Where the Soybeans Grow:

An Exploration of Agricultural Land Use in Pennsylvania, 2017

According to the 2017 Census of Agriculture, Pennsylvania is the 32nd largest state in terms of total land area with about 28,634,936 acres in total. Approximately 25% of the total land in the state is farmland. This farmland includes woodland, cropland, pastureland, and a combination of land dedicated to other farming purposes. With such an abundance of agricultural land in the state, a breakdown of this land by its various uses can help to provide an understanding of farming in Pennsylvania. What does this farmland use look like at the county level? How has land use changed on farms, and what does farmland ownership look like? This report uses data from the 2017 Census of Agriculture regarding the land in farms, land use types, and farmland ownership to examine agricultural land use in Pennsylvania.
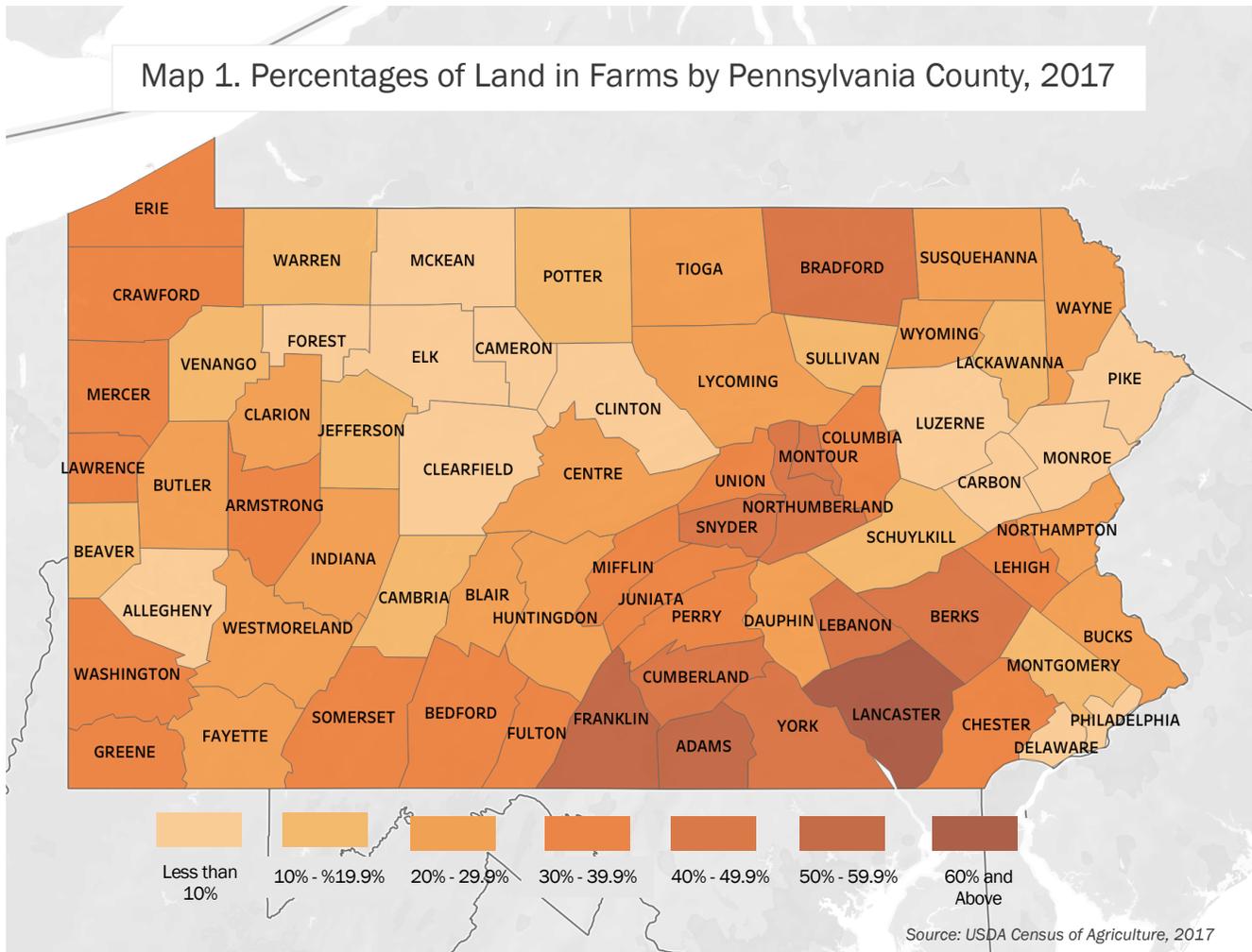
Highlights

- 25% of the total land in Pennsylvania is agricultural land

- 64% of the agricultural land in Pennsylvania is cropland, 10% is pastureland, 20% is woodland, and 6% is land used for other purposes such as roads or barns

- Pennsylvania's total farmland decreased by 6% since 2012, while the number of total farms declined by 10%

- Pennsylvania contains three distinct land resource regions by geography, climate, and soil types that affect the type of farming that occurs

- Only about 0.54% of Pennsylvania agricultural land is registered conservation land

- 79% of farms in Pennsylvania sell under $100,000 a year, and counties with higher proportions of farms selling under $100,000 also have a higher proportion of farmers who own all of the land they operate

