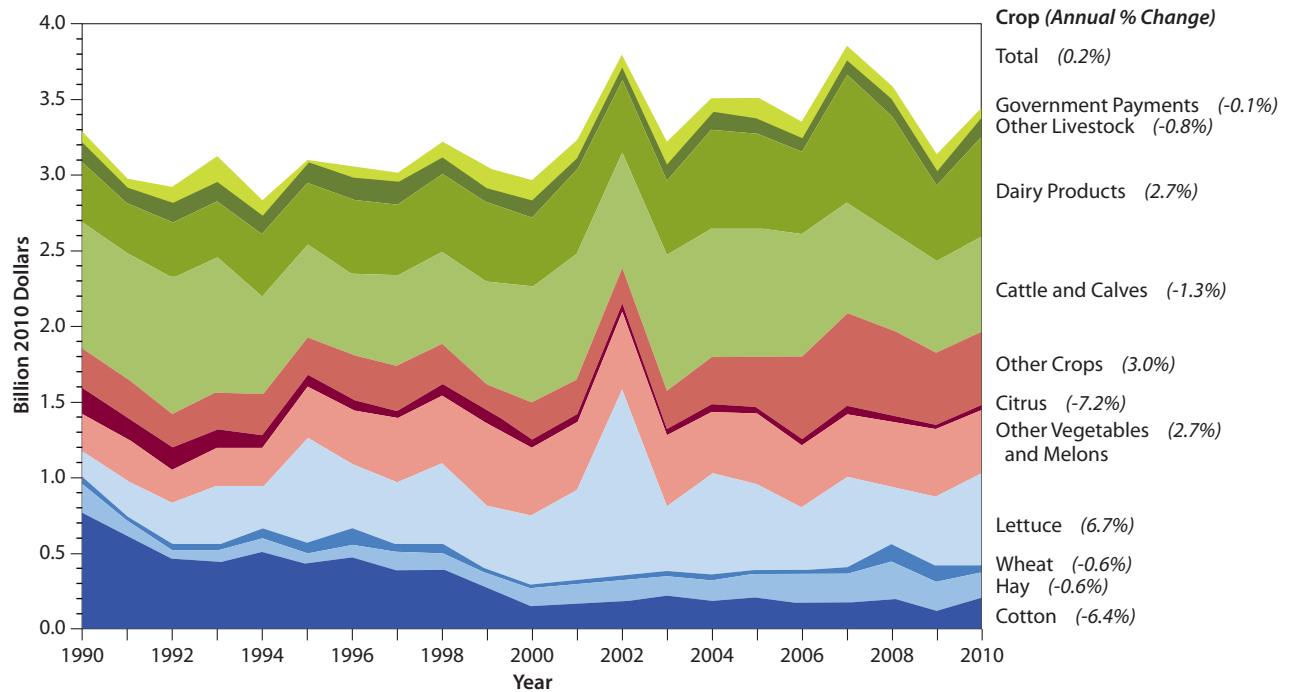
to rely on Mexican feeder cattle being shipped across the border to finish them out. According Rabobank International (Close and Sherwell, 2013), “over the past 15 to 20 years, Mexican feeder cattle have accounted for 5 percent to 10 percent of the U.S. cattle on feed inventory.”

According to the *2013 Arizona Livestock Summary* (USDA, NASS, 2013a), Arizona’s total inventory of cattle and calves of 900,000 head was valued at more than \$1 billion. Milk cows accounted for 263,000 or 29 percent of this total inventory, with the Arizona beef industry managing the remaining 71 percent. These inventories represent valuable assets that can be placed at risk by prolonged drought or weather extremes.

Sales

In 2012, sales of all cattle and calves in Arizona originated from 3,364 operations. As shown in the Figure 5, a majority of the ranches were small-scale producers. Approximately 54 percent of the ranches with sales in 2012 sold less than 10 cattle and calves, resulting in 6,886 cattle and calves sold from this group of producers. A large majority of sales are derived from a small number of large producers. In 2012, about 68 percent of cattle and calves sold were sold from 36 operations that sold more than 2,500 head of cattle each, resulting in a total of 457,951 cattle sold (USDA, 2014c: Table 18).

Figure 7. Arizona Cash Receipts by Crop, 1990–2010



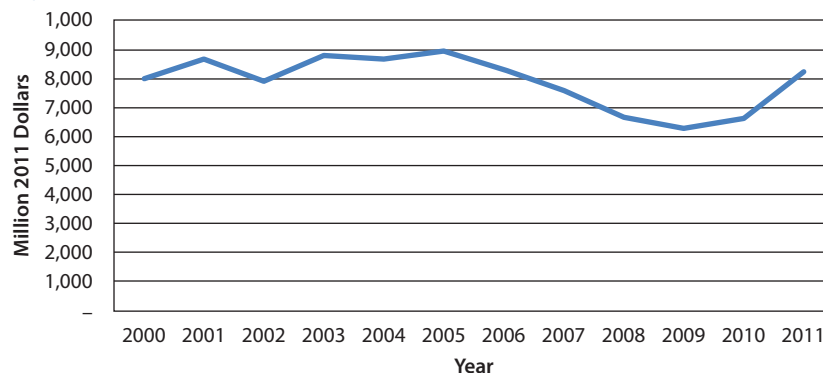
Source: Russell Tronstad, numerous years of NASS Arizona Agricultural Statistics Bulletin.

The distinction between small- and large-scale cattle operations is even more evident when examining the market value of the sales as seen in Figure 6. The 2012 total market value of all cattle and calves sold (676,935 head) was approximately \$700 million. As can be seen in Figure 6, more than 75 percent (\$544 million) of Arizona’s total cattle and calf sales originated from the same 36 operations with sales of 2,500 head or more. As would be expected, the large producers are feedlot operations.

The value of cattle and calves sold can change drastically depending on the year and the conditions of the market. When the market for cattle is saturated, inventories are high and cash receipts decrease. Figure 7 shows how cash receipts have varied over time as well as how the sale of cattle and calves compares to sales of other crops in Arizona. Cattle and calf cash receipts demonstrate a relatively stable market share of total cash receipts from 1990 to 2010, but the cumulative annual percentage change was decreasing at 1.3 percent.

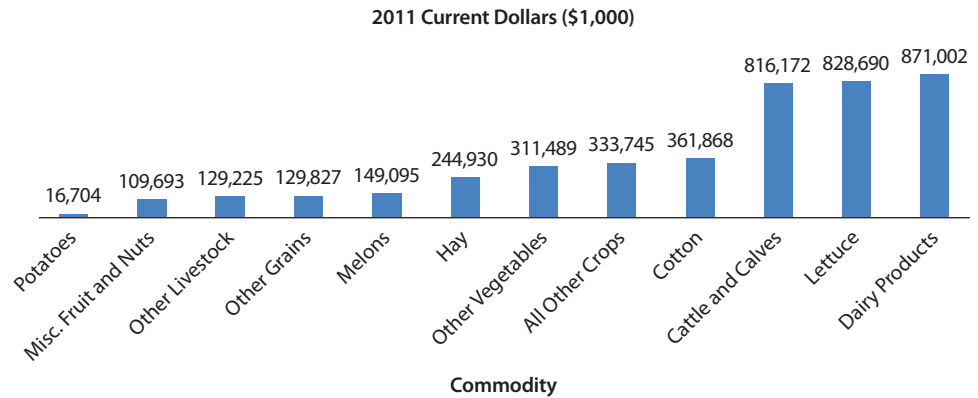
Figure 8 demonstrates the year-to-year variability of cattle and calf cash receipts since 2000. Accounting for inflation and presented in 2011 dollars, cash receipts have

Figure 8. Arizona Cattle and Calves Cash Receipts, 2000–2011



Source: USDA, NASS, 2011: Arizona Agricultural Statistics Bulletin.

Figure 9. Arizona Agriculture Cash Receipts by Commodity, 2011



Source: USDA, NASS, 2011: *Arizona Agricultural Statistics Bulletin*.

ranged from as low as \$630 million in 2009 to as high as \$890 million in 2005. This variation in cash receipts at the ranch level can affect the total economic contribution of the beef industry to the state's economy.

Taking a closer look at the year of analysis, 2011, one can see that beef production is an important source of sales for agriculture. It accounted for approximately 19 percent of total agricultural cash receipts in 2011 (Figure 9). It fell behind only dairy products (\$871 million) and lettuce (\$828.7 million). Total cash receipts from the sale of cattle and calves¹⁶ in Arizona during 2011 were estimated to be just over \$816 million (in 2011 current dollars) (USDA, NASS, 2011).

Geography

Geography is an important consideration when describing the structure of the Arizona beef industry. It is particularly important when describing the production of cattle. As productivity of cow-calf operations is directly linked to environmental and range conditions, some areas of the state are better equipped for cattle production. Furthermore, the interaction between cow-calf operations and feedlots and their respective locations prove to be an important consideration for cattle production. This section discusses the regions with cow-calf ranches and feedlot operations.

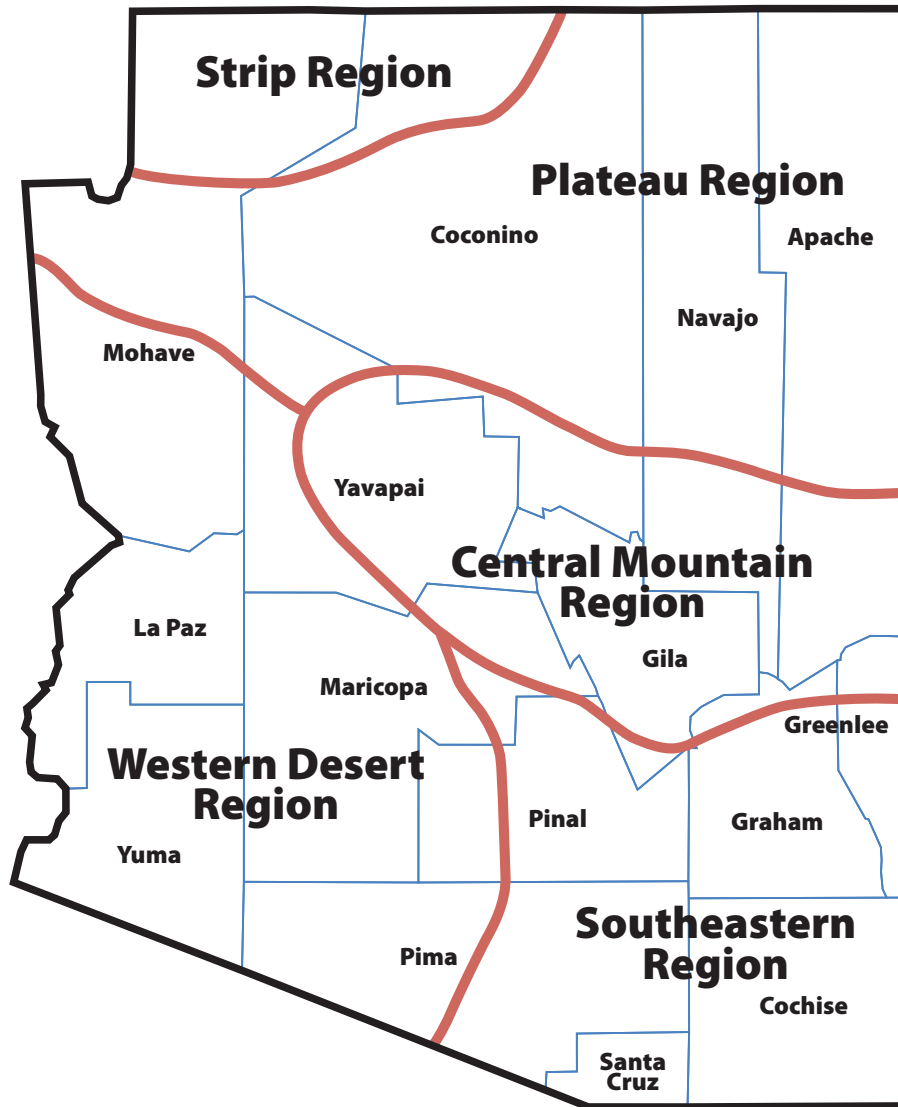
At the ranch level, Arizona can be divided into five regions based upon landscape characteristics (environmental conditions and ownership) and ranching activities. Each region was developed by the University of Arizona Cooperative Extension based on "the typical land ownership pattern associated with an average cow/calf operation within the region" (Teegerstrom and Tronstad, 2000). These five regions are the Strip Region, the Plateau Region, the Central Mountain Region, the Western Desert Region, and the Southeastern Desert Region (see Figure 10). Summaries of the location, precipitation, and land management for each of the regions are provided from the University of Arizona publication.

Strip Region: The Strip Region is comprised of the sections of Mohave and Coconino counties north of the Colorado River. Rainfall averages about eight inches per year and vegetation varies from cactus to ponderosa pine. The land ownership mix of grazing land is approximately 75 percent Bureau of Land Management land, 11 percent Forest Service land, 8 percent state land, and 6 percent private land.

