

Not Inconsequential: The Economic Effect of Small Farms in Pennsylvania, 2017



Small farms in Pennsylvania are often overlooked or even dismissed when people talk about agriculture. Though small farms far outnumber larger farms, they contribute relatively little to total agricultural production in the Commonwealth. Most small farms are operated for lifestyle or recreation reasons, or to supplement the household's food supply, rather than to be a major income source for the owner. Narrowly focusing on the value of their agricultural sales thus misses the reasons many small farms are operated and the important roles they play in the Commonwealth. Small farms are important stewards of farmland in Pennsylvania, keeping land open and providing environmental benefits. Small farm owners can be important allies with larger farms for local farm-friendly policies, providing a stronger voice for the agricultural community. From an economic perspective, small farms purchase a significant amount of supplies and services from local farm-related businesses which larger farms also rely upon, and thus help those businesses remain in operation. Many small farms similarly purchase agricultural products from nearby larger farms, such as hay or other feeds, and thus help financially support those larger farms.

This report explores the important roles that Pennsylvania small farms play within the agricultural and statewide economy. The report includes analysis of the economic contributions and role of small farms in the Commonwealth. The report considers small farms using several different definitions; farms selling less than \$250,000 a year and farms selling less than \$10,000 a year. Most of these definitions are smaller than that used by the U.S. Department of Agriculture, which views farms with gross cash farm income of \$250,000 or less as small. All data in this report, unless otherwise noted, is from the 2017 U.S. Census of Agriculture.

Key Points

- Small farms far outnumber larger farms in Pennsylvania. About 88% of Pennsylvania farms had less than \$250,000 in agricultural sales in 2017, the cutoff for the U.S. Department of Agriculture's definition of small farms. About half (51%) of Pennsylvania farms had less

UNDERSTANDING PENNSYLVANIA AGRICULTURE: 2017 UPDATE



than \$10,000 in agricultural sales in that year, while 24% of farms reported less than \$1,000 in sales.

- Most small farms in Pennsylvania lose money each year, in part because they are operated to supplement the household’s food supply, or for lifestyle or recreational reasons.
- Small farms make significant contributions to the Commonwealth’s economy through what they spend on inputs and services, rather than through the value of what they produce and sell. Farms with less than \$250,000 in annual sales, for example, spent about \$1.5 billion on production expenses in 2017, while farms with less than \$10,000 in annual sales account for \$392 million of that spending.
- When the off-farm effects of small farm spending is considered, it becomes clearer that their economic impact is large. Farms with less than \$250,000 in annual sales supported about \$2.2 billion of economic output in Pennsylvania each year, while farms with less than \$10,000 of annual sales supported about \$457 million of that economic output.

Section 1: Pennsylvania Farms by Annual Agricultural Product Sales

Small farms far outnumber large farms in Pennsylvania. About one quarter (24%) of Pennsylvania farms reported less than \$1,000 of agricultural product sales in 2017, and about 51% of farms had less than \$10,000 in sales in the same year (see Table 1). About 88% of Pennsylvania farms were small farms by the USDA definition, with less than \$250,000 in annual sales.

Table 1. Percent of Farms by Market Value of Agricultural Products Sold: Pennsylvania, 2017

| Farms by Market Value of Ag Products Sold | Number of Farms | Percent of Farms | Total Market Value of Ag Products Sold (\$1,000's) | Share of Annual Market Value of Ag Products Sold |
|---|-----------------|------------------|--|--|
| Less than \$1,000 | 12,748 | 24.0% | \$2,052 | 0.03% |
| \$1,000 to \$2,499 | 4,196 | 7.9% | \$7,077 | 0.1% |
| \$2,500 to \$4,999 | 4,477 | 8.4% | \$16,160 | 0.2% |
| \$5,000 to \$9,999 | 5,579 | 10.5% | \$40,138 | 0.5% |
| \$10,000 to \$19,999 | 5,125 | 9.6% | \$72,990 | 0.9% |
| \$20,000 to \$24,999 | 1,677 | 3.2% | \$37,369 | 0.5% |
| \$25,000 to \$39,999 | 3,159 | 5.9% | \$100,349 | 1.3% |
| \$40,000 to \$49,999 | 1,278 | 2.4% | \$56,950 | 0.7% |
| \$50,000 to \$99,999 | 3,570 | 6.7% | \$254,852 | 3.3% |
| \$100,000 to \$249,000 | 5,056 | 9.5% | \$862,590 | 11.1% |
| \$250,000 to \$499,999 | 3,205 | 6.0% | \$1,121,039 | 14.4% |
| \$500,000 or more | 3,087 | 5.8% | \$5,187,319 | 66.9% |
| Total | 53,157 | 100.0% | \$7,758,885 | 100.0% |

