

Economic Contribution of the Beef Cattle Industry to New Mexico

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INTRODUCTION

Agriculture has a long and important role in New Mexico's economy, culture, and identity. This publication provides an economic overview of New Mexico agriculture and data related to its economic contribution to the state's economy. Included are basic industries identified for New Mexico and its counties, and estimated total economic contribution of all agriculture (including the beef cattle industry) and the beef cattle industry specifically.

NEW MEXICO'S AGRICULTURAL ECONOMY

New Mexico had 24,721 farms in 2012 (USDA, 2012), a 38% increase over the number of farms in 1997. However, farm acreage has decreased from 46.1 million acres (1997) to 43.2 million acres (2012).

In addition to these non-federal agricultural lands², there are approximately 23.3 million acres held by the United States Forest Service (FS) and Bureau of Land Management (BLM) that are assumed to be available for grazing (Vincent et al., 2017). When these acres are included, the total New Mexico acreage involved in agriculture is 85.5% of the state's area (Figure 1).



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² Land in farms is an operating unit concept and includes land owned and operated as well as land rented from others. Land used rent-free was reported as land rented from others. All grazing land, **except land used under government permits** on a per-head basis, was included as "land in farms" provided it was part of a farm or ranch. Land under the exclusive use of a grazing association was reported by the grazing association and included as land in farms. All land in American Indian Reservations used for growing crops, grazing livestock, or with the potential of grazing livestock was included as land in farms (USDA, 2012).

SUMMARY

- Most of New Mexico's land use is agricultural, including agricultural contributions of public land use.
- The most recent Census of Agriculture (USDA, 2012) estimates there are 8,989 beef cattle ranches in New Mexico, with an average size of 3,242 acres per ranch and average net income of \$5,628 per ranch.
- Beef cattle ranching contributes a total (direct, indirect, and induced effects³) of 16,087 jobs, \$1.68 billion in output, and \$448 million in labor income⁴.
- An average beef cattle ranch contributes to the local economy an estimated 1.79 jobs, \$187,361 in output, and \$49,810 in labor income per ranch.
- Twenty-six percent of beef cattle operations share their net income with more than one household.
- Contrary to popular belief, only three-tenths of one percent of beef cattle ranches are corporations other than family held.
- All agriculture and related industries (including beef cattle ranches) are basic industries for the state and a majority of New Mexico counties.
- Agriculture is a major export industry within New Mexico, which means it brings in outside dollars to increase local incomes and jobs.
- Agriculture and related industries contribute an estimated total of 48,356 jobs, over \$5.9 billion in output, and over \$2.0 billion in labor income to New Mexico's economy.

New Mexico Agricultural Statistics (USDA, 2012)

- New Mexico land use
 - 43.2 million acres in agriculture, non-federal (includes State Trust Lands and American Indian Reservations)
 - ◆ 5.4 million acres in crop production (12.5%)
 - ◆ 37.8 million acres in animal production (87.5%)
- Agricultural land use (including beef cattle ranches)
 - 24,721 farms statewide, with an average farm size of 1,748 acres
 - Average net income per farm of \$9,501
 - 0.5% of farms had greater than \$500,000 in value of product sold
 - Over 19% of farm principal operators are female
 - 27% of farm principal operators are 70-years-old or older
 - 24% of farm operations share the net income with more than one household
 - Almost 0.4% of farms are corporations other than family held
- Beef cattle ranching
 - 8,989 ranches with beef cattle ranching as their primary industry, with an average size of 3,242 acres per ranch
 - Average net income per ranch of \$5,628
 - Only 2.1% of beef cattle ranches had greater than \$500,000 in value of product sold
 - Over 17% of beef cattle ranch principal operators are female
 - 27% of beef cattle ranch principal operators are 70-years-old or older
 - 26% of beef cattle operations share the net income with more than one household
 - 0.3% of ranches are corporations other than family held

³For this analysis, the direct effect is the total value of output, the indirect effect is the impact of local industries buying goods and services from other local industries, and the induced effect is money recirculated through household spending patterns that causes further local economic activity (<https://implanhelp.zendesk.com/hc/en-us/sections/115002653168-Glossary>).

⁴Labor income includes employee compensation and proprietor income.