Plateau Region: The Plateau Region includes Mohave, Coconino, Navajo, and Apache counties (excluding the Navajo nation). Rainfall averages about 14 inches per year and common vegetation is ponderosa pine, spruce, fir, piñon, juniper, four-wing

¹⁶ Cash receipts from marketing and sale of farm slaughter, NASS 2011.

Figure 10. Arizona Ranching Regions



Source: Teegerstrom and Tronstad, 2000: University of Arizona Cooperative Extension, Publication AZ1193.

saltbush, winterfat, and sagebrush as well as several species of grama and wheatgrass, Indian ricegrass, and galleta. Grazing occurs on approximately 45 percent state land, 32 percent on private land, 12 percent on Forest Service land, and 11 percent on Bureau of Land Management land.

Central Mountain Region: The Central Mountain Region is in the eastern part of central Arizona and includes portions of the counties of Yavapai, Coconino, Gila, Maricopa, Apache, Navajo, Graham, and Greenlee. Rainfall depends on elevation, but can be as little as 10 inches per year or as much as 30 inches per year. The vegetation ranges from mesquite, cactus, piñon, jojoba, juniper, manzanita, emory, turbinella, gambel oak, ponderosa pine, tobosa, curly mesquite, and several species of grama and love grasses. Ownership is 90 percent Forest Service with the remaining 10 percent private land.

Western Desert Region: The Western Desert Region includes all of La Paz and Yuma counties and portions of Mohave, Yavapai, Maricopa, Pinal, and Pima. Rainfall averages range from 3 inches per year to 18 inches per year. The most common

vegetation is cacti, Joshua tree, mesquite, and desert shrubs with grasses such as grama and some desert annuals. Ownership in this region is 76 percent Bureau of Land Management, 13 percent state land, and 11 percent private land.

Southeastern Desert Region: The Southeastern Desert Region is comprised of the entire counties of Cochise and Santa Cruz and portions of Pima, Pinal, Graham, and Greenlee. Rainfall averages around 8 inches per year in the lower regions and up to 30 inches per year in the mountains. Vegetation ranges from cacti to ponderosa pine depending on elevation and several species of grama grass, lovegrass, mesquite, piñon, juniper, and other desert shrubs are found in this area. Ownership and grazing in this region is 45 percent state land, 35 percent private land, 12 percent Bureau of Land Management land, and 8 percent Forest Service land.

Cow-calf operations are dispersed throughout each of these regions. However, there are certainly differences among the regions. For example, the northeast corner of Arizona in the Plateau Region boasts the highest representative herd size at 400 cows, followed by the Western Desert (370), Southeastern Desert (350), and the Strip (300) and Central Mountain (300) regions. In addition to differences in herd size, the value of production and production costs varies across the state. Geography plays a large role in the cost of production as the “area of land required to support one cow for a year varies from approximately 15 acres in the most productive regions to over 100 acres in the driest” (Ruyle, et al., 2000).

While Arizona’s cow-calf and ranching operations occur throughout the state, Arizona’s feedlots are located in areas with warmer climates such as Pinal, Yuma, Maricopa, and Cochise counties. Four of the state’s seven commercial feedlots are located in Pinal County, and one each in Maricopa, Yuma, and Cochise counties. One potential reason why only 15 percent of feeder cattle come from Arizona cow-calf operations is the variance in geography. Cattle raised in the Plateau and Strip regions tend not to produce as well in the feedlots due to the warmer climate of southern/central Arizona.¹⁷

Regardless of the differences across the state in terms of value of production and production costs, cattle ranching operations (including feedlots) remain an important agricultural activity for a majority of the counties in Arizona. Table 3 lists all agricultural operations with sales in 2012, the number of operations with sales of cattle and its respective share of total sales, as well as the ranking¹⁸ of operations with cattle sales compared to operations with sales of other commodities. In seven of fifteen Arizona counties, operations with sales of cattle were the most common type of agricultural operation. At the state level, operations with sales of cattle were the second most common type of operation.

In addition to being a very common agricultural operation, sales of cattle and calves also produce a large share of total agricultural sales in Arizona counties. For example, in Santa Cruz County, approximately 91 percent of the county’s total agricultural sales originated from the sale of cattle and calves (Table 4). In 5 of the 15 Arizona counties, operations with sales of cattle made up the largest share of total value of county agricultural sales, ranking¹⁹ it as the commodity with the highest market value. Cattle and calf sales were 18.8 percent total Arizona agricultural sales in 2012, ranking third in the state.

¹⁷ Personal communication Bas Aja, Arizona Cattle Feeders’ Association, Jan. 22, 2014

¹⁸ Rank is compared to other agricultural operations where data are available. If data are unavailable due to information disclosure, the rank displayed may be misleading. For example, another agricultural industry may have larger proportion of operations with sales (and therefore have a higher rank), but because there is no data due to disclosure issues the industry would not be ranked at all.

¹⁹ Rank is compared to other agricultural operations where data are available. If data are unavailable due to information disclosure, the rank may be misleading. For example, the sale of cattle and calves only accounts for 2.6 percent of Graham County’s total agricultural sales, yet it is ranked second. This may not be an accurate representation if other commodity sectors with data disclosure problems account for a larger share of total sales.

Table 3. Number of Operations with Agricultural and Cattle Sales by County, 2012

County	Total Operations with Sales	Operations with Sales of Cattle	Percentage of Operations with Cattle Sales	County Rank
Apache	5,591	632	11.3%	2
Cochise	1,093	346	31.7%	1
Coconino	2,239	481	21.5%	2
Gila	195	69	35.4%	1
Graham	412	104	25.2%	1
Greenlee	159	55	34.6%	1
La Paz	125	27	21.6%	2
Maricopa	2,479	222	9.0%	4
Mohave	335	126	37.6%	1
Navajo	3,846	601	15.6%	4
Pima	855	154	18.0%	2
Pinal	938	160	17.1%	3
Santa Cruz	236	97	41.1%	1
Yavapai	940	257	27.3%	1
Yuma	562	33	5.9%	6
Arizona	20,005	3,364	16.8%	2

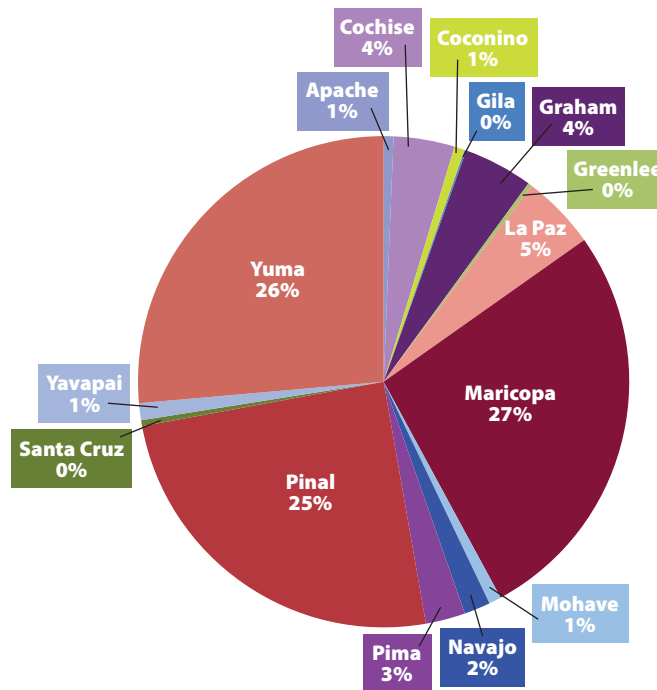
Table 4. Value of Agricultural and Cattle Sales by County, 2012

County	Total Agricultural Sales (\$1,000)	Sales of Cattle and Calves (\$1,000)	Percentage of Total Sales	Rank of Cattle by Sales
Apache	24,194	8,826	36.5%	2
Cochise	149,998	(ND)	(ND)	(ND)
Coconino	25,812	19,009	73.6%	1
Gila	3,752	3,071	81.8%	1
Graham	170,885	4,436	2.6%	2
Greenlee	9,737	(ND)	(ND)	(ND)
La Paz	183,243	4,709	2.6%	4
Maricopa	1,003,475	(ND)	(ND)	(ND)
Mohave	30,184	7,635	25.3%	2
Navajo	64,515	(ND)	(ND)	(ND)
Pima	97,287	(ND)	(ND)	(ND)
Pinal	927,737	314,683	33.9%	1
Santa Cruz	14,658	13,282	90.6%	1
Yavapai	41,628	25,856	62.1%	1
Yuma	985,009	(ND)	(ND)	(ND)
Arizona	3,732,113	700,307	18.8%	3

(ND)–Not disclosable–information is withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c. 2012 Census of Agriculture: Arizona State and County Data: Table 11.

Figure 11. Value of Sales of Cattle and Calves by Arizona County, 2012



Source: USDA, 2014c. 2012 Census of Agriculture: Arizona State and County Data.

As seen in Figure 11, Maricopa, Pinal, and Yuma Counties account for over 75 percent of the total value of sales of cattle in Arizona. This is because the major feedlots are located in these counties.

Arizona’s Cattle Processing: Slaughter and Finishing

Number and Size of Operations

Cattle processing is comprised of slaughtering and processing establishments as well as leather and hide tanning and finishing establishments. The next section of the paper outlines the number and size of these two sectors of the beef industry.

According to the Census Bureau’s County Business Patterns, there were 25 animal slaughtering and processing establishments in Arizona in 2011. This sector is comprised of establishments that are engaged in one of the following: (1) slaughtering animals, (2) preparing processed meats and meat byproducts, and (3) rendering and/or refining animal fat, bones, and meat scraps. Most establishments (14 of the 25) employ fewer than 4 people. However, one of the establishments employs more than 1,000 people (DOC, Census Bureau, 2011).

Of the 25 establishments, only three slaughter plants are under federal inspection and an additional nine slaughter plants are inspected by the state of Arizona (USDA, NASS, 2011). Although there are only 3 establishments that are listed as federally inspected, the USDA Food Safety and Inspection Service (FSIS) directory lists five establishments related to the slaughter and processing of cattle that are eligible for federal inspection. They are JBS Sun Land Tolleson in Tolleson, Arizona; University of Arizona in Tucson, Arizona; Denmark Foods in Peoria, Arizona; Guzman’s Meat in Cochise, Arizona; and US Foods, Inc. in Phoenix, Arizona (USDA, FSIS, 2013).

In 2011, 565,000 head of cattle were commercially slaughtered in Arizona, producing a total live weight of more than 721 million pounds (USDA, NASS, 2011). In the same year, there were over 413 million pounds of red meat produced in the state of

Arizona (USDA, NASS, 2011).²⁰ Again, a relatively large share of slaughter and processing activity is related to the harvesting of Holstein (dairy) cattle.

The 2007 Survey of Business Owners reported that there were 17 firms in Arizona that conducted business related to leather and hide tanning and finishing, with a total employment of 19 or fewer employees within the sector (DOC, Census Bureau, 2007).

Geography

Understanding the geography of where processing plants are located is important for several reasons. First, meatpacking plants have become fewer in number, larger, and steer and heifer slaughtering has become more geographically concentrated by moving closer to where cattle are fed (Ward and Schroeder, 2002). While there are several slaughtering and processing establishments in Arizona, there are technically two major packing plants in the region that receive marketed cattle from Arizona feedlots: JBS Sun Land Tolleson in Tolleson, Arizona and Brawley Beef in Brawley, California.²¹ The sale of cattle across state lines will be an important consideration when conducting the economic contribution analysis as any inputs purchased from outside the state will be considered “leakage,” which will be explained in more detail below.

The Beef Industry’s Contribution to the Arizona Economy

Economists use a variety of methods to understand local economies and the composition of sectors that comprise those economies. This paper uses three different approaches to illustrate the role of the beef industry in the state of Arizona. First, the study examines the value of total exports from the beef industry and estimates whether the industry is a net exporter (total exports – total imports). Then, economic base analysis is used to understand the economic structure of the state of Arizona and determine the relative importance of the beef industry. The study also explores the different roles that cattle ranching plays in local economies across the state. We then use regional economic impact modeling to conduct an economic contribution analysis and estimate the beef industry’s contribution to the Arizona state economy. This analysis includes the multiplier effects from input purchases and spending from profits and salaries.

Each of these analyses uses data from 2011 and wherever possible the analysis was broken down into the three components of the beef industry: cattle ranching and feedlots, slaughter and processing, and leather and hide tanning and finishing.

Total Exports and Net Exports

One of the ways to characterize the importance of an industry is to look at the value of its exports. Export-base theory is based on the idea that a local economy must increase its monetary inflows in order to grow, and the only effective way to do this is to increase exports. Thus, industries with high export sales bring money into the region and promote growth (Simmie, 2008).

²⁰ This figure includes total beef, veal, pork, and lamb and mutton, excluding farm slaughter.

²¹ As of January 2014, the Brawley Beef processing facility is expected to close by April 4, 2014.

Table 5. Beef Industry Total Exports and Percentage Exported by Sector, 2011

Sector	Total Exports	Total Output	Percentage Exported
Cattle ranching and feedlots	\$331,327,633	\$816,171,997	40.6%
Slaughter and processing	\$182,862,169	\$389,269,134	47.0%
Leather and hide tanning and finishing	\$7,147,703	\$7,327,245	97.5%
Beef Industry	\$521,337,505	\$1,212,768,376	43.0%

Source: IMPLAN Group, LLC, 2011.