- From 2007-2017, Pennsylvania's population has increased the most in areas with high agricultural sales, suggesting that population growth could affect farming activity

UNDERSTANDING PENNSYLVANIA AGRICULTURE: 2017 UPDATE

PennState
College of Agricultural Sciences

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Section 1: Land in Farms in Pennsylvania

In 2017, total farmland Pennsylvania equated to about 7,278,668 acres. According to the Census of Agriculture (2017), that means roughly 25% of the total land in Pennsylvania was dedicated to farming and agricultural production. At the county level, the percentage of total land used for agricultural purposes ranges anywhere from virtually 0% (Philadelphia County) to about 65% (Lancaster County). Map 1 shows Pennsylvania's counties and what percentage of their total land is farmland.

Map 1. Percentages of Land in Farms by Pennsylvania County, 2017

Legend: Less than 10% | 10% - %19.9% | 20% - 29.9% | 30% - 39.9% | 40% - 49.9% | 50% - 59.9% | 60% and Above
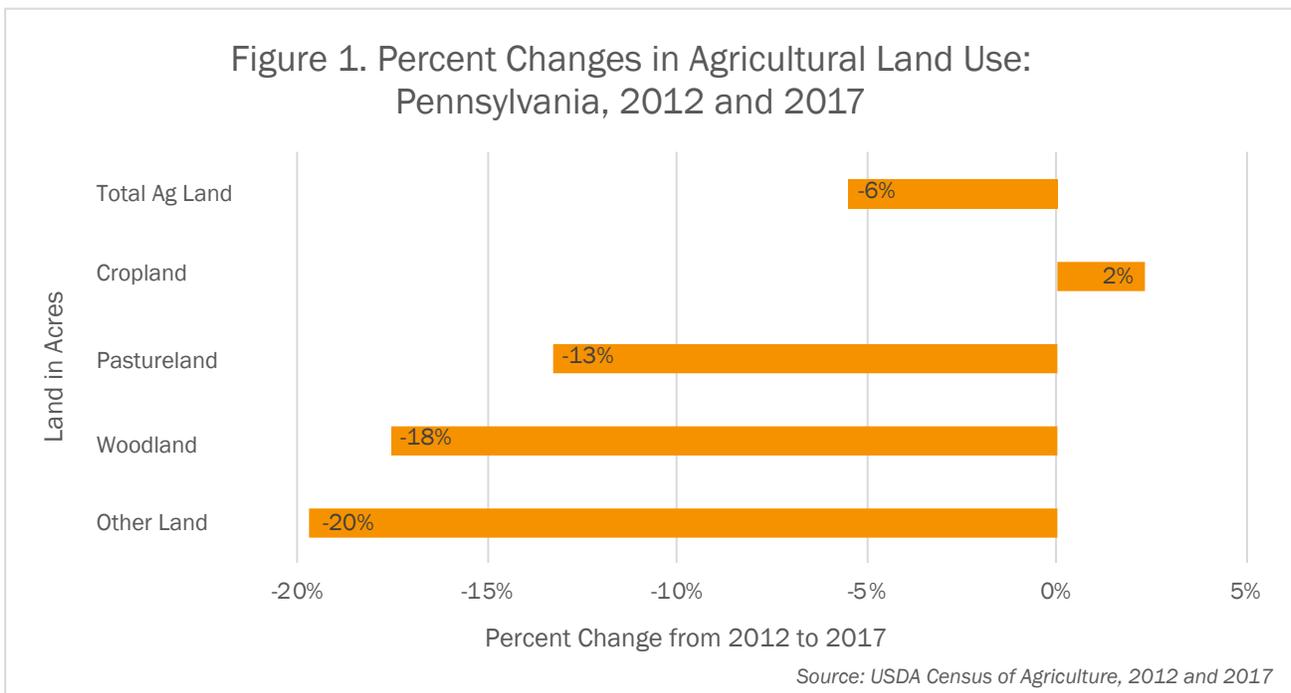
Source: USDA Census of Agriculture, 2017