Data source: U.S. Census of Agriculture, Table 2, 2017

The large numbers of Pennsylvania small farms do not translate into much agriculture production, however. The 27,000 Pennsylvania farms with less than \$10,000 in annual sales collectively accounted for only 0.8% of total agricultural sales in Pennsylvania during 2017. Agricultural sales instead were concentrated in the far fewer farms with \$250,000 or more in sales; these 6,292 farms were only 12% of Pennsylvania farms and yet they produced 81% of total agricultural sales in 2017. The majority of these sales, almost 67% of all agricultural sales in Pennsylvania, were made by the 3,087 farms with \$500,000 or more in annual sales.

Section 2: Spending by Small Farms in Pennsylvania

Because most small farms are operated for lifestyle or recreation reasons, or to supplement the household's food supply or income, the vast majority of small farms lose money each year. Only about 14% of Pennsylvania farms with less than \$1,000 in annual agricultural product sales in 2017 made money from the farm operation once their expenses were considered. Such farms sold a total about \$15 million of agricultural products in 2017, and yet they spent almost \$198 million on inputs like seed, fertilizer, feed, animals, and equipment, and services like machinery repair and veterinary care. Most Pennsylvania farms with less than \$10,000 in annual sales similarly lost money, with only about 20% covering their costs. Farms of this size sold about \$83 million of agricultural products during 2017 but spent about \$392 million. It is clear from these numbers that the economic contribution of small farms to Commonwealth's economy is not what those farms produce and sell, but rather it is what they spend to buy inputs and services.

2.1 How Small Farms Spend Their Money

Small farms in Pennsylvania collectively spend a significant amount of money each year on their operations. Farms with less than \$250,000 in annual agricultural product sales collectively spent about \$1.5 billion in 2017, for example, while Pennsylvania farms with less than \$10,000 in annual sales collectively spent about \$392 million in that same year (see Table 2). Major expenditures included feed (about \$234 million by farms with less than \$250,000 in annual sales), repairs, supplies and maintenance (about \$182 million by such farms), and property taxes (about \$183 million by such farms).

Table 2. Total Spending by Small Farms by Farm Size: Pennsylvania, 2017

| Production Expenses | Total Spending (\$1,000s) by Farms | |
|--|--|---|
| | Farms with Less Than \$250,000 in Ag Products Sold | Farms with Less Than \$10,000 in Ag Products Sold |
| Fertilizer, lime, soil conditioners | \$92,765 | \$10,985 |
| Chemicals | \$42,377 | \$3,088 |
| Seeds, plants, vines | \$84,597 | \$5,598 |
| Livestock purchased or leased | \$80,455 | \$15,141 |
| Feed purchased | \$234,661 | \$49,207 |
| Gasoline, fuels, oils | \$96,677 | \$26,862 |
| Utilities | \$64,014 | \$20,139 |
| Repairs, supplies, maintenance | \$182,248 | \$50,143 |
| Hired labor | \$142,021 | \$37,566 |
| Contract labor | \$17,631 | \$5,117 |
| Customwork and custom hauling | \$42,627 | \$3,730 |
| Cash rent for land, buildings, etc | \$35,473 | \$1,985 |
| Rent & lease for machinery & equipment | \$8,225 | \$2,643 |
| Interest expense | \$99,710 | \$39,053 |
| Property taxes paid | \$182,975 | \$91,143 |
| Medical supplies, veterinary | \$37,043 | \$10,458 |
| All other production expenses | \$82,437 | \$19,118 |
| <i>Total Production Expenses</i> | <i>\$1,525,936</i> | <i>\$391,976</i> |