The beef industry exports approximately \$521 million or 43 percent of its total output outside of the state of Arizona. The component of the beef industry that exports the highest percentage of its total output is the leather and hide tanning and finishing sector. As shown in Table 5, this sector exports approximately 98 percent of its total output to locations outside of Arizona, with a large majority of those products exported outside of the United States. This is in comparison to the other two beef industry sectors, where the slaughter and processing sector exports 47 percent of its total output and the cattle ranching sector exports 41 percent of its total output.

While an analysis of total exports can give a good idea of the proportion of beef industry goods that are sold out of state, net exports are the metric to determine whether the Arizona supply for various beef products is meeting the local demand. Overall, the beef industry is a net importer, importing approximately \$578 million of beef products. However, this is primarily driven by the demand for processed beef products and tanned and finished leather and hides. A large part of this demand is fueled by the Phoenix-Mesa-Glendale Metro Area, which with a population greater than 4.4 million is the 12th largest metropolitan area in the nation. The cattle ranching and feedlot sector, however, is able to meet Arizona's demand for cattle and is a net exporter of \$281 million.

Economic Base Analysis

One of the most widely used approaches to determine the relative importance of an industry to the local economy is to conduct an economic base analysis (Siegel, et al., 1995). This analysis uses an analytical tool known as Location Quotients (LQs) to measure the sector's share of local employment or earnings relative to the national average. When a sector in a region has an LQ > 1.00, it means that the region employs more people (and produces more output) than is needed to meet the demands of their local residents. These sectors are referred to as basic sectors and demonstrate that the region is more specialized in production from that sector than is the nation as a whole. An LQ > 1.25 indicates that the sector is part of the economic base—exporting goods and services outside the region and bringing money into the region from outside. Sectors with LQs ≤ 1.00 indicate the sector is equally specialized or less specialized than the nation. These sectors, called non-basic sectors, typically produce goods and services that are sold and consumed locally. Often these are consumer goods and services purchased from incomes earned from the basic (and other non-basic) sectors.

Table 6 shows how Arizona compares to the nation according to jobs-based location quotients for 20 broad sectors of the economy. The economic base analysis at the state level suggests that Arizona is more specialized than the nation in several industries, among which is the *agriculture, forestry, fishing and hunting* industry. The beef cattle ranching sector is a part of this industry.

Table 6. Arizona’s Economic Sectors by Jobs-based Location Quotient, 2011

Industry	Location Quotient
Administrative and waste services	1.40
Real estate and rental and leasing	1.27
Finance and insurance	1.19
Utilities	1.18
Agriculture, forestry, fishing and hunting	1.14
Educational services	1.11
Construction	1.10
Retail trade	1.09
Accommodation and food services	1.08
Health care and social assistance	0.99
Wholesale trade	0.94
Arts, entertainment, and recreation	0.93
Transportation and warehousing	0.90
Professional and technical services	0.87
Mining, quarrying, and oil and gas extraction	0.86
Other services, except public administration	0.82
Information	0.74
Management of companies and enterprises	0.71
Manufacturing	0.69
Unclassified	0.14

Source: DOL, BLS, 2011: QCEW Data.

As the *agriculture, forestry, fishing and hunting* industry is a broad aggregation of multiple agriculture-related sectors, it is difficult to see how the beef cattle ranching sector contributes to Arizona’s specialization in agriculture. To take a closer look, we conduct the same type of analysis focusing only on Arizona’s agricultural sectors.

As can be seen in Table 7, the *agriculture and forestry support* sector employs nearly twice as many people as the nation, demonstrating the importance of support activities for crop and livestock production including farm labor contracting, breeding services, and cattle spraying. The *other crop farming* (cotton, hay, and seed farming), *vegetable and melon farming*, and *dairy cattle and milk production* sectors are also more specialized than the nation and contribute to the economic base of the state of Arizona. *Beef cattle ranching and feedlots* has a location quotient of 0.70 demonstrating that, when aggregated to the state level, Arizona is less specialized than the nation in cattle ranching. These results also suggest that local production of feeder calves does not meet local demand and thus the state must import feeders.

These state-level statistics, however, include economic activity in urban centers such as the Phoenix and Tucson metropolitan areas. For this reason, they fail to capture the role of ranching in local, rural economies throughout the state. While Arizona as a whole may not be more specialized or concentrated in cattle ranching than the nation, certain Arizona county economies have a strong economic base in cattle ranching and feedlots and are highly specialized in that sector. When examining specialization at a smaller geographic scale, many Arizona counties are more specialized in cattle ranching and feedlots than the nation (Table 8). A prime example is Santa Cruz County

Table 7. Arizona’s Agricultural Sectors by Jobs-based Location Quotient, 2011

Industry	Location Quotient
Agriculture and forestry support activities	1.97
Other crop farming	1.88
Vegetable and melon farming	1.84
Dairy cattle and milk production	1.54
Greenhouse and nursery production	0.76
Beef cattle ranching and feedlots	0.70
Other animal production	0.63
Sheep and goat farming	0.47
Fruit and tree nut farming	0.25
Aquaculture	0.21
Oilseed and grain farming	0.18
Forestry and logging	0.09
Fishing, hunting and trapping	0.03

Source: DOL, BLS, 2011: QCEW Data.

Table 8. Beef Cattle Ranching and Feedlots Jobs-based Location Quotients by County, 2011

Arizona	Location Quotient
Apache County	3.53
Cochise County	4.23
Coconino County	2.21
Gila County	4.35
Graham County	(ND)
Greenlee County	(ND)
La Paz County	(NC)
Maricopa County	0.19
Mohave County	0.95
Navajo County	(ND)
Pima County	(ND)
Pinal County	5.56
Santa Cruz County	9.57
Yavapai County	(ND)
Yuma County	(ND)

(ND) Not Disclosable; (NC) Not Calculable, the data does not exist or it is zero.

Source: DOL, BLS, 2011: QCEW Data.

where relative employment in this sector is nearly 10 times the national average. Aside from the counties where there are problems with data disclosure,²² the only two counties that do not exhibit specialization in cattle production are urban Maricopa County and Mohave County (where there is greater specialization in mining).

In order to capture the importance of cattle ranching in the counties where data were not disclosed, a location quotient was estimated for the combined counties. The counties included in the cumulative analysis were Graham, Greenlee, La Paz, Navajo, Pima, Yavapai, and Yuma. Just as the urban area economic activity affected state-level location quotient estimates, the presence of Pima County and the Tucson metropolitan area within this demographic underestimates the relative importance of ranching in rural areas. With this in mind, a lower bound and upper bound LQ was estimated. At minimum the location quotient for this collection of counties is 1.41, suggesting that ranching is considered part of the economic base. Nevertheless, the upper bound LQ when urban Pima County is accounted for is 4.25, further demonstrating that a majority of Arizona rural counties are more specialized in cattle production than the nation and that ranching is an important part of the counties' economic base.

Location quotients were also calculated at the state level for the two sectors that comprise processing—slaughter and leather and hide tanning and finishing. Using the same data from the Bureau of Labor Statistics (BLS), the slaughter and processing sector has a location quotient of 0.16 suggesting that it is less specialized than the nation and does not make up part of Arizona's economic base. Additionally, the leather and hide tanning and finishing sector is so small that data cannot be disclosed. Data is withheld by the federal government to avoid revealing information about specific, individual operations. Thus, a location quotient could not be calculated for this sector.

²² Government statistics are not reported when such reporting will identify individual operations.

The results of the economic base analysis suggest that although the state of Arizona is not more specialized in cattle production and processing than the nation, a majority of Arizona counties have cattle production as an important part of the local economic base. The high LQs shown in Table 8 for many of the counties in Arizona suggest that the cattle ranching sector is an important sector for these smaller county economies. It also suggests that ranching brings money into the county from the export of its cattle. Individual county profiles are available in the Appendix, and detailed reports are available by request.

Economic Contribution Analysis

The input-output modeling program, IMPLAN, was used to estimate the beef industry's contribution to the Arizona economy. The beef industry is defined as cattle producing and cattle processing (see Figure 2).

The beef industry's contribution to the state economy is more than just the economic activity in cattle production and processing. It includes all of the economic sectors that are related to the beef industry, either directly or indirectly. Sectors that provide inputs to operations that produce beef products are also contributing to the Arizona economy, which without the beef industry would not be operating at the same level of economic activity. These are called backward linkages. The backward linkages include the purchased inputs of goods and services by cattle producers (whether cow-calf or feedlot operators). The total inputs for cattle production were estimated using national info that was modified to meet Arizona conditions and production costs. As recognized by Ruyle, et al., "estimates of the cost of production for livestock are notoriously difficult to make because of the fragmented nature of the industry, and diversity in rangeland conditions and production practices" (2000: 398). Additionally, the income generated by employees of beef operations and input suppliers is spent in other sectors of the Arizona economy, such as health and retail sectors, that generate additional economic activity. Economists describe this as the "ripple effect."

The ripple effect occurs, however, with a dampening effect. This is due to a phenomenon called "leakage." When an industry purchases inputs from outside the study region, those dollars leave the region. Those dollars will not circulate throughout the local economy. This is an important consideration for the beef industry, as the cattle ranching sector must import grain from outside the state for Arizona feedlots and the processing sector imports cattle sources from other regions.

The IMPLAN model estimates the total "ripple" effect from the production and processing of cattle. The effects can be broken down into three separate effects. The *direct effects* of the beef industry are the total output, value added, employment, and income generated by operations that produce beef products—such as the cattle production sector (cow-calf and feedlot operations) and processing sectors (the slaughter and processing sector and the leather and hide tanning and finishing sector). The *indirect effects* are the economic activities that occur in input sectors to the direct industries. This effect would include the output, value added, employment, and income generated in the grain, veterinary services, transportation and distribution services, utilities, as well as other sectors. Finally, *induced effects* are the economic impacts when households employed in beef industry operations and input suppliers spend their paychecks at local businesses. These effects can also be measured in terms of total industry output, value added, employment, and income.

Output

In 2011, the Arizona beef industry generated approximately \$1.2 billion in direct economic output (sales). Just over two-thirds of this amount (\$816 million) was from the sale of cattle and calves²³ from cattle producers (USDA, NASS, 2011).

²³ Cash receipts from marketing and sale of farm slaughter, NASS 2011.

Table 9. Economic Contribution of Beef Industry to Arizona's Economy, 2011

	Direct Effects	Indirect Effects	Induced Effects	Total
Total Output				
Beef Industry	\$1,212,768,378	\$325,835,672	\$166,545,091	\$1,705,149,141
Cattle Ranching and Feedlots	\$816,171,997	\$255,989,187	\$98,242,894	\$1,170,404,078
Animal Processing	\$389,269,135	\$67,301,216	\$66,726,736	\$523,297,087
Hide and Leather Finishing	\$7,327,246	\$2,545,269	\$1,575,461	\$11,447,976
Value Added				
Beef Industry	\$168,323,652	\$160,933,702	\$101,875,619	\$431,132,973
Cattle Ranching and Feedlots	\$136,797,755	\$120,521,282	\$60,094,399	\$317,413,436
Animal Processing	\$30,871,900	\$38,830,070	\$40,817,520	\$110,519,490
Hide and Leather Finishing	\$653,997	\$1,582,350	\$963,700	\$3,200,047
Employment				
Beef Industry	5,411	1,974	1,373	8,758
Cattle Ranching and Feedlots	4,070	1,481	810	6,361
Animal Processing	1,323	474	550	2,346
Hide and Leather Finishing	18	20	13	51
Income				
Beef Industry	\$101,033,446	\$81,555,669	\$57,366,323	\$239,955,438
Cattle Ranching and Feedlots	\$51,576,544	\$56,077,736	\$33,842,034	\$141,496,314
Animal Processing	\$48,741,691	\$24,465,329	\$22,981,595	\$96,188,615
Hide and Leather Finishing	\$715,210	\$1,012,603	\$542,695	\$2,270,509

Data Source: IMPLAN Group, LLC, 2011.

This figure is total cash receipts from the sale of all cattle and calves, which includes all receipts from marketing and sale of farm slaughter. Total industry sales from the animal slaughtering, rendering, and processing sector were estimated to be \$389.3 million and leather and hide tanning and finishing establishments generated approximately \$7.3 million in industry sales (IMPLAN Group, LLC, 2011). These sales figures were used to estimate the total economic contribution of the beef industry (Table 9).

The total gross output (sales) of \$1.2 billion from the beef industry stimulates an additional \$500 million of economic output from other sectors within Arizona. So, directly and indirectly, the beef industry contributes about \$1.7 billion to economic output in the Arizona economy (Table 9). *Total Industry Output* measures the total dollars of goods and services produced by an industry. While the output measure is useful in that it provides a cumulative view of industry-related sales, this metric can inadvertently inflate the estimate of the industry's economic contribution to the state. The problem with this metric is that related industries are aggregated and, in effect, are double counted. The beef industry is an example of where such double counting can occur. In this industry, one animal is bought and sold numerous times and passes through several sectors until it reaches the final product. When the total output of each sector is counted with each intermediate sale, the total output measures include values from the previous chain of economic activity. As a result, economists favor the value added metric, which measures the value of final sales of goods and services. Value added in an individual industry or location measure is what is added together to create gross domestic product (GDP), the measure economists use most to measure the size of the economy.