The highest percent of their total land being used as farms were found near the south-central and southeastern parts of Pennsylvania. As will be discussed later in this report, the south-central and southeastern parts of Pennsylvania are particularly suitable for farming because of the soil and topography in the region. Counties with lower percentages of farmland seem to be situated more northward, both in the northeastern and northwestern parts of the state.
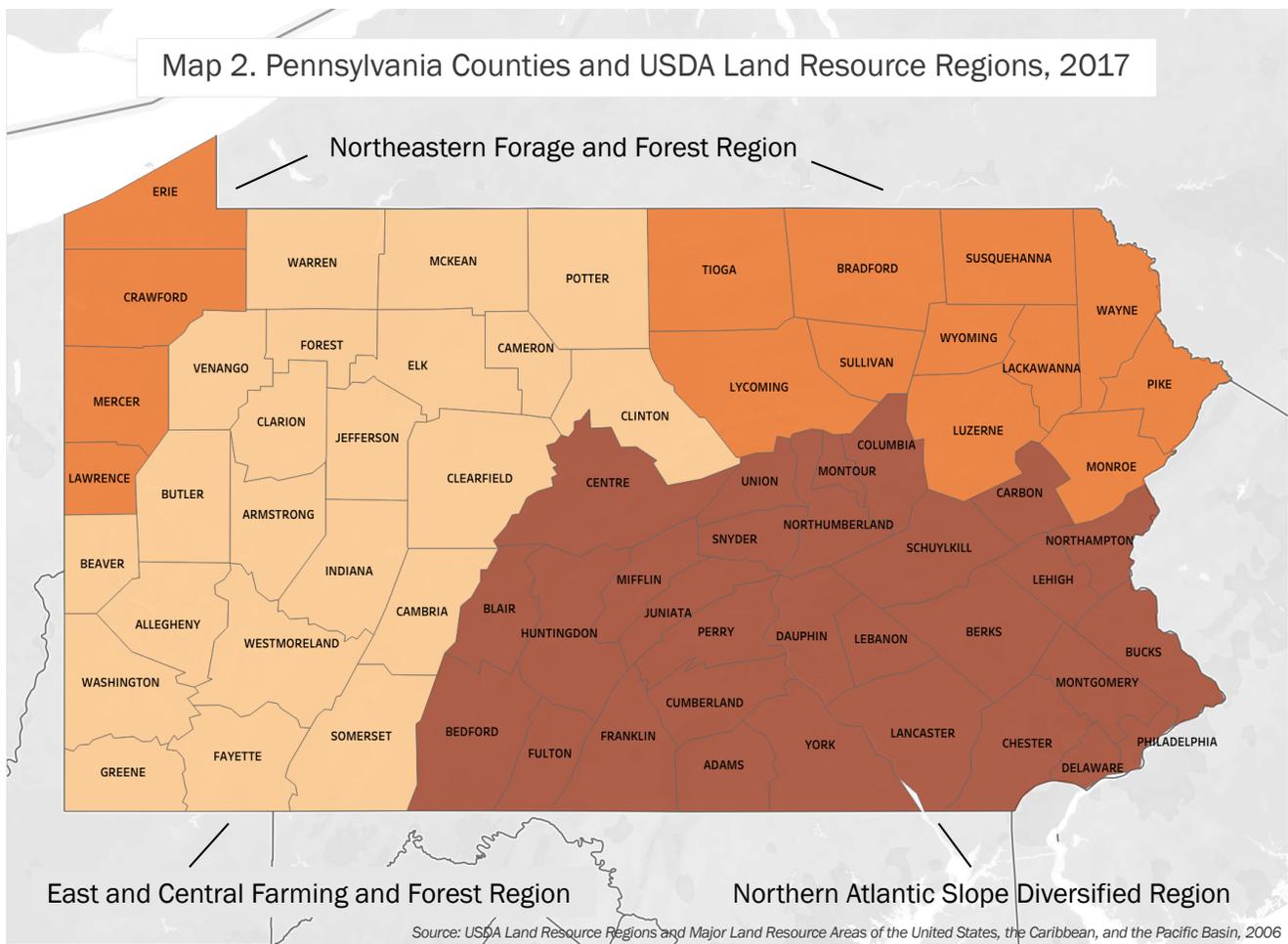
Section 2: Land in Farms in Pennsylvania

The Census of Agriculture breaks agricultural land into four categories: cropland, pastureland, woodland, and "other land." Cropland is land used for growing and harvesting crops. Cropland made up 64% of agricultural land in Pennsylvania in 2017, which is the largest proportion among agricultural land types. The second-largest agricultural land use in Pennsylvania, accounting for 20% of all agricultural land, is woodland, which includes natural or planted woodlot that might be used as wood products or timber. Then there is pastureland, or grazing land for animals. About 10% of total agricultural land was used as permanent pasture for animals to graze. Finally, the "other land" category is land that was used for houses, barns, roads, ponds, and wasteland, or any other land is not counted as cropland, pastureland, or woodland on a farm operation. "Other land" represents the smallest proportion of Pennsylvania agricultural land use at 6%. Most of the Pennsylvanian counties' land use patterns are similar to the statewide pattern in their land allotted to each category, with the exception of Pike County that has nearly 86% of its farmland used as woodland (see Table A1 in the Appendix).