Data source: U.S. Census of Agriculture, Table 72, 2017

2.2 How Small Farm Spending Compares to Spending by Large Farms

Not surprisingly, spending patterns by Pennsylvania farms vary by the value of their sales. Property taxes accounted for about 23.3% of all farm-related expenses for farms with less than \$10,000 in annual agricultural product sales, while such taxes were only about 1.6% of farm-related expenses for farms with \$250,000 or more in sales (see Table 3). This likely reflects how land-intensive most small farms are in relation to the value of their production, as well as the relatively small size of their other farm-related expenses. Other common large expenses of small farms included feed, hired labor, interest, and repairs, supplies and maintenance costs. Notably larger farms tend to spend a much larger percentage of their total expenditures on feed and livestock (28.7% and 11.3%, respectively, of total spending by farms with \$250,000 or more in total sales), reflecting that many such large farms in Pennsylvania are dairy farms. Farms with less than \$250,000 in annual sales, in contrast, only spent 15.4% and 5.3% of their total expenditures, respectively, on such purchases.

Table 3. How Farms Spent Their Money by Size of Farm: Pennsylvania, 2017

| Production Expense | Percent of Spending on Different Production Expenses | | | |
|--|--|---|---------------------|--------------------|
| | All Farms | Farms by Market Value of Ag Products Sold | | |
| | | \$250,000 or more | Less than \$250,000 | Less than \$10,000 |
| Fertilizer, lime, soil conditioners | 5.3% | 5.0% | 6.1% | 2.8% |
| Chemicals | 2.6% | 2.6% | 2.8% | 0.8% |
| Seeds, plants, vines | 5.0% | 4.8% | 5.5% | 1.4% |
| Livestock purchased or leased | 9.7% | 11.3% | 5.3% | 3.9% |
| Feed purchased | 25.3% | 28.7% | 15.4% | 12.6% |
| Gasoline, fuels, oils | 4.2% | 3.4% | 6.3% | 6.9% |
| Utilities | 3.2% | 2.9% | 4.2% | 5.1% |
| Repairs, supplies, maintenance | 8.1% | 6.8% | 11.9% | 12.8% |
| Hired labor | 13.2% | 14.5% | 9.3% | 9.6% |
| Contract labor | 1.9% | 2.2% | 1.2% | 1.3% |
| Customwork and custom hauling | 2.9% | 2.9% | 2.8% | 1.0% |
| Cash rent for land, buildings, etc | 2.4% | 2.4% | 2.3% | 0.5% |
| Rent & lease for machinery & equipment | 0.5% | 0.4% | 0.5% | 0.7% |
| Interest Expense | 3.7% | 2.8% | 6.5% | 10.0% |
| Property taxes paid | 4.2% | 1.6% | 12.0% | 23.3% |
| Medical supplies, veterinary | 2.1% | 2.0% | 2.4% | 2.7% |
| All other production expenses | 5.7% | 5.8% | 5.4% | 4.9% |
| <i>All production expenses</i> | <i>100%</i> | <i>100%</i> | <i>100%</i> | <i>100%</i> |

Data source: U.S. Census of Agriculture, Table 72, 2017

2.3 Proportion of All Farm Production Spending

Small farms in Pennsylvania as a group accounted for just a small share of total farm production expenses in Pennsylvania in 2017; farms selling less than \$250,000 a year collectively made about 25.6% of total farm production expenditures in the Commonwealth, and farms with \$10,000 or less in annual agricultural product sales accounted for about 6.6% of total farm expenses (see Table 4). Farms with \$250,000 or more in annual sales, in contrast, accounted for about 74.4% of total farm production expenses.