Table 10. Beef Industry’s Contribution to Arizona Employment, Top 10 Sectors

Economic Sector	Employment
Cattle ranching and feedlots	4,070
Animal (except poultry) slaughtering, rendering, and processing	1,323
Real estate establishments	355
Support activities for agriculture and forestry	339
All other crop farming	313
Food services and drinking places	203
Wholesale trade businesses	159
Transport by truck	142
Monetary authorities and depository credit intermediation activities	122
Securities, commodity contracts, investments, and related activities	96

Source: IMPLAN Group, LLC, 2011.

Value Added

The estimated \$168 million of direct value added for cattle production and processing is linked to an additional \$260 million indirect and induced value added, to bring the industry’s total value-added contribution to just over \$431 million. As stated previously, value added is the appropriate economic concept for estimating the total effects from the beef industry on other industries because it does not double count transactions of the same good; it only measures the net incremental change in value from the last stage of production. In other words, *Value Added* measures the total gain in economic activity and is comprised of the profits of the industry, wages, salaries, and taxes. In effect, value added is synonymous to the measure of gross domestic product (GDP) in the state.

Employment

Finally, according to model estimates, the beef industry directly hires approximately 5,411 people and supports an additional 3,347 jobs in other industries of the Arizona economy, resulting in the beef industry supporting 8,758 jobs. This means that every 100 beef industry jobs contribute to an additional 62 jobs in other industries in Arizona.

Employment, as measured by IMPLAN, is all full-time, part-time, and temporary jobs. Therefore, it accounts for employment not often captured in government statistics. For example, according the Bureau of Labor Statistics employment in beef cattle ranching and feedlots is only 600 (DOL, BLS, 2011), while the model estimates more than 4,000 jobs.

Table 10 lists the top ten economic sectors with employment supported by the beef industry. The top two industries are sectors within the beef industry itself—the *cattle ranching and feedlot* sector and the *animal slaughtering and processing* sector. Other employment tied to the beef industry is from sectors that provide inputs to the cattle ranching and feedlot sector such as *support activities for agriculture and forestry production*, *real estate establishments*, and *all other crop farming*. The *support activities for agriculture and forestry* sector encompasses support for animal production such as breeding services, dairy herd improvement, and livestock spraying. Employment in the *real estate establishment* sector is affected due the large amounts of land required for cattle production, but could also be related to the housing needs of Arizonans. The *all other crop farming* sector is certainly a source of inputs to cattle production as it includes various type of hay farming. Lastly, employment in other sectors is supported by the beef industry through the induced effect. The induced effect captures effects of the beef industry’s employees spending their paychecks and beef industry proprietors spending their incomes. An example of this is the 203 jobs supported in the *food services and drinking places* sector.

Labor Income

The estimate of \$101 million of direct income to cattle producers and processors is linked to an additional \$139 million of income throughout the Arizona economy for a total impact of approximately \$240 million of personal income (IMPLAN Group, LLC, 2011). *Labor income*, also known as total personal income, is comprised of wage and salary income and proprietary income.

As most farm and ranch income is typically reported as proprietor income, this analysis also looks at the contribution of the beef industry to proprietor income. However, while \$3 million of the \$101 million is proprietor's income, a large majority of the proprietor's income comes from the animal-processing sector. Somewhat unexpectedly, the cattle ranching sector did not exhibit that it is responsible for a large share of proprietor income. This is likely due to low returns to cattle ranches. The beef industry's total contribution to proprietor income throughout all sectors of the Arizona economy is estimated to be approximately \$26.8 million (IMPLAN Group, LLC, 2011).

Conclusions and Discussion

It is clear that the beef industry represents an important part of agricultural activity throughout the state and contributes to the Arizona economy. As a whole, the beef industry, defined in this paper as cattle production (both cow calf ranching and feedlot operations) and processing (slaughter and leather and hide tanning and finishing establishments), contributed \$1.7 billion to state output. Approximately \$1.2 billion of this output is directly related to beef industry sales and \$0.5 billion in sales is generated in other Arizona industries. The beef industry also contributed approximately \$431 million to Arizona's GDP and a total of 8,758 jobs.

Ranching is an important agricultural activity in Arizona as beef cattle ranching is the third most common of all agricultural operations in Arizona, with 21 percent of all farms in Arizona specializing in beef production. Additionally, the market value of cattle and calves sold in 2012 accounted for just over 18 percent of total agricultural sales in Arizona, placing it as the 3rd highest agricultural commodity sold.

The ranching sector is also an important component of public land management as nearly three-quarters of Arizona's total land is managed by grazing. Well-managed grazing practices and range management can lead to positive impacts such as reductions in fuels for fires, improved watersheds, and wildlife habitat.

The importance of the beef industry, particularly cattle production, is even more evident when looking at Arizona's counties. Seven of the 15 counties in Arizona had agricultural operations with sales of cattle as the most numerous type of operation. In addition to being very common, 5 of the 15 counties had sales of cattle and calves as the largest percentage of total agricultural sales and ranked number one in terms of commodity sales. Furthermore, ranching is considered part of the economic base in six of eight counties (where data were available), meaning that this industry typically employs more jobs than the national average and exports its goods, bringing money into the local economy. In the remaining counties where data were unavailable (Graham, Greenlee, La Paz, Navajo, Pima, Yavapai, and Yuma counties), lower bound and upper bound location quotients were estimated. At minimum, the location quotient for this collection of counties was 1.41 and at maximum it was 4.25, suggesting that ranching is also considered part of the economic base of these local economies. Individual county beef industry profiles are presented in the Appendix.

While this analysis was conducted with the latest NASS cash receipt data available, the beef industry's contribution to the Arizona economy can vary from year to year depending on the value of sales in the beef industry sectors. As cattle production

follows a cyclical nature with higher inventories resulting in lower returns and profits, and lower inventories resulting in higher returns, the total economic contribution can also vary from year to year.

References

- Arizona Department of Agriculture. 2012. *Arizona Department of Agriculture Annual Report FY 2012–2013*. Available at <http://azmemory.azlibrary.gov/cdm/ref/collection/statepubs/id/661>.
- Close, Don, and Pablo Sherwell. 2013. “U.S. and Mexico Feeder Cattle Supplies.” *Rabobank Industry Note #363*, January 2013.
- Goldstein, Joshua H., Carrie K. Presnall, Laura López-Hoffman, Gary P. Nabhan, Richard L. Knight, George B. Ruyle, and Theodore P. Toombs. 2011. “Beef and Beyond: Paying for Ecosystem Service on Western US Rangelands.” *Rangelands* 33(5):4–12.
- IMPLAN Group, LLC. 2011. IMPLAN System (data and software). 16740 Birkdale Commons Parkway, Suite 206, Huntersville, NC 28078, www.IMPLAN.com.
- Marti, Daniel L., Rachel J. Johnson, and Kenneth H. Mathews, Jr. 2011. “Where’s the (Not) Meat?: Byproducts from Beef and Pork Production,” U.S. Department of Agriculture (USDA), Economic Research Service (ERS), Outlook No. LDP-M-209-01. Available at http://www.ers.usda.gov/publications/ldpm-livestock,-dairy,-and-poultry-outlook/ldpm209-01.aspx#.U_Jmo0ivz-g.
- Mathews, Jr., Kenneth H., and Rachel J. Johnson. 2013. “Alternative Beef Production Systems: Issues and Implications.” U.S. Department of Agriculture (USDA), Economic Research Service (ERS), Outlook No. LDPM-218-01. Available at http://www.ers.usda.gov/publications/ldpm-livestock,-dairy,-and-poultry-outlook/ldpm21801.aspx#.U_JstUivz-g.
- Ruyle, George B., Russell Tronstad, Diane W. Hadley, Philip Heilman, and David A. King. 2000. “Commercial Livestock Operation in Arizona.” *Livestock Management in the American Southwest: Ecology, Society, and Economics*. Ed. R. Jemison and C. Raish. Elsevier Science.
- Siegel, Paul B., Thomas G. Johnson, and Jeffrey Alwang. 1995. “Regional Economic Diversity and Diversification.” *Growth and Change* 26(2):261–284.
- Simmie, J. 2008. “The Contribution of Clustering to Innovation: From Porter I Agglomeration to Porter II Export Base Theories.” In *Handbook of Research on Innovation and Clusters: Cases and Policies, Volume 2*, ed. C. Karlsson, pp. 19–32. Edward Elgar Publishing.
- Teegerstrom, Trent, and Russell Tronstad. 2000. “Cost and Return Estimates for Cow/Calf Ranches in Five Regions of Arizona.” Cooperative Extension, AZ119. Department of Agricultural and Resource Economics, The University of Arizona.
- U.S. Department of Agriculture (USDA). 2014a. “Animal Production: Beef Resources.” Available at http://www.usda.gov/wps/portal/usda/usdahome?navid=ANIMAL_PRODUCATION. Accessed February 5, 2014.

- U.S. Department of Agriculture (USDA). 2014b. *2012 Census of Agriculture: United States Summary and State Data*, Volume 1, Geographic Area Series, Part 51 AC 12-A-51. Issued May 2014. Available at <http://www.agcensus.usda.gov/Publications/2012/>.
- U.S. Department of Agriculture (USDA). 2014c. *2012 Census of Agriculture: Arizona State and County Data*, Volume 1, Geographic Area Series, Part 3 AC 12-A-3. Issued May 2014. Available at <http://www.agcensus.usda.gov/Publications/2012/>.
- U.S. Department of Agriculture (USDA), Economic Research Service (ERS). 2014. "Data Products: Major Land Uses." Available at <http://www.ers.usda.gov/data-products/major-land-uses.aspx#UvLE0z1dWi4>. Accessed February 5, 2014.
- U.S. Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS). 2013. "FSIS Meat, Poultry, and Egg Product Inspection Directory" as of November 1, 2013. Available at <http://www.fsis.usda.gov/wps/portal/fsis/topics/inspection/mpi-directory>. Accessed December 12, 2013.
- U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). 2011. *Arizona Agricultural Statistics Bulletin*.
- U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). 2013a. "2013 Arizona Livestock Summary." Available at http://www.nass.usda.gov/Statistics_by_State/Arizona/Publications/Annual_Livestock_Summary/.
- U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). 2013b. "Cattle on Feed." Available at <http://usda01.library.cornell.edu/usda/nass/CattOnFe/2010s/2013/CattOnFe-09-20-2013.pdf>. Released September 20, 2013.
- U.S. Department of Commerce (DOC), United States Census Bureau. 2007. "Survey of Business Owners. Statistics for All U.S. Firms by Industry, Gender, Ethnicity, and Race for the U.S., States, Metro Areas, Counties, and Places: 2007. Table SB700CSA01." Available at http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=SBO_2007_00CSA01&prodType=table.
- U.S. Department of Commerce (DOC), United States Census Bureau. 2011. "County Business Patterns (NAICS)." Data retrieved from 2011 database. Available at <http://censtats.census.gov/cgi-bin/cbpnaic/cbpdetl.pl>.
- U.S. Department of Interior (DOI), Bureau of Land Management (BLM). 2014. "Fact Sheet on the BLM's Management of Livestock Grazing." Available at <http://www.blm.gov/wo/st/en/prog/grazing.html>. Accessed May 12, 2014.
- U.S. Department of Labor (DOL), Bureau of Labor Statistics (BLS). 2011. "Quarterly Census of Employment and Wages (QCEW)." Available at http://data.bls.gov/location_quotient/ControllerServlet.
- Vernooij, Albert, and Don Close. 2013. "Outlook for Global and Regional Markets." *Rabobank Beef Quarterly* Q4-2013.
- Ward, Clement and Ted Schroeder. 2002. "Structural Changes in Cattle Feeding and Meat Packing." Oklahoma State Cooperative Extension Service, AGEC-553.

Appendix

Introduction

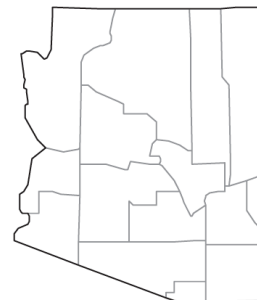
Cattle ranching remains an important part of Arizona agriculture, making various contributions to Arizona county economies and to the state economy as a whole. The beef industry extends beyond cattle production (cow-calf ranches and feedlots) and includes the value-added activities from cattle processing in slaughter and leather and hide tanning and finishing establishments. In addition, economic activity in the beef industry has multiplier effects, generating additional jobs and sales in the local economy. The beef industry purchases inputs from other sectors of the economy (indirect effects) and earnings (profits and wages) from the industry are spent on Arizona goods and services (induced effects). These multiplier effects provide additional stimulus to other sectors of the local economy that one can measure by output (sales), value added (GDP), labor income, and jobs.

This is a summary report of The Contribution of the Beef Industry to the Arizona Economy. It includes a beef industry profile for the state of Arizona and as well as for each of Arizona's 15 counties. These profiles report the contribution of the beef industry to the local economy, a summary of cattle ranching activities in the region, and a determination of whether cattle ranching is part of the region's economic base.