ECONOMIC TERM EXPLANATIONS

Location Quotients

A location quotient (LQ) measures the relative importance of an industry to a local economy as compared to the larger/wider economy. Mathematically, the location quotient for New Mexico is calculated as:

$$LQ = \frac{(\text{Employment in NM industry} / \text{total employment in NM})}{(\text{Employment in U.S. industry} / \text{total employment in the U.S.})}$$

An LQ greater than 1 indicates that the number of local jobs within a specific industry is greater than the proportion of jobs within that industry at the national level. A higher LQ suggests that the industry is proportionally more important to the local economy as compared to the larger, e.g., U.S. economy. The LQ also assumes that a basic industry produces more than is consumed locally, meaning it is a net exporter that brings income and jobs into the local economy.

Basic or Base Industry

“According to economic base theory, any local economy may be divided into basic and non-basic industries. This theory also suggests that economic growth depends on sectors that export goods and services out of the region (basic industries), as opposed to those businesses whose services remain local (non-basic industries). Basic industries promote local economic growth by bringing jobs and income into the local economy. Non-basic industries serve local residents and provide support to basic industries.” (The Office of Policy Analysis at Arrowhead Center, 2016a; p. 1)

Location quotients are commonly used to explore the importance of particular industries on local economies. For example, the Office of Policy Analysis at Arrowhead Center (OPAAC) utilized LQs and U.S. Department of Commerce’s Bureau of Economic Analysis data to determine the basic industries for New Mexico and individual counties (OPAAC, 2016b). Even though the OPAAC analysis included both public and private sectors, our analysis only includes the private sector. The tables below present OPAAC-identified basic industries for New Mexico and county economies.

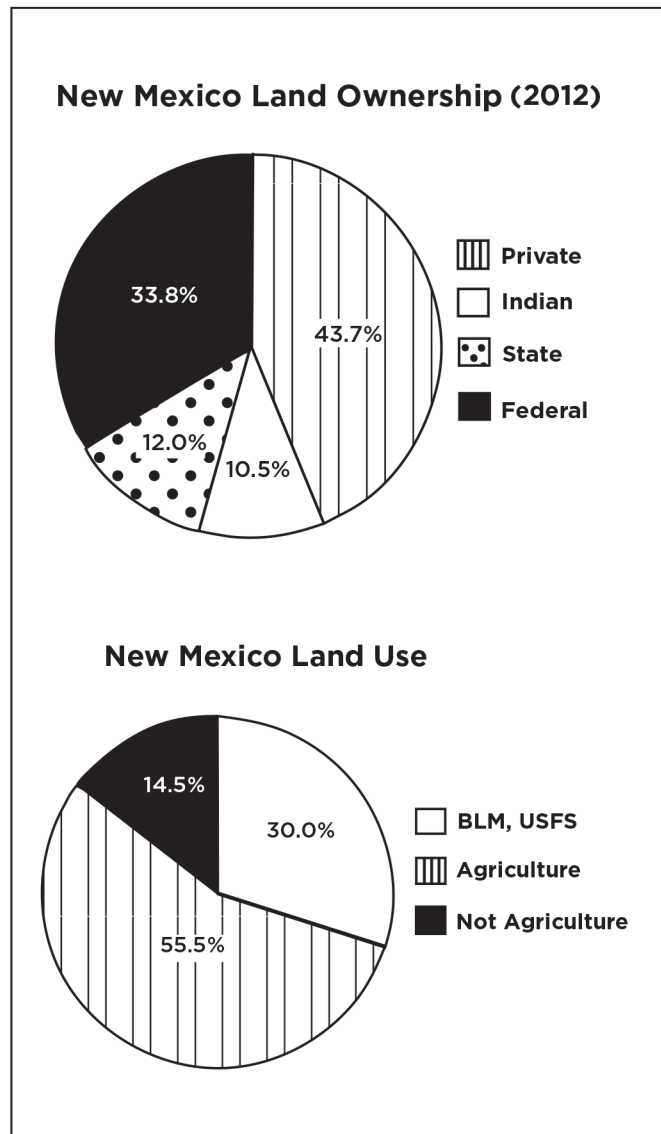


Figure 1. New Mexico land ownership and land use (USDA 2012, Vincent, et.al. 2017)