Table 4. Share of Total Spending By Farms by Size of Farm: Pennsylvania, 2017

| Production Expense | Share of Total Spending on Each Production Expense | | | |
|--|--|------------------|---------------------|--------------------|
| | Farms by Market Value of Ag Products Sold | | | |
| | All Farms | \$250,00 or more | Less than \$250,000 | Less than \$10,000 |
| Fertilizer, lime, soil conditioners | 100% | 70.4% | 29.6% | 3.5% |
| Chemicals | 100% | 73.1% | 26.9% | 2.0% |
| Seeds, plants, vines | 100% | 71.3% | 28.7% | 1.9% |
| Livestock purchased or leased | 100% | 86.1% | 13.9% | 2.6% |
| Feed purchased | 100% | 84.4% | 15.6% | 3.3% |
| Gasoline, fuels, oils | 100% | 61.0% | 39.0% | 10.8% |
| Utilities | 100% | 66.8% | 33.2% | 10.4% |
| Repairs, supplies, maintenance | 100% | 62.3% | 37.7% | 10.4% |
| Hired labor | 100% | 81.9% | 18.1% | 4.8% |
| Contract labor | 100% | 84.7% | 15.3% | 4.5% |
| Customwork and custom hauling | 100% | 75.2% | 24.8% | 2.2% |
| Cash rent for land, buildings, etc | 100% | 74.7% | 25.3% | 1.4% |
| Rent & lease for machinery & equipment | 100% | 70.5% | 29.5% | 9.5% |
| Interest Expense | 100% | 55.0% | 45.0% | 17.6% |
| Property taxes paid | 100% | 27.6% | 72.4% | 36.1% |
| Medical supplies, veterinary | 100% | 70.9% | 29.1% | 8.2% |
| All other production expenses | 100% | 75.7% | 24.3% | 5.6% |
| <i>All production expenses</i> | <i>100%</i> | <i>74.4%</i> | <i>25.6%</i> | <i>6.6%</i> |

Data source: U.S. Census of Agriculture, Table 72, 2017

The proportion of total spending made by small farms varied by the expense. Notably, small farms paid a disproportionately large share of property taxes paid by farms, with farms selling less than \$250,000 a year paying about 72.4% of total farm property taxes in 2017. The smaller farms, those with \$10,000 or less in annual sales, collectively paid about 36.1% of total farm property taxes.

Section 3: Economic Effects of Spending

This spending by small farms has a broader effect across Pennsylvania’s economy because it creates a larger flow of dollars to business selling farm supplies and services, and to larger farms selling hay, livestock, and other agricultural products purchased by the small farms. These broader effects were estimated using the economic impact modeling software IMPLAN, which creates an economic model of the regional economy of interest, such as a state or county, and then estimates the flow of goods and services between the economic sectors within that economy. IMPLAN uses these interconnections to estimate how economic activity associated with a business or sector ripples across local businesses and workers in that regional economy. IMPLAN is among the most widely used economic impact models and is frequently used nationally to estimate the job and income effects of local activities, such as tourism, the opening of a new factory, or the economic contributions of a business or sector of the economy.

The IMPLAN analysis estimated three components of the economic effects of small farms: direct impacts, indirect impacts, and induced impacts.

The *direct impacts* include the changes in employment, worker income, and total economic activity in farms and non-farm businesses selling goods and services to small farms. These impacts include the jobs, wages and benefits, and economic output in such firms directly attributable to purchases by small farms.

Indirect impacts measure the effect of these direct impacts on other businesses in the regional economy who sell products or services to the larger farms and non-farm businesses selling to small farms, such as seeds, supplies and equipment. For large farms selling hay to small farms, for example, these indirect impacts include a proportionate share of the large farms' purchases of fertilizer or lime, machinery maintenance and repair, fuel to run the tractor, and other supplies and services required by those farms to grow and harvest the hay.

The *induced impacts* are the effects resulting from household spending by employees of the small farms and of the farms and non-farm businesses who are indirectly impacted by these facilities. For example, employees at a local feed store working more hours due to purchases by small farms use these increased wages on things like groceries, clothing, housing, local entertainment, and other items.

The IMPLAN analysis considered two sizes of small farms in Pennsylvania, including (1) farms with less than \$250,000 of agricultural product sales in 2017, and (2) farms with less than \$10,000 of agricultural product sales in 2017. The analysis was made using expense data from the 2017 Census of Agriculture (as reported above in Table 2). In IMPLAN, total small farm spending within each expense category was matched with the appropriate commodity or sector of the economy providing that good or service. For example, small farm spending on chemicals was allocated in IMPLAN to the Pesticide and Other Agricultural Chemicals category, while contract labor (i.e. hiring workers temporarily, such as to harvest a crop) was allocated to Support Activities for Agriculture and Forestry. Hired labor expenses was allocated to households. Consistent with other economic impact analysis, small farm expenditures on property taxes and interest were not included in the analysis because such spending is a transfer rather than a purchase, so they would not have an economic impact. Note these two analyses overlap so they should not be added together; the "farms with less than \$250,000 in sales..." analysis already includes farms with less than \$10,000 in sales, so adding them would double count the impact of these smallest farms.