Each profile refers to a particular geographic area (either the state as a whole or one of Arizona's counties). Each area is modeled individually using the IMPLAN Group, LLC software, with the model reflecting conditions of the local economy. This is an important consideration for several reasons. First, the beef industry definition provided above is not consistent across geographies. At the state level, there are numerous ranching operations, animal slaughtering establishments, and leather and hide tanning and finishing establishments. This is not necessarily the case at the county level. Some Arizona counties do not have any cattle processing establishments. For these counties, the beef industry is comprised solely of the beef cattle ranching sector. Each profile has a footnote that denotes the industry definition used. Second, when inputs are purchased or incomes are spent outside of the region; those dollars leave the area and no longer circulate throughout the local economy. This phenomenon is called "leakage" and results in a discrepancy between the state results and the sum of the 15 county results. For example, in the state model, a rancher in Gila County can buy inputs from a business in Maricopa County and there would be no leakage out of the Arizona state economy, the geographic area modeled. In the Gila County model, however, those purchases result in leakage because the area being modeled is the Gila County economy. Therefore, the economic contribution of the beef industry to Arizona is greater than the sum of the contributions from each individual county.

Finally, we provide some definitions of terms from the IMPLAN modeling system. Labor income includes all forms of employment income, including employee compensation (wages and benefits) and proprietor income. Jobs refer to full-time and part-time wage and salary employment. Persons who are self-employed, proprietors, or unpaid family workers are not included in the jobs estimates. Proprietor income, however, is counted as part of labor income. Output is the value of production. In IMPLAN, this represents annual production estimates for the year of the data set valued in producer prices. Value added is the difference between total output and the cost of intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus.

THE CONTRIBUTION OF THE BEEF INDUSTRY TO THE STATE OF ARIZONA



In 2011, the estimated contribution of the beef industry¹ to total economic output in the state of Arizona was \$1.7 billion.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$1,212,768,378	\$325,835,672	\$166,545,091	\$1,705,149,141
Value Added	\$168,323,652	\$160,933,702	\$101,875,619	\$431,132,973
Employment	5,411	1,974	1,373	8,758
Labor Income	\$101,033,446	\$81,555,669	\$57,366,323	\$239,955,438

Source: IMPLAN Group, LLC, 2011

The beef industry in the state of Arizona is comprised of the beef cattle ranching sector with estimated output (sales) of \$816 million, the animal processing sector with output (sales) of about \$389 million, and the leather and hide tanning and finishing sector with output (sales) of \$7.3 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$1.2 billion. The direct effects of the beef industry also include more than \$168 million in value added (the local equivalent of gross domestic product, GDP), \$101 million in labor income (proprietor's income plus employee compensation), and 5,411 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the state economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the state economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Arizona economy is \$1.7 billion in output, \$431 million in value added, and about \$240 million in labor income.**

Every 100 beef industry jobs in Arizona support an additional 62 jobs in other industries. The beef industry supports 8,758 jobs. 5,411 of those jobs are directly attributed to the beef industry and the additional 3,347 jobs are a result of economic activity stimulated by the beef industry that occurs in other sectors of the Arizona economy (IMPLAN Group, LLC, 2011).

¹ The beef industry in Arizona is comprised of the beef cattle ranching sector, the animal processing sector, and the leather and hide tanning and finishing sector.

The Arizona beef cattle ranching sector manages 71% of the state’s cattle and calf inventory, which is valued at more than \$1 billion. The state inventory of 911,334 represents valuable assets that can be placed at risk by prolonged drought or weather extremes. The beef industry manages 71% of these assets while the dairy industry manages the remaining 29% (USDA, 2014c).

Sales of cattle accounted for 18.8% of total Arizona agricultural sales, placing it as the 3rd highest agricultural commodity sold.

Agricultural Product	Farms	Sales (\$1,000)	Percent of Total Sales
<i>Total Sales</i>	20,005	3,732,113	100.0%
Vegetables, melons, potatoes, and sweet potatoes	1,750	764,062	20.5%
Milk and other dairy products from cows	104	762,957	20.4%
Cattle and calves	3,364	700,307	18.8%
Other crops and hay	1,287	425,203	11.4%
Nursery, greenhouse, floriculture, and sod	453	315,548	8.5%
Cotton and cottonseed	388	224,486	6.0%
Horses, ponies, mules, burros, and donkeys	1,954	31,801	0.9%
Sheep, goats, and their products *	4,250	11,276	0.3%
Aquaculture	34	5,363	0.1%
Grains, oilseeds, dry beans, and dry peas	2,015	(D)	(D)
Fruits, tree nuts, and berries	966	(D)	(D)
Poultry and eggs	922	(D)	(D)
Hogs and pigs	354	(D)	(D)
Other animals and other animal products	660	(D)	(D)
Cut Christmas trees and short rotation woody crops	3	(D)	(D)
Tobacco	-	-	-

- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

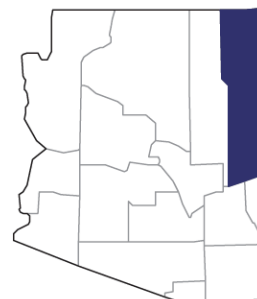
Source: USDA, 2014c.

21% of Arizona farms are specialized in beef cattle ranching. This means that 4,215 farms in Arizona have more than 50% of their total agricultural sales originating from the sale of cattle and calves (USDA, 2014c).

The total market value of capital assets of Arizona beef cattle operations is more than \$5.2 billion. Assets in land, buildings, and machinery in Arizona beef cattle operations average more than \$1.2 million per ranching operation, significantly higher than the national average (USDA, 2014c).

Grazing is the dominant land use in the state of Arizona. Approximately 73% of Arizona’s total land area is grazing land. When focusing only on Arizona’s agricultural lands, grazing accounts for 98%, with crop land accounting for the remaining 2% (USDA, ERS, 2014).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO APACHE COUNTY



In 2011, the estimated contribution of the beef industry² to total economic output in Apache County was \$11.2 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$9,553,719	\$1,523,702	\$135,704	\$11,213,125
Value Added	\$1,545,380	\$1,016,109	\$84,476	\$2,645,965
Employment	397	16	1	414
Labor Income	\$180,044	\$271,851	\$32,650	\$484,545

Source: IMPLAN Group, LLC, 2011

The beef industry in Apache County is comprised of the beef cattle ranching sector with estimated output (sales) of \$8.6 million and the animal processing sector with output (sales) of about \$1 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is approximately \$9.6 million. The direct effects of the beef industry also include more than \$1.5 million in value added (the local equivalent of gross domestic product, GDP), \$180,000 in labor income (proprietor’s income plus employee compensation), and 397 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Apache County economy is \$11.2 million in output, \$2.6 million in value added, about \$485,000 in labor income, and 414 total jobs.**

18% of Apache County farms are specialized in beef cattle ranching. This means that 1,022 farms in Apache County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the third most numerous type of agricultural operation in this county (USDA, 2014c).

² The beef industry in Apache County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Apache County accounts for 4% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Apache County is estimated to be 32,682 head, accounting for 4% of Arizona’s total inventory (USDA, 2014c).

Sales of cattle accounted for 36.5% of total Apache County agricultural sales.

Apache County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	5,591	24,194	100.0%
Vegetables, melons, potatoes, and sweet potatoes	550	11,328	46.8%
Cattle and calves	632	8,826	36.5%
Sheep, goats, and their products	2,142	1,287	5.3%
Other crops and hay	120	1,220	5.0%
Horses, ponies, mules, burros, and donkeys	251	735	3.0%
Grains, oilseeds, dry beans, and dry peas	595	586	2.4%
Other animals and other animal products	42	84	0.3%
Fruits, tree nuts, and berries	16	38	0.2%
Milk and other dairy products from cows	15	26	0.1%
Nursery, greenhouse, floriculture, and sod	7	25	0.1%
Poultry and eggs	61	19	0.1%
Hogs and pigs	38	19	0.1%
Cotton and cottonseed	-	-	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

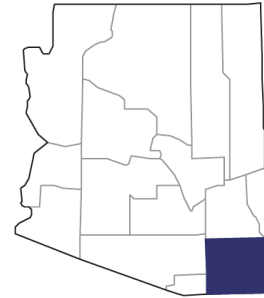
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Apache County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 3.53 demonstrates that employment in cattle ranching in Apache County is more than 3 and a half times the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Apache County is a net exporter. Apache County's beef cattle ranching sector exports a total of \$4.7 million outside the county, bringing money into the local economy. It accounts for 12% of total agricultural exports and 0.5% of economy wide exports. Of the 116 sectors in the county economy, the cattle ranching sector is ranked 40th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO COCHISE COUNTY



In 2011, the estimated contribution of the beef industry³ to total economic output in Cochise County was \$59.1 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$52,406,567	\$4,454,071	\$2,199,908	\$59,060,546
Value Added	\$6,294,084	\$2,638,696	\$1,345,559	\$10,278,339
Employment	234	35	20	289
Labor Income	\$6,249,910	\$830,670	\$584,996	\$7,665,577

Source: IMPLAN Group, LLC, 2011

The beef industry in Cochise County is comprised of the beef cattle ranching sector with output (sales) of \$34.5 million and the animal processing sector with output (sales) of \$17.9 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$52.4 million. The direct effects of the beef industry also include approximately \$6.3 million in value added (the local equivalent of gross domestic product, GDP), \$6.2 million in labor income (proprietor’s income plus employee compensation) and 234 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Cochise County economy is \$59.1 million in output, \$10.3 million in value added, \$7.7 million in labor income, and 289 total jobs.**

30% of Cochise County farms are specialized in beef cattle ranching. This means that 324 farms in Cochise County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the most numerous type of agricultural operation in this county (USDA, 2014c).

³ The beef industry in Cochise County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Cochise County accounts for 6% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Cochise County is estimated to be about 56,725 head, accounting for more than 6% of Arizona’s inventory (USDA, 2014c).

Cattle sales data are not disclosed in Cochise County to protect individual info.

Cochise County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	1,093	149,998	100%
Grains, oilseeds, dry beans, and dry peas	50	36,661	24%
Fruits, tree nuts, and berries	151	32,616	22%
Other crops and hay	95	21,072	14%
Cotton and cottonseed	11	5,265	4%
Horses, ponies, mules, burros, and donkeys	110	729	0.5%
Sheep, goats, and their products	85	564	0.4%
Other animals and other animal products	66	323	0.2%
Poultry and eggs	136	297	0.2%
Hogs and pigs	66	166	0.1%
Vegetables, melons, potatoes, and sweet potatoes	26	(D)	
Milk and other dairy products from cows	14	(D)	
Cattle and calves	346	(D)	
Nursery, greenhouse, floriculture, and sod	19	(D)	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

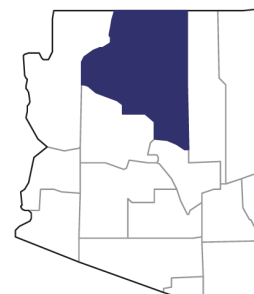
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Cochise County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 4.23 demonstrates that employment in cattle ranching in Cochise County is more than 4 times the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Cochise County is a net exporter. Cochise County's beef cattle ranching sector exports a total of \$9.9 million outside the county, bringing money into the local economy. It accounts for 4% of total agricultural exports and 0.5% of economy wide exports. Of the 117 sectors in the county economy, the cattle ranching sector is ranked 40th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO COCONINO COUNTY



In 2011, the estimated contribution of the beef industry⁴ total economic output in Coconino County was \$25.8 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$22,509,981	\$2,610,151	\$634,334	\$25,754,466
Value Added	\$3,605,707	\$1,507,581	\$385,273	\$5,498,562
Employment	304	33	6	343
Labor Income	\$755,001	\$533,380	\$210,694	\$1,499,074

Source: IMPLAN Group, LLC, 2011

The beef industry in Coconino County is comprised of the beef cattle ranching sector with output (sales) estimated at \$20.2 million and then animal processing sector with output (sales) estimated at \$2.3 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$22.5 million. The direct effects of the beef industry also include more than \$3.6 million in value added (the equivalent of gross domestic product, GDP), \$755,000 in labor income (proprietor’s income plus employee compensation, and 304 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Coconino County economy is \$25.8 million in output, \$5.5 million in value added, \$1.5 million in labor income and 343 jobs.**

31% of Coconino County farms are specialized in beef cattle ranching. This means that 696 farms in Coconino County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of agricultural operation in this county (USDA, 2014c).

⁴ The beef industry in Coconino County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Coconino County accounts for 5% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Coconino County is estimated to be about 49,318 head, accounting for 5% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 73.6% of total Coconino County agricultural sales.