In Pennsylvania, the amount of land used for farming has decreased since the last Census of Agriculture was conducted in 2012, falling by 6% from 2012 to 2017, while the total number of farms decreased by about 10% (see Figure 1). Overall, the land in farms has changed at a rate slower than is the number of farms. The disparity between the rates might be due to farm consolidation where land that one producer can no longer work is sold to a different producer. Though this will result in a smaller number of farms, the amount of total farmland will not change as much. The only category of agricultural land that grew in terms of acres is cropland which has increased 2% since 2012 (see Figure 1). The number of acres in every other category of agricultural land has decreased since 2012.
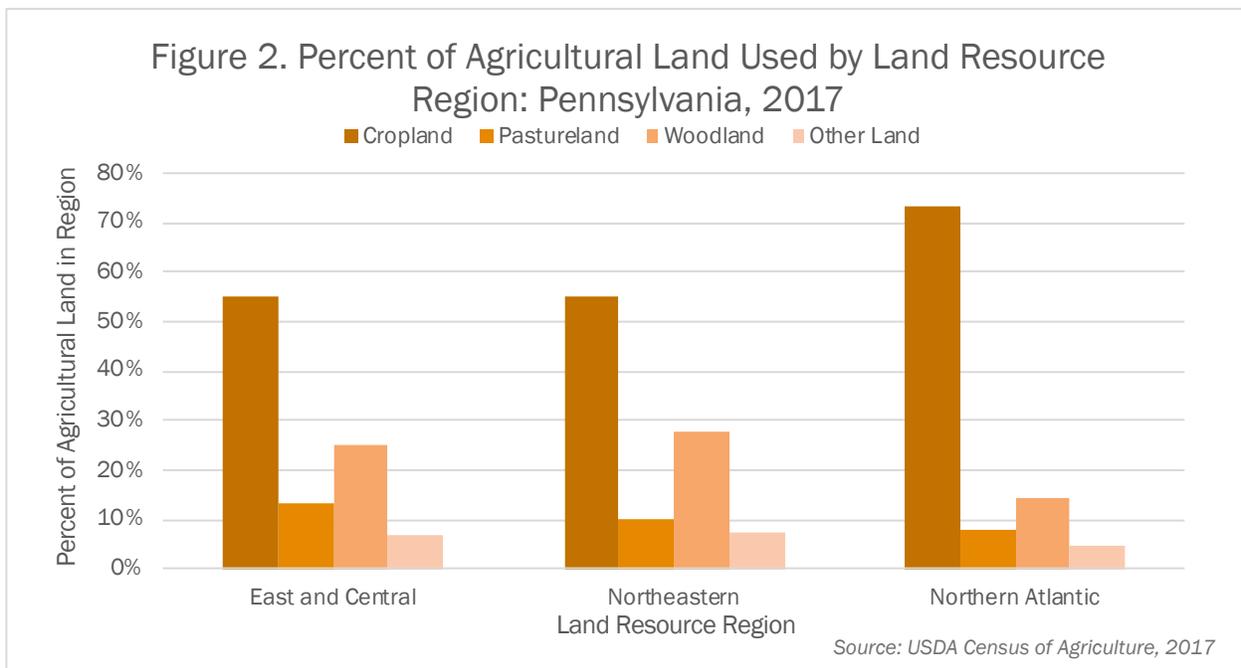

Figure 1. Percent Changes in Agricultural Land Use: Pennsylvania, 2012 and 2017

Source: USDA Census of Agriculture, 2012 and 2017

Section 3: Land Resource Regions in Pennsylvania

The USDA breaks the United States down into regions with similar climates, soil types, and geographies called land resource regions. These factors influence where different types of farms are occur, agricultural sales and farm size. Pennsylvania's land falls into three different land resource regions, including (1) the East and Central Farming and Forest Region; (2) the Northeastern Forage and Forest Region; and (3) the Northern Atlantic Slope Diversified Farming Region. It should be noted that these regions extend beyond Pennsylvania into other states in order to include other parts of the country that share characteristics. The land resource regions also do not fit within county lines perfectly; the counties below are shaded based on the primary land resource region type found in each county.

Map 2. Pennsylvania Counties and USDA Land Resource Regions, 2017

Source: USDA Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, 2006

East and Central Farming and Forest Region

The East and Central Farming and Forest Region's name may seem misleading at first because this region is not in eastern Pennsylvania; it is actually more prominent in central and western PA, but again, the region extends out past just Pennsylvania. A lot of the East and Central Region is made up of rolling hills and valleys, and much of the area is located in the Allegheny Plateau. In 2017, about 26% of the agricultural land in Pennsylvania was located here. Nearly 55% of the region's total agricultural land was dedicated cropland where common crops include soybeans, corn, wheat, and other feed grains for animals (see Figure 2). About 13% of the agricultural land in this region was permanent pastureland for animals to graze on, and 25% was woodland. Hardwood trees like oak and yellow poplar are common and some softwoods like pine trees could also be found here (USDA Natural Resources Conservation Services). The smallest proportion of agricultural land in the East and Central Region was used as "other land."

Figure 2. Percent of Agricultural Land Used by Land Resource Region: Pennsylvania, 2017

Source: USDA Census of Agriculture, 2017

Northeastern Forage and Forest Region

The Northeastern Forage and Forest Region is found in both the northwestern and northeastern sides of Pennsylvania and accounted for roughly 25% of the agricultural land in the state. Much of the region is made up of forested plateaus, plains, and mountains. Approximately 55% of the agricultural land in this region was used as cropland where the crops grown are diverse, including forage and grains for cattle, like hay and alfalfa, as well as fruits and potatoes (see Figure 2). Woodland made up 28% of the agricultural land in the region; lumber, pulpwood, and Christmas trees are common products sourced here, as well as maple syrup. Permanent pastureland and "other land" made up smaller proportions of the region's agricultural land at 10% and 7%, respectively.