3.1 Farms Selling Less Than \$250,000 a Year

According to the Census of Agriculture, Pennsylvania farms with less than \$250,000 in annual agricultural product sales spent about \$1.5 billion on farm-related production expenses in 2017 (about \$1.2 billion when property taxes and interest expenses are omitted). The IMPLAN results suggest that these purchases annually support about \$2.2 billion in economic activity and 19,908 jobs in the Commonwealth (see Table 5). This includes about \$1 billion in direct impacts by the

farms' spending, about \$381 million in impacts on businesses who sell goods and services to the businesses these farms patronize, and about \$742 million of economic output resulting from employees in these businesses spending the income they earned as a result of the small farm expenditures.

Furthermore, the results suggest that purchases by farms selling less than \$250,000 a year support about \$791 million in income and other compensation going to Pennsylvania workers. These economic impacts are solely a result of purchases by these farms, and thus do not include effects from their agricultural sales.

| Impact Type | Employment | Labor Income | Output |
|---------------------|-------------------|----------------------|------------------------|
| Direct Effect | 13,158 | \$406,531,316 | \$1,033,901,154 |
| Indirect Effect | 2,162 | \$126,129,326 | \$380,918,148 |
| Induced Effect | 4,587 | \$257,968,779 | \$742,372,911 |
| <i>Total Effect</i> | <i>19,908</i> | <i>\$790,629,422</i> | <i>\$2,157,192,213</i> |

Data sources: U.S. Census of Agriculture, 2017; IMPLAN

3.2 Farms Selling Less Than \$10,000 a Year

According to the Census of Agriculture, Pennsylvania farms with less than \$10,000 of agricultural product sales in 2017 spent a total of about \$392 million on production expenses that year (about \$262 million when property taxes and interest payments are omitted). The IMPLAN results suggest that these purchases support about \$457 million in economic activity and 3,574 jobs in the Commonwealth (see Table 6). This includes about \$217 million in direct output, about \$78 million in impacts on businesses who sell goods and services to the businesses these small farms patronize, and about \$162 million resulting from employee spending income earned through these sales. When including the indirect and induced effects, these farms support about \$173 million in income and compensation going to Pennsylvania workers. These economic impacts are solely a result of purchases by these farms, and thus do not include effects from their agricultural sales.

| Impact Type | Employment | Labor Income | Output |
|---------------------|-------------------|----------------------|----------------------|
| Direct Effect | 2,154 | \$90,824,723 | \$216,782,908 |
| Indirect Effect | 417 | \$25,370,884 | \$77,852,242 |
| Induced Effect | 1,003 | \$56,417,981 | \$162,361,250 |
| <i>Total Effect</i> | <i>3,574</i> | <i>\$172,613,588</i> | <i>\$456,996,401</i> |

Data sources: U.S. Census of Agriculture, 2017; IMPLAN

Implications

Small farms often are overlooked or dismissed when people discuss agriculture because they produce only a small share of agricultural production. Many small farms are operated for lifestyle or recreational reasons, not as a major source of income for the farm operators. However, the economic impact analysis suggests that small farms have a relatively large impact on the Commonwealth's economy through their purchases of supplies and services. The analysis suggests farms with less than \$250,000 in annual agricultural product sales support about \$2.2 billion of economic output in Pennsylvania each year. Farms with less than \$10,000 of annual sales support about \$457 million of that economic output.

As context, the total value of grain and oilseed sales by Pennsylvania farms in 2017 was \$981 million, the value of cattle and calves sales was \$626 million, and the value of vegetable and melon sales (including potatoes) was \$187 million. These sales amounts are not directly comparable to the IMPLAN results because they do not consider the indirect and induced effects, yet they suggest that the statewide economic contributions of small farms are substantial. Small farms in Pennsylvania may primarily serve lifestyle or recreational purposes for their owners rather than being a major producer of agricultural products, yet collectively they have a large economic impact.

For a deeper dive into other characteristics of small farms in Pennsylvania, see the CECD report "Understanding the Quiet Majority: Small Farms in Pennsylvania, 2017."

References

IMPLAN input-output economic model: <https://implan.com>

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