| New Mexico Basic Industry Summary | New Mexico | | Counties | | |
|--|----------------|------|--|-------------------|-------------------|
| | Basic industry | LQ | Number of counties with basic industry | Low LQ (county) | High LQ (county) |
| Mining | X | 4.14 | 10* | 1.31 (Taos) | 31.35 (Lea) |
| Agriculture and related industries | X | 1.89 | 30 | 1.32 (Lea) | 30.31 (Harding) |
| Utilities | X | 1.35 | 19 | 1.29 (Curry) | 6.75 (Cibola) |
| Accommodation and food services | X | 1.12 | 15* | 1.01 (San Juan) | 2.60 (Guadalupe) |
| Construction and maintenance | X | 1.06 | 13 | 1.00 (Colfax) | 1.53 (Lea) |
| Health care and social assistance | X | 1.06 | 8 | 1.00 (Taos) | 1.40 (Doña Ana) |
| Retail trade | X | 1.05 | 21 | 1.00 (Cibola) | 1.51 (Lincoln) |
| Professional, scientific, and technical services | X | 1.02 | 2 | 1.12 (Santa Fe) | 1.33 (Bernalillo) |
| Transportation and warehousing | | 0.69 | 7* | 1.15 (Hidalgo) | 2.06 (Valencia) |
| Arts, entertainment, and recreation | | 1.01 | 6* | 1.08 (Rio Arriba) | 3.80 (Taos) |
| Real estate and rental and leasing | | 0.80 | 4* | 1.00 (Sandoval) | 1.28 (Lincoln) |
| Information | | 0.82 | 3 | 1.08 (Sandoval) | 1.25 (Bernalillo) |
| Other services, except public administration | | 0.87 | 3 | 1.01 (Valencia) | 1.70 (Colfax) |
| Wholesale trade | | 0.73 | 1 | 1.17 (Torrance) | 2.45 (McKinley) |
| Manufacturing | | 0.45 | 2 | 1.17 (Sandoval) | 1.42 (Luna) |
| Administrative and waste management | | 0.78 | 1* | | 1.41 (Sandoval) |
| Management of companies and enterprises | | 0.41 | 1 | | 1.29 (Curry) |
| Educational services | | 0.65 | 1 | | 1.25 (Santa Fe) |

* A sector included in the count; although identified as a basic industry in the county report, the LQ was not equal to or greater than 1.

DATA

Table 1 Notes and Observations

Table 1 presents a summary of 18 aggregate industries, identified as basic industries (state and counties), and location quotients for each, as identified by OPAAC. The table, based on 2015 data, also identifies the county basic industries and the lowest and highest county LQs.

- Mining has the highest LQ (4.14) for the state and was identified in 10 counties as a basic industry.
 - The mining industry includes oil and gas extraction, all ore mining, sand and gravel, minerals, and mining services.
- Agriculture and related industries, also identified as a basic industry for the state, has the second-highest LQ (1.89) and is also identified as a basic industry for a majority of the counties (30).
 - Agriculture and related industries include agricultural production, forestry and forest products,

commercial logging, commercial hunting and trapping, and support activities for agriculture and forestry.

- Counties in which agriculture and related industries are not identified as a basic industry are Bernalillo, Santa Fe, and Los Alamos.
- Utilities are also identified as a basic industry (LQ = 1.35) for the state.
 - The utilities industry includes electric power generation, electric power transmission and distribution, natural gas distribution, and water and sewage systems.
- Other basic industries at the state level are accommodation and food services, construction and maintenance, health care and social assistance, retail trade, and professional, scientific, and technical services.
- Manufacturing is often assumed to be a basic industry; however, this data suggests that manufacturing is not a specialization (high LQ) of New Mexico, even though it is in two counties.