Coconino County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	2,239	25,812	100.0%
Cattle and calves	481	19,009	73.6%
Sheep, goats, and their products	492	2,816	10.9%
Vegetables, melons, potatoes, and sweet potatoes	238	1,974	7.6%
Aquaculture	3	666	2.6%
Horses, ponies, mules, burros, and donkeys	134	661	2.6%
Other animals and other animal products	31	246	1.0%
Grains, oilseeds, dry beans, and dry peas	257	198	0.8%
Nursery, greenhouse, floriculture, and sod	18	125	0.5%
Hogs and pigs	31	45	0.2%
Fruits, tree nuts, and berries	9	39	0.2%
Other crops and hay	34	21	0.1%
Poultry and eggs	29	11	0.0%
Milk and other dairy products from cows	-	-	
Cotton and cottonseed	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

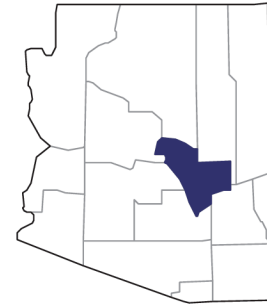
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Coconino County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 2.21 demonstrates that employment in cattle ranching in Coconino County is more than twice the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Coconino County is a net exporter. Coconino County's beef cattle ranching sector exports a total of \$13.9 million outside the county, bringing money into the local economy. It accounts for 33% of total agricultural exports and 0.3% of economy wide exports. Of the 190 sectors in the county economy, the cattle ranching sector is ranked 54th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO GILA COUNTY



In 2011, the estimated contribution of the beef industry⁵ to total economic output in Gila County was \$14.1 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$12,650,063	\$743,301	\$699,766	\$14,093,131
Value Added	\$1,949,866	\$393,325	\$400,502	\$2,743,693
Employment	63	7	6	76
Labor Income	\$1,814,625	\$201,662	\$201,911	\$2,218,199

Source: IMPLAN Group, LLC, 2011

The beef industry in Gila County is comprised of the beef cattle ranching sector with estimated output (sales) of \$3.4 million and the animal processing sector with output (sales) of \$9.2 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output for the industry is more than \$12.6 million. The direct effects of the beef industry also include more than \$1.9 million in value added (the local equivalent of gross domestic product, GDP), \$1.8 million in labor income (proprietor’s income plus employee compensation), and 63 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Gila County economy is \$14.1 million in output, \$2.7 million in value added, \$2.2 million in labor income, and 76 total jobs.**

53% of Gila County farms are specialized in beef cattle ranching. This means that 104 farms in Gila County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the most numerous type of agricultural operation in this county (USDA, 2014c).

⁵ The beef industry in Gila County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Gila County accounts for 1% of Arizona’s inventory of cattle and calves. Inventory of cattle in Gila County is estimated to be 10,626 head, accounting for 1% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 81.8% of total Gila County agricultural sales.

Gila County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	195	3,752	100.0%
Cattle and calves	69	3,071	81.8%
Other animals and other animal products	7	141	3.8%
Grains, oilseeds, dry beans, and dry peas	5	117	3.1%
Sheep, goats, and their products	11	87	2.3%
Fruits, tree nuts, and berries	12	57	1.5%
Nursery, greenhouse, floriculture, and sod	4	26	0.7%
Hogs and pigs	3	1	0.0%
Vegetables, melons, potatoes, and sweet potatoes	2	(D)	
Other crops and hay	4	(D)	
Poultry and eggs	7	(D)	
Horses, ponies, mules, burros, and donkeys	18	(D)	
Milk and other dairy products from cows	-	-	
Cotton and cottonseed	-	-	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

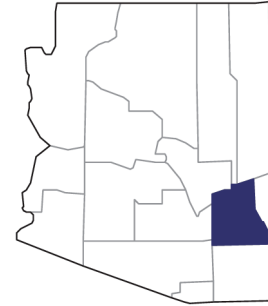
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Gila County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 4.35 demonstrates that employment in cattle ranching in Gila County is more than 4 times the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

Local demand for cattle exceeds Gila County production, therefore the beef cattle ranching sector must import cattle from other counties. All cattle produced in Gila County are used to meet local demand. Local demand exceeds supply. Thus, the beef cattle ranching sector in Gila County is a net importer (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO GRAHAM COUNTY



In 2011, the estimated contribution of the beef industry⁶ to total economic output in Graham County was \$4.8 million.

Impact Type	Direct Effect	Indirect & Induced Effects	Total Effect
Output	\$4,556,062	\$292,247	\$4,848,309
Value Added	\$763,637	\$174,395	\$938,032
Employment	17	2	19
Labor Income	\$333,503	\$71,460	\$404,963

Source: IMPLAN Group, LLC, 2011

The beef industry in Graham County is comprised solely of the beef cattle ranching sector with estimated output (sales) of \$4.6 million (USDA, NASS, 2011). The animal processing and leather and hide tanning and finishing sectors are not included because there are no local operations. The direct effects of the beef industry also include more than \$763,000 in value added (the local equivalent of gross domestic product, GDP), \$333,000 in labor income (proprietor’s income plus employee compensation), and 17 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Graham County economy is \$4.8 million in output, \$938,000 in value added, \$405,000 in labor income, and 19 total jobs.**

33% of Graham County farms are specialized in beef cattle ranching. This means that 138 farms in Graham County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the most numerous type of agricultural operation in this county (USDA, 2014c).

⁶ The beef industry in Graham County is comprised solely of the beef cattle ranching sector. It does not include the animal processing sector or the leather and hide tanning and finishing sector because there are no local operations.

Graham County accounts for 1% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Graham County is estimated to be 12,635 head, accounting for 1% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 2.6% of total Graham County agricultural sales.

Graham County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	412	170,885	100.0%
Grains, oilseeds, dry beans, and dry peas	17	14,275	8.4%
Cattle and calves	104	4,436	2.6%
Fruits, tree nuts, and berries	41	2,719	1.6%
Other crops and hay	92	2,203	1.3%
Vegetables, melons, potatoes, and sweet potatoes	4	766	0.4%
Horses, ponies, mules, burros, and donkeys	54	402	0.2%
Other animals and other animal products	15	101	0.1%
Sheep, goats, and their products	24	43	0.03%
Poultry and eggs	25	27	0.02%
Hogs and pigs	13	17	0.01%
Nursery, greenhouse, floriculture, and sod	8	(D)	
Cotton and cottonseed	48	(D)	
Cut Christmas trees and short rotation woody crops	3	(D)	
Milk and other dairy products from cows	-	-	
Aquaculture	-	-	
Tobacco	-	-	

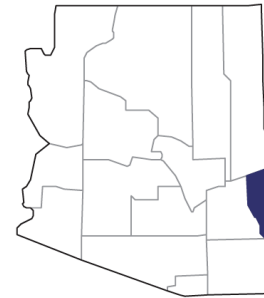
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is part of Graham County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Graham County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Graham County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, Graham County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Graham County is a net exporter. Graham County's beef cattle ranching sector exports a total of \$2.6 million outside the county, bringing money into the local economy. It accounts for 4% of total agricultural exports and 0.3% of economy wide exports. Of the 126 sectors in the county economy, the cattle ranching sector is ranked 34th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO GREENLEE COUNTY



In 2011, the estimated contribution of the beef industry⁷ to total economic output in Greenlee County was \$3.3 million.

Impact Type	Direct Effect	Indirect & Induced Effects	Total Effect
Output	\$2,932,309	\$359,504	\$3,291,813
Value Added	\$491,482	\$230,251	\$721,733
Employment	9	3	12
Labor Income	\$92,083	\$107,289	\$199,372

Source: IMPLAN Group, LLC, 2011

The beef industry in Greenlee County is comprised solely of the beef cattle ranching sector with estimated direct output (sales) of \$2.9 million (USDA, NASS, 2011). The animal processing and leather and hide tanning and finishing sectors are not included because there are no local operations. The direct effects of the beef industry also include more than \$491,000 in value added (the equivalent of gross domestic product, GDP), \$92,000 in labor income (proprietor’s income plus employee compensation), and 9 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Greenlee County economy is \$3.3 million in output, \$722,000 in value added, \$200,000 in labor income, and 12 total jobs.**

30% of Greenlee County farms are specialized in beef cattle ranching. This means that 47 farms in Greenlee County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of operation in this county (USDA, 2014c).

⁷ The beef industry in Greenlee County is comprised solely of the beef cattle ranching sector. It does not include the animal processing sector or the leather and hide tanning and finishing sector because there are no local operations.

Greenlee County accounts for 1% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Greenlee County is estimated to be 7,837 head, accounting for 1% of Arizona’s inventory (USDA, 2014c).

Cattle sales data are not disclosed in Greenlee County to protect individual info.

Greenlee County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	159	9,737	100.0%
Other crops and hay	15	1,345	13.8%
Sheep, goats, and their products	20	248	2.5%
Horses, ponies, mules, burros, and donkeys	30	160	1.6%
Aquaculture	3	120	1.2%
Poultry and eggs	11	3	0.0%
Hogs and pigs	4	2	0.0%
Milk and other dairy products from cows	1	(D)	
Cattle and calves	55	(D)	
Nursery, greenhouse, floriculture, and sod	1	(D)	
Cotton and cottonseed	6	(D)	
Grains, oilseeds, dry beans, and dry peas	11	(D)	
Fruits, tree nuts, and berries	12	(D)	
Other animals and other animal products	2	(D)	
Vegetables, melons, potatoes, and sweet potatoes	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

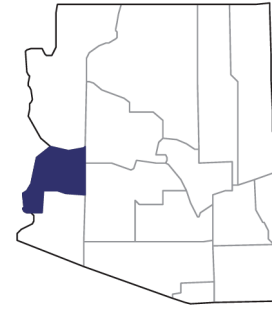
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is part of Greenlee County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Greenlee County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Greenlee County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, Greenlee County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Greenlee County is a net exporter. Greenlee County's beef cattle ranching sector exports a total of \$1.5 million outside the county, bringing money into the local economy. It accounts for 7% of total agricultural exports and 0.1% of economy wide exports. Of the 78 sectors in the county economy, the cattle ranching sector is ranked 26th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO LA PAZ COUNTY



In 2011, the estimated contribution of the beef industry⁸ to total economic output in La Paz County was \$2.3 million.

Impact Type	Direct Effect	Indirect & Induced Effects	Total Effect
Output	\$2,096,243	\$185,476	\$2,281,719
Value Added	\$351,351	\$82,589	\$433,940
Employment	12	1	13
Labor Income	\$33,327	\$23,150	\$56,477

Source: IMPLAN Group, LLC, 2011.

The beef industry in La Paz County is comprised solely of the beef cattle ranching sector with estimated direct output (sales) of \$2.1 million (USDA, NASS, 2011). The animal processing and leather and hide tanning and finishing sectors are not included because there are no local operations. The direct effects of the beef industry also include more than \$351,000 in value added (the equivalent of gross domestic product, GDP), \$33,000 in labor income (proprietor’s income plus employee compensation), and 12 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total economic contribution of the beef industry to the La Paz County economy is \$2.3 million in output, \$434,000 in value added, \$56,000 in labor income and 13 total jobs.**

18% of La Paz County farms are specialized in beef cattle ranching. This means that 23 farms in La Paz County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of agricultural operation in this county (USDA, 2014c).

⁸ The beef industry in La Paz County is comprised solely of the beef cattle ranching sector. It does not include the animal processing sector or the leather and hide tanning and finishing sector because there are no local operations.

La Paz County accounts for 1% of Arizona’s inventory of cattle and calves.

Inventory of cattle in La Paz County is estimated to be 11,437 head, accounting for 1% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 2.6% of total La Paz County agricultural sales.

La Paz County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	125	183,243	100.0%
Other crops and hay	72	97,744	53.3%
Cotton and cottonseed	16	26,366	14.4%
Grains, oilseeds, dry beans, and dry peas	17	8,627	4.7%
Cattle and calves	27	4,709	2.6%
Nursery, greenhouse, floriculture, and sod	6	6	0.0%
Sheep, goats, and their products	4	4	0.0%
Vegetables, melons, potatoes, and sweet potatoes	3	(D)	
Milk and other dairy products from cows	1	(D)	
Fruits, tree nuts, and berries	1	(D)	
Poultry and eggs	2	(D)	
Hogs and pigs	5	(D)	
Horses, ponies, mules, burros, and donkeys	1	(D)	
Other animals and other animal products	1	(D)	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

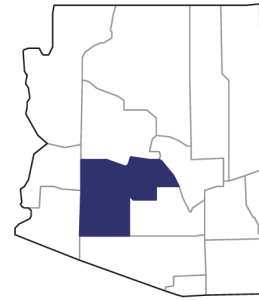
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Source: USDA, 2014c.

Cattle ranching is part of La Paz County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for La Paz County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for La Paz County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, it is clear that La Paz County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (BLS QCEW, 2011).

The beef cattle ranching sector in La Paz County is a net exporter. La Paz County's beef cattle ranching sector exports more than \$850,000 outside the county, bringing money into the local economy. It accounts for 0.3% of total agricultural exports and 0.2% of economy wide exports. Of the 109 sectors in the county economy, the cattle ranching sector is ranked 47th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO MARICOPA COUNTY



In 2011, the estimated contribution of the beef industry⁹ to total economic output in Maricopa County was \$575.9 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$431,969,840	\$76,151,586	\$67,822,930	\$575,944,356
Value Added	\$43,274,140	\$46,551,454	\$42,665,200	\$132,490,794
Employment	1,449	527	551	2,527
Labor Income	\$52,671,640	\$27,533,367	\$24,471,783	\$104,676,789

Source: IMPLAN Group, LLC, 2011

The beef industry in Maricopa County is comprised of the beef cattle ranching sector with estimated output (sales) of \$92.4 million, the animal processing sector with output (sales) of \$332.2 million, and the leather and hide tanning and finishing sector with output (sales) of \$7.3 million. Total direct output from the industry is \$431.9 million. The direct effects of the beef industry also include \$43.3 million in value added (the equivalent of gross domestic product, GDP), \$52.7 million in labor income (proprietor’s income plus employee compensation), and 1,449 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Maricopa County economy is \$575.9 million, \$132.5 million in value added, \$104.7 in labor income, and 2,527 jobs.**

8% of Maricopa County farms are specialized in beef cattle ranching. This means that 201 farms in Maricopa County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of agricultural operation in this county (USDA, 2014c).