Northern Atlantic Slope Diversified Region

More colloquially known as the 'ridge and valley' region, the Northern Atlantic Slope Diversified Region is found in the southeast portion of Pennsylvania. This region is made up of coastal lowlands, plains, and of course, ridges and valleys. Rich soil makes the area ideal for growing crops, where 73% of the agricultural land is used for cropland (see Figure 2). Hay and soybeans are commonly grown as feed for beef and dairy cattle, and corn, tobacco, and fruit, such as apples and peaches, are also grown. Because much of the agricultural land in the ridge and valley region is cropland, woodland made up a significantly smaller proportion of agricultural land in this region compared to the other two land resource regions. Permanent pastureland and "other land" both made up under 10% of the agricultural land in this region. The Northern Atlantic Slope Diversified region was the largest region in Pennsylvania both in terms of land size; about half of the agricultural land in Pennsylvania was found here.

The proportion of Pennsylvania's farms and sales in each land resource region varies, which likely relates to each regions' use of agricultural land and the value of the agricultural products grown there. The East and Central Farming and Forest region held 25% of Pennsylvania's agricultural land, yet it only accounted for 9% of yearly agricultural sales, while the Northeastern Forage and Forest Region had 20% of Pennsylvania's agricultural land and accounted for 9% of Pennsylvania's annual agricultural sales, the same as the East and Central Farming and Forest Region (see Figure 3).

The Northern Atlantic Slope Diversified Region, in contrast, had the largest portion of Pennsylvania's total farms and agricultural sales with approximately 55% of Pennsylvania farms and 82% of the total agricultural sales in Pennsylvania which likely reflects the high quality of the soils and climate there (see Figure 3).

Figure 3. Percent of Pennsylvania Farmland, Farms, and Agricultural Sales from USDA Land Resource Regions: Pennsylvania, 2017

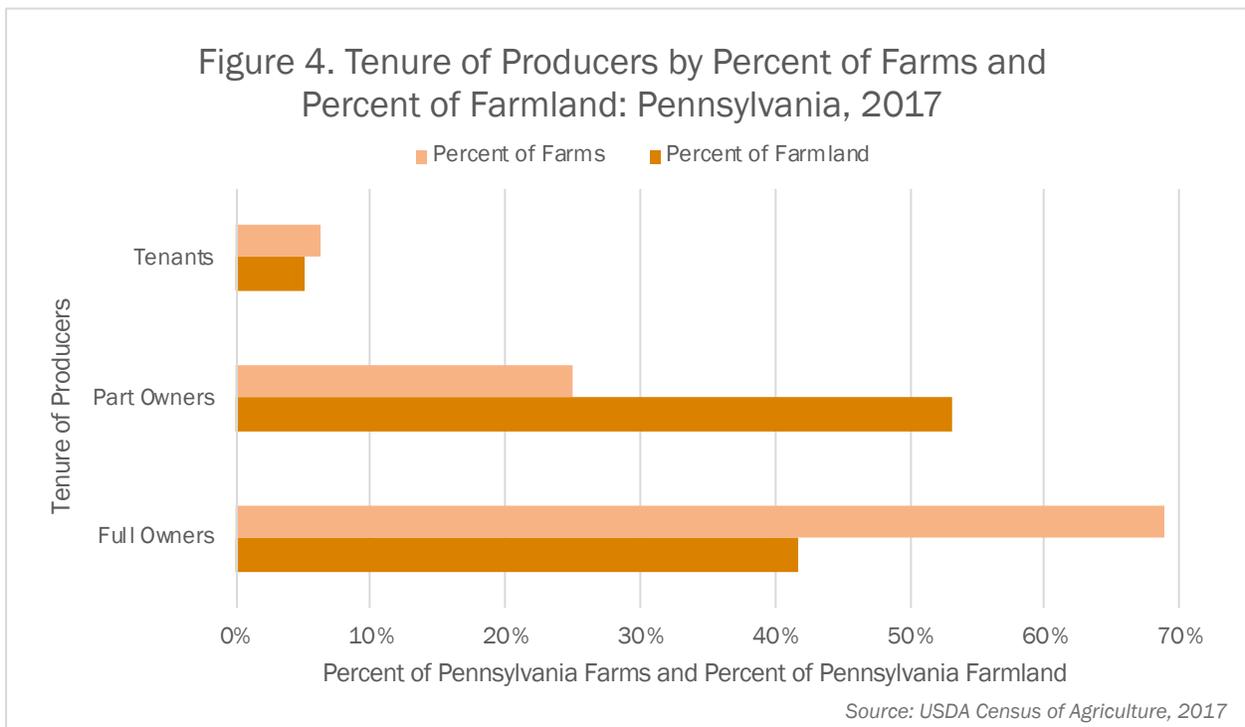Source: USDA Census of Agriculture, 2017
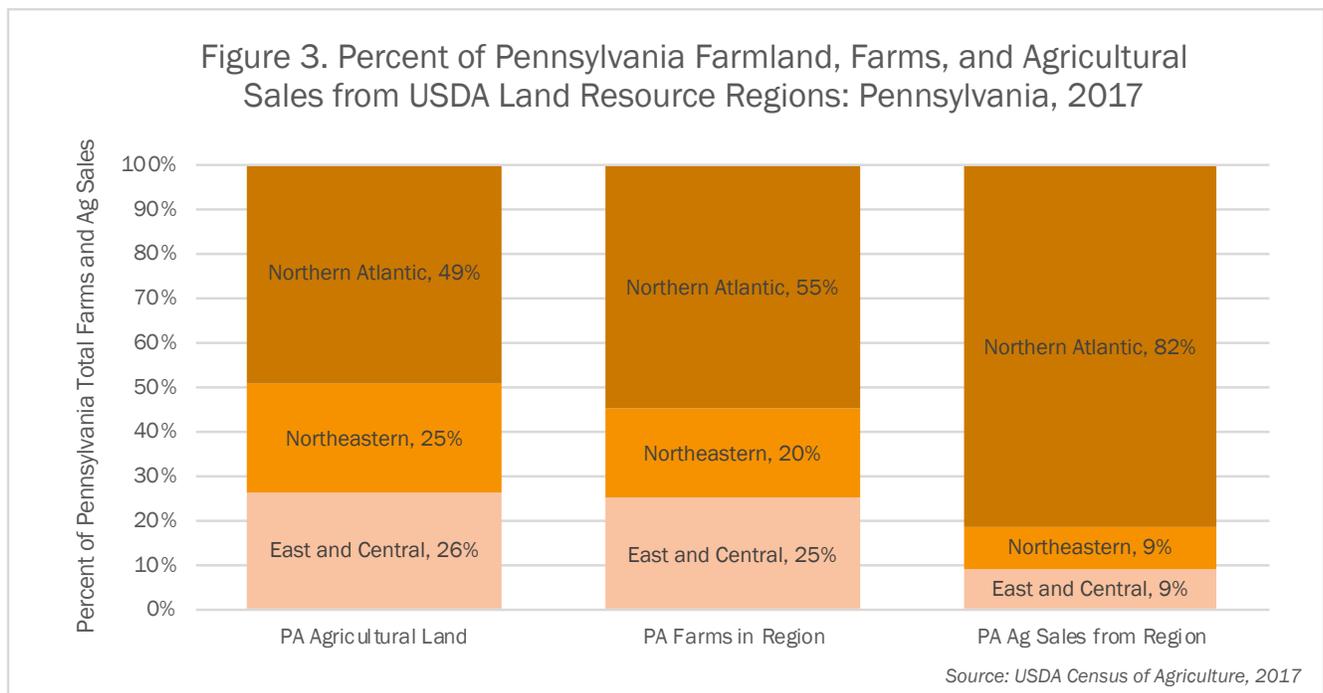
Section 4: Conservation Land in Pennsylvania