Table 2. IMPLAN Data for New Mexico Aggregate Basic Sectors, Select Sectors, and the Beef Cattle Ranching Sectora Subsector of Animal Production): Employment, Output, and Labor Income (2015 data, 2017 dollars; IMPLAN 2017)

| Aggregate Sector | Sectors, sub-subsector | Employment (jobs) | Output (value of production, million \$) | Labor income (proprietary income and employee compensation, million \$) | Exports (million \$) | Export/output (%) |
|---|--------------------------------|-------------------|--|---|----------------------|-------------------|
| Mining | | 36,531 | 11,235 | 2,993 | 8,069 | 72 |
| | Oil and gas | 31,740 | 7,677 | 2,575 | 4,789 | 62 |
| | Metal ore | 2,772 | 2,689 | 272 | 2,524 | 94 |
| | Other mining | 2,019 | 868 | 146 | 756 | 87 |
| Agriculture and related industries | | 34,364 | 3,959 | 1,495 | 2,591 | 65 |
| | Crops | 12,638 | 850 | 482 | 588 | 69 |
| | Animal production | 16,696 | 2,870 | 910 | 1,922 | 67 |
| | <i>Beef cattle ranching</i> | <i>10,550</i> | <i>991</i> | <i>254</i> | <i>716</i> | <i>72</i> |
| | Agriculture-related industries | 5,029 | 239 | 103 | 80 | 34 |
| Utilities | | 4,647 | 4,534 | 492 | 2,661 | 59 |
| Accommodations and food services | | 91,566 | 5,464 | 1,933 | 1,184 | 22 |
| | Accommodations | 10,915 | 924 | 265 | 865 | 94 |
| | Food services | 80,651 | 4,540 | 1,668 | 318 | 7 |
| Manufacturing | | 34,972 | 17,486 | 2,110 | 13,502 | 77 |
| | Food and drink manufacturing | 8,022 | 4,242 | 344 | 3,385 | 80 |
| | Other manufacturing | 26,950 | 13,244 | 1,766 | 10,117 | 76 |
| All other industries | | 886,219 | 126,569 | 43,574 | 19,983 | 16 |
| Total for New Mexico | | 1,088,299 | 169,247 | 52,597 | 47,989 | |

Table 2 Notes and Observations

Basic industries are often identified as “export industries,” indicating that the industry exports services or products from the region, e.g., state or county. Table 2 presents the employment, output, labor income (proprietary income and employee compensation), and export data for the top four industries that were identified as basic industries in Table 1, as well as manufacturing. Manufacturing was included in Table 2, even though it was not identified as a basic industry for the state, because manufacturing is typically assumed to be a basic industry. By its very nature, the manufacturing sector typically produces more than can be consumed locally, and therefore will have substantial exports.

Table 2 also includes the major subsectors for these industries to provide additional insight into these key sectors. As an example, accommodation and food services are estimated to only export 22% of their services, which seems low since this aggregate industry would be assumed to be used mostly by consumers from outside the economy. However, by looking at the subsectors

we can see that accommodation exports 94% of its services and food services only exports 7% of services, indicating that food services are used primarily by local residents.

- All of the aggregate industries identified in Table 2 have a substantial (>50%) percentage of their outputs exported, except accommodations and food services (22%). However, considering the subsectors that make up this aggregate industry may justify its inclusion.
- The five aggregate industries in Table 2 make up about 19% of total jobs within New Mexico, 25% of the total output, and 58% of exports.
- Although these industries constitute only 25% of the state's economic output, they are important when considering that many of these dollars are from outside the New Mexico economy and will generate economic activity (indirect and induced impacts) locally.

Table 3. Total Economic Contribution¹ of the Agriculture and Related Industries Sector to All Other Sectors Within the New Mexico Economy (2015 data, 2017 dollars; IMPLAN 2017)