⁹ The beef industry in Maricopa County is comprised of the beef cattle ranching sector, the animal processing sector, and the leather and hide tanning and finishing sector.

Maricopa County accounts for 20% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Maricopa County is estimated to be 181,835 head, accounting for 20% of Arizona’s inventory (USDA, 2014c).

Cattle sales data are not disclosed in Maricopa County to protect individual info.

Maricopa County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	2479	1,003,475	100.0%
Milk and other dairy products from cows	45	398,256	39.7%
Nursery, greenhouse, floriculture, and sod	148	128,888	12.8%
Other crops and hay	247	119,298	11.9%
Vegetables, melons, potatoes, and sweet potatoes	84	101,259	10.1%
Grains, oilseeds, dry beans, and dry peas	141	47,976	4.8%
Cotton and cottonseed	79	40,457	4.0%
Horses, ponies, mules, burros, and donkeys	605	13,644	1.4%
Fruits, tree nuts, and berries	261	9,016	0.9%
Aquaculture	10	3,330	0.3%
Hogs and pigs	71	748	0.1%
Sheep, goats, and their products	129	521	0.1%
Cattle and calves	222	(D)	
Poultry and eggs	192	(D)	
Other animals and other animal products	191	(D)	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

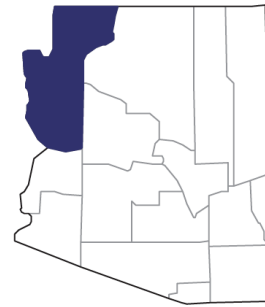
Beef cattle ranching is not considered part of Maricopa County’s economic base, primarily because the county is largely an urban area.

The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 0.19 demonstrates that employment in cattle ranching in Maricopa County is approximately 20% of the national average and is not considered part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

Local demand for cattle exceeds Maricopa County production, therefore the beef cattle ranching sector must import cattle from outside the county.

Although Maricopa County has approximately \$91.6 million in cattle exports (equaling 9% of total agricultural exports and 0.1% of economy wide exports), it is still a net importer of cattle due to demand from a large animal processing facility (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO MOHAVE COUNTY



In 2011, the estimated contribution of the beef industry¹⁰ to total economic output in Mohave County was \$9.3 million.

Impact Type	Direct Effect	Indirect & Induced Effects	Total Effect
Output	\$7,880,996	\$1,467,649	\$9,348,645
Value Added	\$1,320,927	\$866,368	\$2,187,295
Employment	66	11	77
Labor Income	\$1,291,947	\$379,621	\$1,671,568

Source: IMPLAN Group, LLC, 2011.

The beef industry in Mohave County is comprised solely of the beef cattle ranching sector with estimated direct output (sales) of \$7.9 million (USDA, NASS, 2011). The animal processing and leather and hide tanning and finishing sectors are not included because there are no local operations. The direct effects of the beef industry also include approximately \$1.3 million in value added (the equivalent of gross domestic product, GDP), \$1.3 million in labor income (proprietor’s income plus employee compensation), and 66 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total economic contribution of the beef industry to the Mohave County economy is \$9.3 million in output, \$2.2 in value added, \$1.7 million in labor income, and 77 total jobs.**

40% of Mohave County farms are specialized in beef cattle ranching. This means that 133 farms in Mohave County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the most numerous type of agricultural operation in this county (USDA, 2014c).

¹⁰ The beef industry in Mohave County is comprised solely of the beef cattle ranching sector. It does not include the animal processing sector or the leather and hide tanning and finishing sector because there are no local operations.

Data are not available regarding Mohave County inventory of cattle and calves.

Data on the total inventory of cattle and calves in Mohave County is not disclosed by the Census of Agriculture to protect individual ranch information (USDA, 2014c).

Sales of cattle accounted for 25.3% of total Mohave County agricultural sales.

Mohave County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	335	30,184	100.0%
Other crops and hay	19	13,157	43.6%
Cattle and calves	126	7,635	25.3%
Cotton and cottonseed	10	6,963	23.1%
Aquaculture	3	474	1.6%
Horses, ponies, mules, burros, and donkeys	40	361	1.2%
Vegetables, melons, potatoes, and sweet potatoes	8	220	0.7%
Nursery, greenhouse, floriculture, and sod	30	158	0.5%
Other animals and other animal products	23	148	0.5%
Poultry and eggs	42	21	0.1%
Milk and other dairy products from cows	2	(D)	
Grains, oilseeds, dry beans, and dry peas	1	(D)	
Fruits, tree nuts, and berries	18	(D)	
Hogs and pigs	1	(D)	
Sheep, goats, and their products	24	(D)	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

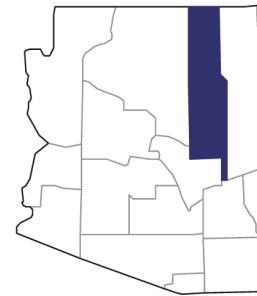
Source: USDA, 2014c.

Beef cattle ranching is not considered part of Mohave County's economic base.

The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county's *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 0.95 demonstrates that employment in cattle ranching in Mohave County is 5% lower than the national average and that ranching is not considered part of the county's economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Mohave County is a net exporter. Mohave County's beef cattle ranching sector exports a total of \$7.7 million outside the county, bringing money into the local economy. It accounts for 18% of total agricultural exports and 0.3% of economy wide exports. Of the 224 sectors in the county economy, the cattle ranching sector is ranked 63rd in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO NAVAJO COUNTY



In 2011, the estimated contribution of the beef industry¹¹ to total economic output in Navajo County was \$62.6 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$57,004,802	\$4,363,570	\$1,193,080	\$62,561,452
Value Added	\$8,733,937	\$2,488,143	\$711,000	\$11,933,079
Employment	335	40	11	386
Labor Income	\$1,779,324	\$947,226	\$334,421	\$3,060,970

Source: IMPLAN Group, LLC, 2011

The beef industry in Navajo County is comprised of the beef cattle ranching sector with estimated output (sales) of \$51.3 million and the animal processing sector with output (sales) of \$5.7 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$57 million. The direct effects of the beef industry also include more than \$8.7 million in value added (the local equivalent of gross domestic product, GDP), \$1.8 million in labor income (proprietor’s income plus employee compensation), and 335 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Navajo County economy is \$62.6 million in output, \$11.9 in value added, \$3.1 million in labor income, and 386 total jobs.**

22% of Navajo County farms are specialized in beef cattle ranching. This means that 828 farms in Navajo County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of operation in this county (USDA, 2014c).

¹¹ The beef industry in Navajo County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Navajo County accounts for 3% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Navajo County is estimated to be 26,133 head, accounting for 3% of Arizona’s inventory (USDA, 2014c).

Cattle sales data are not disclosed in Navajo County to protect individual info.

Navajo County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	3846	64,515	100.0%
Vegetables, melons, potatoes, and sweet potatoes	628	4,234	6.6%
Sheep, goats, and their products	1114	1,100	1.7%
Grains, oilseeds, dry beans, and dry peas	652	1,019	1.6%
Horses, ponies, mules, burros, and donkeys	209	736	1.1%
Nursery, greenhouse, floriculture, and sod	17	404	0.6%
Other crops and hay	95	164	0.3%
Other animals and other animal products	38	71	0.1%
Poultry and eggs	82	35	0.1%
Fruits, tree nuts, and berries	14	16	0.0%
Cattle and calves	601	(D)	
Hogs and pigs	50	(D)	
Aquaculture	1	(D)	
Milk and other dairy products from cows	-	-	
Cotton and cottonseed	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

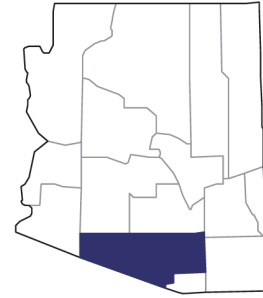
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is part of Navajo County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Navajo County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Navajo County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, it is clear that Navajo County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (DOL BLS, 2011).

The beef cattle ranching sector in Navajo County is a net exporter. Navajo County's beef cattle ranching sector exports a total of \$26.5 million outside the county, bringing money into the local economy. It accounts for 20% of total agricultural exports and 1.6% of economy wide exports. Of the 159 sectors in the county economy, the cattle ranching sector is ranked 11th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO PIMA COUNTY



In 2011, the estimated total economic contribution of the beef industry¹² in Pima County was \$18.1 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$14,256,220	\$2,692,752	\$1,169,387	\$18,118,359
Value Added	\$2,147,511	\$1,610,587	\$707,113	\$4,465,211
Employment	43	23	11	76
Labor Income	\$1,255,941	\$654,695	\$395,055	\$2,305,691

Source: IMPLAN Group, LLC, 2011

The beef industry in Pima County is comprised of the beef cattle ranching sector with estimated output (sales) of \$10.3 million and the animal processing sector with output (sales) of \$3.9 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$14.2 million. The direct effects of the beef industry also include more than \$2.1 million in value added (the local equivalent of gross domestic product, GDP), \$1.3 million in labor income (proprietor’s income plus employee compensation), and 43 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Pima County economy is \$18.1 million in output, \$4.5 million in value added, \$2.3 million in labor income, and 76 jobs.**

21% of Pima County farms are specialized in beef cattle ranching. This means that 176 farms in Pima County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of operation in this county (USDA, 2014c).

¹² The beef industry in Pima County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Pima County accounts for 2% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Pima County is estimated to be 18,312 head, accounting for 2% of Arizona’s inventory (USDA, 2014c).

Cattle sales data are not disclosed in Pima County to protect individual info.

Pima County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	855	97,287	100.0%
Cotton and cottonseed	15	10,486	10.8%
Other crops and hay	19	10,122	10.4%
Horses, ponies, mules, burros, and donkeys	155	7,649	7.9%
Vegetables, melons, potatoes, and sweet potatoes	56	1,989	2.0%
Other animals and other animal products	82	1,178	1.2%
Hogs and pigs	24	375	0.4%
Poultry and eggs	102	54	0.1%
Milk and other dairy products from cows	1	(D)	
Cattle and calves	154	(D)	
Nursery, greenhouse, floriculture, and sod	74	(D)	
Grains, oilseeds, dry beans, and dry peas	11	(D)	
Fruits, tree nuts, and berries	44	(D)	
Aquaculture	1	(D)	
Sheep, goats, and their products	51	(D)	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

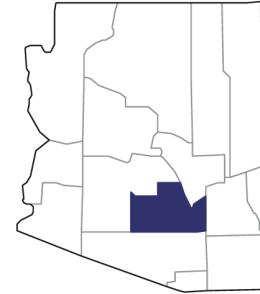
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is not considered part of Pima County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Pima County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Pima County beef cattle ranching is less than 1.00. From this approximate measure, it is clear that Pima County does not have more employment in beef cattle ranching than the national average and that ranching is not considered part of the county’s economic base. This is primarily because the county is largely an urban area (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Pima County is a net exporter. Pima County's beef cattle ranching sector exports a total of \$10.2 million outside the county, bringing money into the local economy. It accounts for 5% of total agricultural exports and 0.05% of economy wide exports. Of the 302 sectors in the county economy, the cattle ranching sector is ranked 152nd in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO PINAL COUNTY



In 2011, the estimated contribution of the beef industry¹³ to total economic output in Pinal County was \$466.3 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$440,574,414	\$18,026,630	\$7,687,276	\$466,288,320
Value Added	\$73,342,830	\$11,683,141	\$4,902,452	\$89,928,423
Employment	659	149	58	866
Labor Income	\$27,312,727	\$4,012,532	\$1,865,938	\$33,191,196

Source: IMPLAN Group, LLC, 2011

The beef industry in Pinal County is comprised of the beef cattle ranching sector with estimated output (sales) of \$432.4 million and the animal processing sector with output (sales) of \$8.2 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is approximately \$440.6 million. The direct effects of the beef industry also include more than \$73.3 million in value added (the local equivalent of gross domestic product, GDP), \$27.3 million in labor income (proprietor’s income plus employee compensation), and 659 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Pinal County economy is \$466.3 million in output, \$89.9 million in value added, \$33.2 million in labor income, and 866 total jobs.**

14% of Pinal County farms are specialized in beef cattle ranching. This means that 135 farms in Pinal County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the third most numerous type of agricultural operation in this county (USDA, 2014c).

¹³ The beef industry in Pinal County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Pinal County accounts for 34% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Pinal County is estimated to be 306,517 head, accounting for 34% of Arizona’s inventory. This is the largest share of any Arizona county (USDA, 2014c).