The Conservation Reserve Program (CRP) was founded by the USDA in 1985. As part of this program, farmers receive annual payments to take environmentally sensitive land on their farms out of production for a 10-15-year timespan. Instead, the farmers can plant vegetative cover crops like grasses and trees to help improve environmental health. CRP aims to decrease soil erosion, improve water quality, and protect wildlife habitats across the United States. Conservation programs in Pennsylvania under CRP include the Wetlands Reserve Program, Farmable Wetlands Program, Conservation Reserve Enhancement Program. In Pennsylvania, 153,748 acres of agricultural land was conservation land which translates to only about 0.54% of the total land in farms.

Section 5: Farmland Tenure of Producers in Pennsylvania

In Pennsylvania, farmers may own all the land they operate, they may own only some of land they operate and rent the remainder from other landowners, or they may rely entirely on rented land for their farm operations. In 2017, about 69% of Pennsylvania farms owned all of the land they operated, while 25% of farms owned only some of the land they operated (see Figure 4). The remaining 6% of farms were tenant-operated farms which relied entirely upon rental land for their operation.

From a land use perspective, about 52% of agricultural land in Pennsylvania was operated by farmers who used a mix of land they owned and land they rented from others (see Figure 4). The smallest proportion of farms were run exclusively by tenants who rented all the land they operated. Approximately 4% of the agricultural land in Pennsylvania was operated by tenants.

Figure 4. Tenure of Producers by Percent of Farms and Percent of Farmland: Pennsylvania, 2017

Source: USDA Census of Agriculture, 2017

When this is considered at the county level, there seems to be a positive relationship between a county's proportion of farms that sold under $100,000 and its proportion of farms that were run by farmers who owned all the land they operated (see Figure 5). The opposite appears to be true as well; counties with a smaller proportion of farms that sold under $100,000 seem to have a smaller proportion of farms that were run by farmers who owned all the land they worked on. The farms that were run by farmers who owned all the land they worked on may have operated on a smaller number of acres, but they represented a larger portion of the total farms in Pennsylvania compared to partly owned and tenant-run farms.