| Aggregate Sector | Employment (jobs) | Output (value of production, million \$) | Labor income (proprietary income and employee compensation, million \$) |
|---|-------------------|--|---|
| Agriculture and related industries (direct-total values of sector) | 34,364 | 3,959 | 1,495 |
| Mining | 141 | 43 | 12 |
| Utilities | 73 | 75 | 8 |
| Construction and maintenance | 237 | 35 | 11 |
| Food and drink manufacturing | 120 | 139 | 6 |
| All other manufacturing | 83 | 105 | 6 |
| Wholesale trade | 1,237 | 256 | 70 |
| Retail trade | 1,905 | 147 | 58 |
| Transportation and warehousing | 753 | 137 | 44 |
| Information | 150 | 79 | 8 |
| Financial and insurance | 848 | 183 | 45 |
| Real estate | 686 | 155 | 11 |
| Rental and leasing services | 100 | 29 | 6 |
| Professional and technical services | 716 | 73 | 33 |
| Management of companies and enterprises | 79 | 15 | 6 |
| Administrative and waste services | 806 | 50 | 25 |
| Educational services | 329 | 17 | 10 |
| Health care and social assistance | 2,379 | 211 | 116 |
| Arts, entertainment, and recreation | 406 | 24 | 6 |
| Accommodation and food services | 1,634 | 93 | 34 |
| Other services, except public administration | 1,028 | 81 | 36 |
| Postal service and government enterprises | 283 | 60 | 19 |
| Total | 48,356 | 5,965 | 2,066 |

¹Agriculture and related industries (total values of the aggregate sector) are the direct impacts and all other sectors are indirect (business purchases) and induced (household purchases) impacts.

- Because the top two basic industries are producers of primary products, it could indicate an opportunity to develop value-added industries.
- This data agrees with the Office of Policy Analysis at Arrowhead Center on the top four identified basic industries for New Mexico and provides an argument for including manufacturing as a basic industry.

Table 3 Notes and Observations

Table 3 provides the estimated economic contribution of the aggregated agriculture and related industries for New Mexico (IMPLAN, 2017). This aggregate sector includes crop and animal production, commercial logging, commercial hunting and trapping, and support activities for agriculture and forestry. Agriculture and related industries totals include the direct (total output), indirect (purchases for production), and induced (employee spending of labor income) effects. All other industry totals only include the indirect and induced effects related to the agriculture and related industries production direct impacts.

- The total economic contribution of agriculture and related industries to the New Mexico economy is 48,356 jobs, over \$5.9 billion in output, and \$2.0 billion in labor income.
 - Total effects include the output of agriculture and related industries, local industries buying goods and services from other local industries, and money recirculated through household spending.
- Table 3 demonstrates all of the other industries that indirectly benefit from agricultural production and estimates that contribution.
- Agriculture and related industries' employment contribution (total effects) is largest within the health care and social assistance, retail trade, accommodation and food services, and wholesale trade aggregate industries.
- Agriculture and related industries' output contribution (total effects) is largest within the wholesale trade, health care and social assistance, financial and insurance, and retail trade aggregate industries.
- Agriculture and related industries' labor income contribution is largest within the health care and social assistance, wholesale trade, retail trade, and financial and insurance aggregate industries.

Table 4. Total Economic Contribution¹ of the Beef Cattle Ranching Sector to All Other Sectors Within the New Mexico Economy (2015 data, 2017 dollars; IMPLAN 2017), Beef Cattle Ranching Average Cash Receipts 2004–2015 (USDA–NASS 2016)