Sales of cattle accounted for 33.9% of total Pinal County agricultural sales.

Pinal County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	938	927,737	100.0%
Cattle and calves	160	314,683	33.9%
Milk and other dairy products from cows	24	294,886	31.8%
Cotton and cottonseed	148	94,008	10.1%
Other crops and hay	241	91,840	9.9%
Grains, oilseeds, dry beans, and dry peas	161	61,800	6.7%
Fruits, tree nuts, and berries	34	7,781	0.8%
Horses, ponies, mules, burros, and donkeys	127	1,661	0.2%
Sheep, goats, and their products *	74	457	0.0%
Other animals and other animal products	41	317	0.0%
Hogs and pigs	21	6	0.0%
Vegetables, melons, potatoes, and sweet potatoes	30	(D)	
Nursery, greenhouse, floriculture, and sod	37	(D)	
Poultry and eggs	70	(D)	
Aquaculture	7	(D)	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

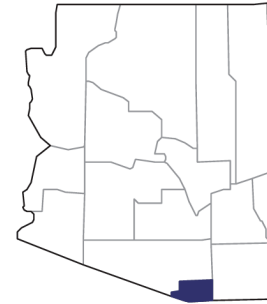
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Pinal County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 5.56 demonstrates that employment in cattle ranching in Pinal County is more than 5 and a half times the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Pinal County is a net exporter. Pinal County's beef cattle ranching sector exports a total of \$421 million outside the county, bringing money into the local economy. It accounts for 38% of total agricultural exports and 6.2% of economy wide exports, the highest share of all Arizona counties. Of the 206 sectors in the county economy, the cattle ranching sector is ranked 3rd in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO SANTA CRUZ COUNTY



In 2011, the estimated contribution of the beef industry¹⁴ to total economic output in Santa Cruz County was \$5.9 million.

Impact Type	Direct Effect	Indirect & Induced Effects	Total Effect
Output	\$5,029,576	\$887,001	\$5,916,577
Value Added	\$843,002	\$498,199	\$1,341,201
Employment	32	8	40
Labor Income	\$310,029	\$214,418	\$524,447

Source: IMPLAN Group, LLC, 2011

The beef industry in Santa Cruz County is comprised solely of the beef cattle ranching sector with estimated direct output (sales) of \$5.0 million (USDA, NASS, 2011). The animal processing and leather and hide tanning and finishing sectors are not included because there are no local operations. The direct effects of the beef industry also include \$843,000 in value added (the equivalent of gross domestic product, GDP), \$310,000 in labor income (proprietor’s income plus employee compensation), and 32 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Santa Cruz County economy is \$5.9 million in output, \$1.3 million in value added, \$524,000 in labor income, and 40 total jobs.**

44% of Santa Cruz County farms are specialized in beef cattle ranching. This means that 105 farms in Santa Cruz County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the most numerous type of operation in this county (USDA, 2014c).

¹⁴ The beef industry in Santa Cruz County is comprised solely of the beef cattle ranching. It does not include the animal processing sector or the leather and hide tanning and finishing sector because there are no local operations.

Santa Cruz County accounts for 2% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Santa Cruz County is estimated to be 21,177 head, accounting for 2% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 90.6% of total Santa Cruz County agricultural sales.

Santa Cruz County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	236	14,658	100.0%
Cattle and calves	97	13,282	90.6%
Horses, ponies, mules, burros, and donkeys	42	527	3.6%
Fruits, tree nuts, and berries	13	349	2.4%
Other animals and other animal products	8	106	0.7%
Vegetables, melons, potatoes, and sweet potatoes	11	83	0.6%
Poultry and eggs	12	11	0.1%
Nursery, greenhouse, floriculture, and sod	11	(D)	
Other crops and hay	5	(D)	
Grains, oilseeds, dry beans, and dry peas	2	(D)	
Hogs and pigs	2	(D)	
Sheep, goats, and their products *	8	(D)	
Milk and other dairy products from cows	-	-	
Cotton and cottonseed	-	-	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

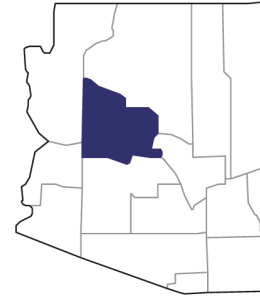
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Beef cattle ranching is part of Santa Cruz County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. The LQ of 9.57 demonstrates that employment in cattle ranching in Santa Cruz County is nearly 10 times the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Santa Cruz County is a net exporter. Santa Cruz County's beef cattle ranching sector exports a total of \$2.8 million outside the county, bringing money into the local economy. It accounts for 18% of total agricultural exports and 0.4% of economy wide exports. Of the 149 sectors in the county economy, the cattle ranching sector is ranked 44th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO YAVAPAI COUNTY



In 2011, the estimated contribution of the beef industry¹⁵ to total economic output in Yavapai County was \$48.6 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$43,774,556	\$3,583,388	\$1,281,910	\$48,639,854
Value Added	\$6,369,839	\$2,156,362	\$776,777	\$9,302,978
Employment	204	32	12	248
Labor Income	\$2,051,403	\$790,595	\$382,106	\$3,224,105

Source: IMPLAN Group, LLC, 2011

The beef industry in Yavapai County is comprised of the beef cattle ranching sector with estimated output (sales) of \$37 million and the animal processing sector with output (sales) of approximately \$6.8 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is approximately \$43.8 million. The direct effects of the beef industry also include approximately \$6.4 million in value added (the local equivalent of gross domestic product, GDP), \$2.1 million in labor income (proprietor’s income plus employee compensation), and 204 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Yavapai County economy is \$48.6 million in output, \$9.3 million in value added, \$3.2 million in labor income, and 248 total jobs.**

28% of Yavapai County farms are specialized in beef cattle ranching. This means that 260 farms in Yavapai County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the second most numerous type of operation in this county (USDA, 2014c).

¹⁵ The beef industry in Yavapai County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Yavapai County accounts for 5% of Arizona’s inventory of cattle and calves.

Inventory of cattle in Yavapai County is estimated to be 43,144 head, accounting for 5% of Arizona’s inventory (USDA, 2014c).

Sales of cattle accounted for 62% of total Yavapai County agricultural sales.

Yavapai County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	940	41,628	100%
Cattle and calves	257	25,856	62%
Nursery, greenhouse, floriculture, and sod	64	7,782	19%
Horses, ponies, mules, burros, and donkeys	154	4,247	10%
Vegetables, melons, potatoes, and sweet potatoes	57	1,133	3%
Fruits, tree nuts, and berries	84	649	2%
Other animals and other animal products	94	643	2%
Other crops and hay	47	591	1%
Grains, oilseeds, dry beans, and dry peas	7	452	1%
Poultry and eggs	120	167	0.4%
Sheep, goats, and their products	59	101	0.2%
Hogs and pigs	9	7	0.0%
Milk and other dairy products from cows	-	-	
Cotton and cottonseed	-	-	
Aquaculture	-	-	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

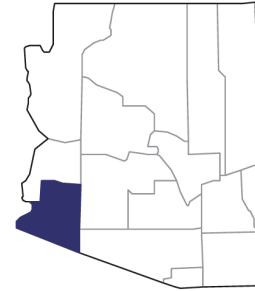
- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is part of Yavapai County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Yavapai County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Yavapai County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, it is clear that Yavapai County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Yavapai County is a net exporter. Yavapai County's beef cattle ranching sector exports a total of \$25.8 million outside the county, bringing money into the local economy. It accounts for 24% of total agricultural exports and 0.7% of economy wide exports. Of the 226 sectors in the county economy, the cattle ranching sector is ranked 39th in exports (IMPLAN Group, LLC, 2011).

THE CONTRIBUTION OF THE BEEF INDUSTRY TO YUMA COUNTY



In 2011, the estimated contribution of the beef industry¹⁶ to total economic output in Yuma County was \$141.2 million.

Impact Type	Direct Effect	Indirect Effect	Induced Effect	Total Effect
Output	\$128,509,692	\$9,344,484	\$3,335,372	\$141,189,548
Value Added	\$21,093,724	\$6,179,112	\$2,076,014	\$29,348,849
Employment	266	80	31	378
Labor Income	\$6,787,531	\$2,853,992	\$1,109,503	\$10,751,025

Source: IMPLAN Group, LLC, 2011

The beef industry in Yuma County is comprised of the beef cattle ranching sector with estimated output (sales) of \$125.4 million and the animal processing sector with output (sales) of \$3.1 million (USDA, NASS, 2011; IMPLAN Group, LLC, 2011). Total direct output from the industry is more than \$128.5 million. The direct effects of the beef industry also include \$21.1 million in value added (the local equivalent of gross domestic product, GDP), \$6.8 million in labor income (proprietor’s income plus employee compensation), and 266 jobs (part- and full-time jobs).

Economic activity of the beef industry also has multiplier effects, generating additional jobs and sales in other sectors of the local economy. Indirect effects account for beef industry purchases of inputs, while induced effects account for proprietor and employee spending from their incomes. These multiplier effects provide additional stimulus to the local economy. Accounting for these multiplier effects, **the total contribution of the beef industry to the Yuma County economy is \$141.2 million in output, \$29.3 million in value added, \$10.8 million in labor income, and 378 total jobs.**

4% of Yuma County farms are specialized in beef cattle ranching. This means that 23 farms in Yuma County have more than 50% of their total agricultural sales originating from the sale of cattle and calves. Ranches specializing in cattle production are the fifth most numerous type of operation in this county (USDA, 2014c).

¹⁶ The beef industry in Yuma County is comprised of the beef cattle ranching sector and the animal processing sector. It does not include the leather and hide tanning and finishing sector because there are no local operations.

Data are not available regarding Yuma County inventory of cattle and calves.

Data on the total inventory of cattle and calves in Yuma County is not disclosed by the Census of Agriculture to protect individual ranch information (USDA, 2014c).

Cattle sales data are not disclosed in Yuma County to protect individual info.

Yuma County	Farms	Sales (\$1,000)	Percent of Total Sales
Total Sales	562	985,009	100.0%
Vegetables, melons, potatoes, and sweet potatoes	53	579,124	58.8%
Other crops and hay	182	66063	6.7%
Grains, oilseeds, dry beans, and dry peas	88	52023	5.3%
Nursery, greenhouse, floriculture, and sod	9	2850	0.3%
Other animals and other animal products	19	849	0.1%
Aquaculture	6	337	0.0%
Horses, ponies, mules, burros, and donkeys	24	169	0.0%
Hogs and pigs	16	73	0.0%
Poultry and eggs	31	12	0.0%
Milk and other dairy products from cows	1	(D)	
Cattle and calves	33	(D)	
Cotton and cottonseed	55	(D)	
Fruits, tree nuts, and berries	256	(D)	
Sheep, goats, and their products	13	(D)	
Cut Christmas trees and short rotation woody crops	-	-	
Tobacco	-	-	

- represents zero; (D) Data withheld to avoid disclosing data for individual farms.

Source: USDA, 2014c.

Cattle ranching is part of Yuma County’s economic base. The location quotient (LQ) is a measure used in regional economics to assess the relative importance of a sector to a local economy. An LQ greater than 1.00 indicates the sector employs more people (and produces more output) than is needed just to meet demands of local residents. An LQ greater than 1.25 indicates that the sector is part of a county’s *economic base* – exporting goods and services outside the county and bringing money into the county from outside. Data is not available for Yuma County because the federal government does not report county-level economic data that could reveal business information about specific operations. From data reported for other counties, however, it is possible to estimate that the LQ for Yuma County beef cattle ranching is between 1.41 and 4.25. From this approximate measure, it is clear that Yuma County has more employment in beef cattle ranching than the national average and that ranching is part of the county’s economic base (DOL, BLS, 2011: QCEW Data).

The beef cattle ranching sector in Yuma County is a net exporter. Yuma County's beef cattle ranching sector exports a total of \$124.4 million outside the county, bringing money into the local economy. It accounts for 7% of total agricultural exports and 3% of economy wide exports. Of the 198 sectors in the county economy, the cattle ranching sector is ranked 6th in exports (IMPLAN Group, LLC, 2011).

References

- IMPLAN Group, LLC. 2011. IMPLAN System (data and software). 16740 Birkdale Commons Parkway, Suite 206, Huntersville, NC 28078 www.IMPLAN.com
- U.S. Department of Agriculture (USDA). 2014c. *2012 Census of Agriculture: Arizona State and County Data*, Volume 1, Geographic Area Series, Part 3 AC-12-A-3. Issued May 2014. Available at <http://www.agcensus.usda.gov/Publications/2012/2/>.
- U.S. Department of Agriculture (USDA), Economic Research Service (ERS). 2014. “Data Products: Major Land Uses.” Available at <http://www.ers.usda.gov/data-products/major-land-uses.aspx#.UvLE0z1dWi4>. Accessed February 5, 2014.
- U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). 2011. *Arizona Agricultural Statistics Bulletin*.
- U.S. Department of Labor (DOL), Bureau of Labor Statistics (BLS). 2011. “Quarterly Census of Employment and Wages (QCEW).” Available at http://bls.gov/location_quotient/ControllerServlet.