Figure 5. Percent of Farms in County where Farmer Owns All Acres Operated by Percent of Farms in County Selling under $100,000: Pennsylvania 2017
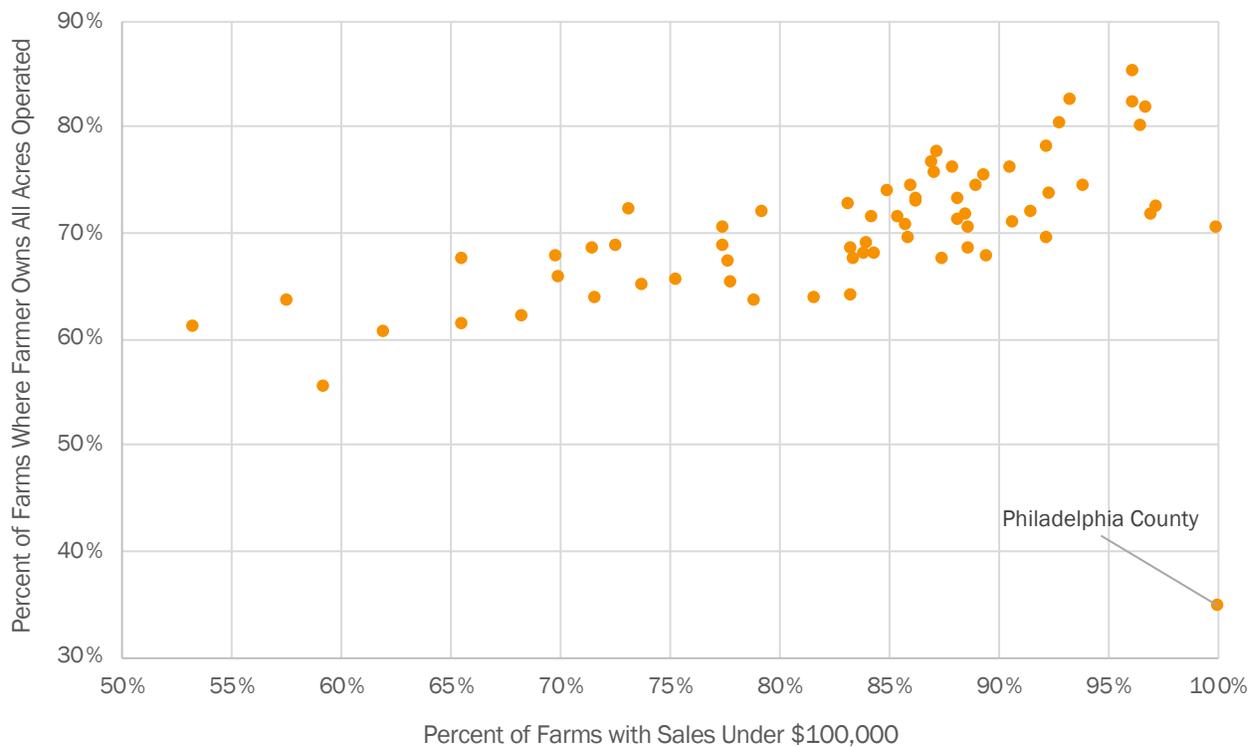
Source: USDA Census of Agriculture, 2017

A little more than three-quarters of Pennsylvania farms (about 79%) sold under $100,000 each year. Philadelphia County was an outlier where all the farms there sold under $100,000 a year. The county also had the lowest percentage of farms operated by producers who owned all of the land they worked on in Pennsylvania at less than 40%. Generally, urbanizing counties that have experienced larger increases in their populations also have a larger amount of tenant farms due to factors like the price and availability of farmland.

Section 6: Population Change and Agricultural Sales in Pennsylvania

The top agricultural counties in Pennsylvania have experienced major population growth pressures, which could problematic for them in the long run. Seven out of the top ten agricultural counties are in counties with population growth between 5.1% and 10% between 2007 and 2017 (see Map 3). The south-central and southeastern parts of Pennsylvania have had high increases in population during this time frame (Pennsylvania State Data Center, 2007 & 2017). As discussed previously, this area is part of the ridge and valley region (or the Northern Atlantic Slope Diversified Region) where the soil is prime for farming. The counties with the top 10 highest agricultural sales were all located in this region. The remaining three counties in the top ten have also experienced some growth but to a lesser extend with between a 1% and 5% increase in population since 2007. Strong population growth and land development can create challenges for agriculture by making farmland less affordable, increasing property taxes, increasing the difficulty of accessing farm fields due to higher traffic, and increasing conflicts between non-farm neighbors' interests.

Map 3. Population Changes in Pennsylvania Counties, 2007-2017 and Top Ten Counties by Agricultural Sales, 2017

Legend:
- Decreased by over 10%
- Decreased by 5.1% - 10%
- Decreased by 1%- 5%
- Increased by 1% - 5%
- Increased by 5.1% - 10%
- Increased by over 10%
- Minimal Changes in Population
- Top 10 Counties by Ag Sales