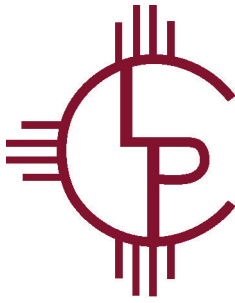
| Sector | Employment (total) | Employment (jobs per ranch) | Output (value of production, million \$) | Output (value of production, \$ per ranch) | Labor income (proprietary income and employee compensation, million \$) | Labor income (proprietary income and employee compensation, \$ per ranch) |
|---|--------------------|-----------------------------|--|--|---|---|
| Agriculture and related industries | 12,901.3 | 1.44 | 1,151 | 128,099 | 312 | 34,658 |
| Beef cattle ranching (direct–total values of sector) | 11,218.6 | 1.25 | 1,069 | 118,910 | 274 | 30,442 |
| Mining | 55.0 | 0.01 | 17 | 1,864 | 5 | 525 |
| Utilities | 15.9 | 0.00 | 16 | 1,793 | 2 | 197 |
| Construction and maintenance | 39.7 | 0.00 | 6 | 655 | 2 | 200 |
| Food and drink manufacturing | 27.1 | 0.00 | 32 | 3,536 | 1 | 162 |
| Other manufacturing | 21.7 | 0.00 | 38 | 4,265 | 2 | 213 |
| Wholesale trade | 318.9 | 0.04 | 66 | 7,338 | 18 | 2,002 |
| Retail trade | 388.4 | 0.04 | 30 | 3,336 | 12 | 1,318 |
| Transportation and warehousing | 314.6 | 0.03 | 57 | 6,309 | 19 | 2,103 |
| Information | 31.3 | 0.00 | 16 | 1,773 | 2 | 189 |
| Finance and insurance | 203.4 | 0.02 | 42 | 4,667 | 11 | 1,224 |
| Real estate | 176.8 | 0.02 | 40 | 4,438 | 3 | 311 |
| Rental and leasing services | 20.8 | 0.00 | 6 | 648 | 1 | 146 |
| Professional and technical services | 143.7 | 0.02 | 15 | 1,653 | 7 | 755 |
| Management of companies and enterprises | 19.0 | 0.00 | 4 | 389 | 1 | 162 |
| Administrative and waste services | 178.1 | 0.02 | 11 | 1,210 | 6 | 620 |
| Educational services | 67.7 | 0.01 | 4 | 399 | 2 | 222 |
| Health care and social assistance | 481.3 | 0.05 | 43 | 4,740 | 23 | 2,606 |
| Arts, entertainment, and recreation | 80.2 | 0.01 | 5 | 530 | 1 | 133 |
| Accommodations and food services | 331.1 | 0.04 | 19 | 2,095 | 7 | 776 |
| Other services, except public administration | 204.9 | 0.02 | 16 | 1,775 | 7 | 788 |
| Government enterprises | 66.3 | 0.01 | 13 | 1,499 | 4 | 499 |
| Total | 16,087.2 | 1.79 | 1,684 | 187,361 | 448 | 49,810 |

¹Beef cattle ranching (total values of the sector) are the direct impacts and all other sectors are indirect (business purchases) and induced (household purchases) impacts.

Table 4 Notes and Observations

Table 4 presents the total estimated economic contribution (direct, indirect, and induced) of the beef cattle industry using the average cash receipts for cattle and calves from 2004–2015 (USDA–NASS, 2016). Average cash receipts were used because of the variability of agricultural prices from year to year, and to demonstrate an average economic impact instead of a good or bad year.

Agriculture and related industries include crop and animal production, commercial logging, commercial hunting and trapping, and support activities for agriculture and forestry. Total impacts under agriculture and related industries include beef cattle production (direct impacts or industry output) and indirect (production expenses) and induced (labor income purchases) impacts to the other agriculture and related industries.



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Also calculated were the employment, output, and total labor income estimated on a per-ranch basis. Total impacts per industry were divided by the number of ranches (8,989 in the 2012 Census of Agriculture) that are primarily beef production.

- Beef cattle ranching's direct contribution of 11,218 jobs, \$1.1 billion in output, and \$274 million in labor income generates additional economic impacts of 4,868 jobs, \$615 million in output, and \$174 million in labor income.
- Indirect and induced impacts of beef cattle ranching are estimated to have the greatest contribution on other agriculture and related industries, with an estimated 1,683 jobs, \$82 million in output, and \$38 million in labor income.
- Other aggregate industries with significant employment impacts (indirect and induced) include health care and social assistance, retail trade, wholesale trade, and transportation and warehousing.
- Other aggregate industries with significant output impacts (indirect and induced) include wholesale trade, transportation and warehousing, health care and social assistance, and financial and insurance.
- Other aggregate industries with significant labor income impacts (indirect and induced) include health care and social assistance, transportation and warehousing, wholesale trade, and retail trade.

CONCLUSION

Natural resources are an important economic component for New Mexico. A majority of land uses and basic industries include mining, agriculture, and utilities, which are all predominantly natural resource industries. As basic industries, which are exporters by nature, they bring in new dollars that contribute to jobs and income within the local economies. Agriculture and related industries contribute a total estimated 48,356 jobs, \$5.9 billion in economic activity, and \$2.0 billion in labor income (includes direct, indirect, and induced impacts). Beef cattle ranching's direct contribution of 11,218 jobs, \$1.1 billion in output, and \$274 million in labor income generates additional economic impacts of 4,868 jobs, \$615 million in output, and \$174 million in labor income.

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