Source: Pennsylvania State Data Center, 2008 and 2018; USDA Census of Agriculture, 2017
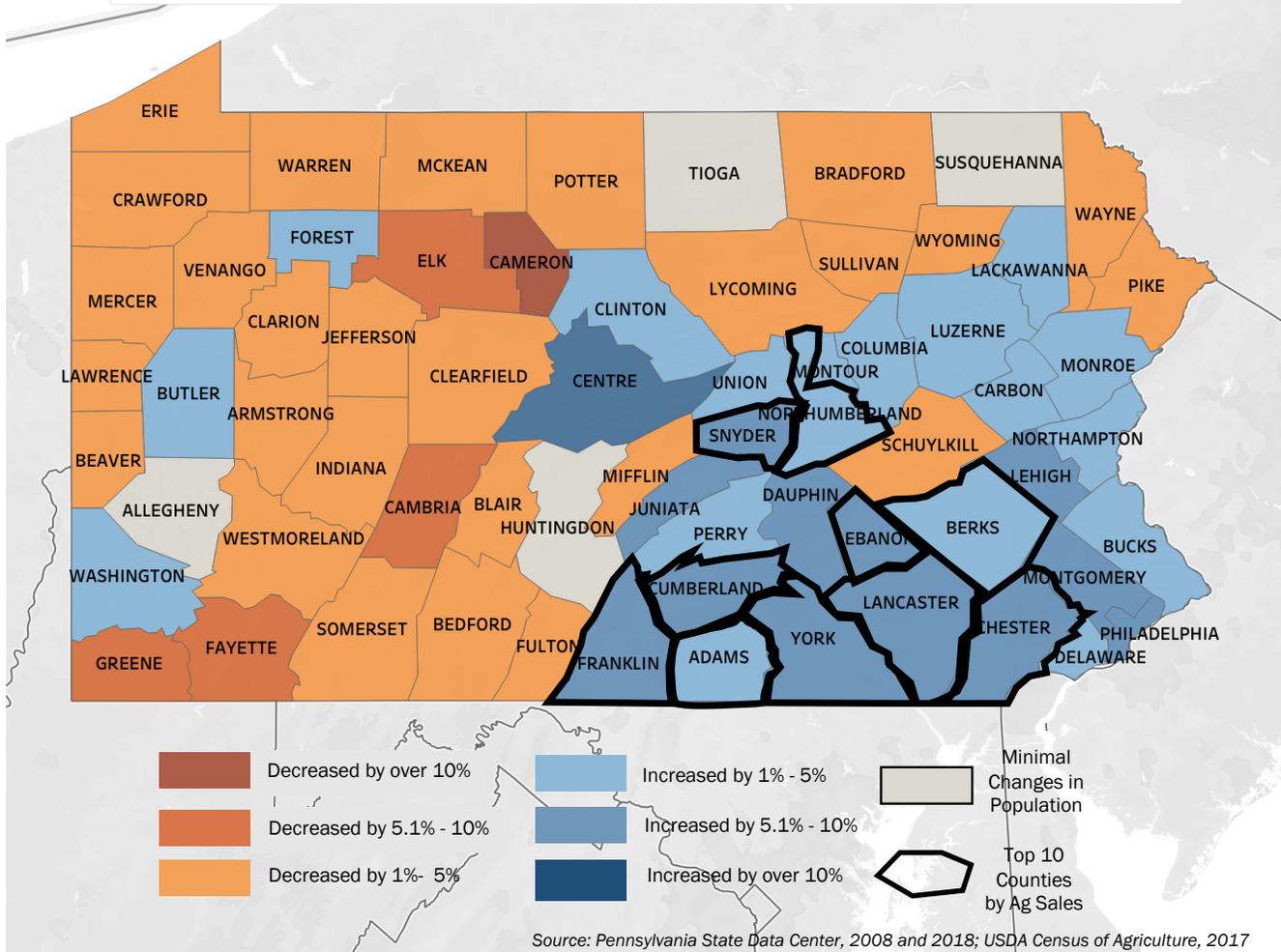
Summary

According to the 2017 Census of Agriculture, about 25% of Pennsylvania is farmland which can be broken down into cropland, pastureland, woodland, and land purposed for other uses like roads or barns. The USDA also breaks land up into different land resource regions that have similar soil types, climates, and geographies; each region has varying amounts of each type of agricultural land. Pennsylvania contains three land resource regions. While the ridge and valley region has experienced population increases, the other two regions seem to have remained stagnant or have even had some population loss between 2007 and 2017. Increasing populations can have implications that could create challenges for some counties in the long run because of additional competing interests.

There is also some correlation between farm size and tenure where counties with a higher proportion of farms selling under $100,000 also have a higher percentage of farmers who own all of the land they operate.

This report sought to explore what the agricultural landscape looks like in Pennsylvania using data regarding agricultural land, sales, and tenure from the most recent Census of Agriculture in 2017. Farming has been and still continues to be a part of Pennsylvania, and cultivating fresh perspectives on farmland use can show us exactly that.

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Appendix

Table A1. Number (Percent) of Agricultural Land Acres by Land Type: Pennsylvania, 2017					
County	Total County Ag Land	Share of Agricultural Land in County			
		Cropland	Pastureland	Woodland	Other Land
Adams	166,227 (50%)	128,436 (77%)	9,464 (6%)	200,96 (12%)	8,231 (5%)
Allegheny	28,970 (6%)	15,504 (54%)	4,004 (14%)	6,163 (21%)	3,299 (11%)
Armstrong	126,655 (30%)	7,3655 (58%)	1,4150 (11%)	2,9153 (23%)	9,697 (8%)
Beaver	53,832 (19%)	30,082 (56%)	8,001 (15%)	11,522 (21%)	4,227 (8%)
Bedford	222,224 (34%)	119,520 (54%)	26,909 (12%)	65,681 (30%)	10,114 (5%)
Berks	224,722 (41%)	18,451 (82%)	14,833 (7%)	14,045 (6%)	11,330 (5%)
Blair	78,923 (23%)	55,797 (71%)	5,936 (8%)	13,947 (18%)	3,243 (4%)
Bradford	303,601 (41%)	183,299 (60%)	30,790 (10%)	67,506 (22%)	22,006 (7%)
Bucks	77,255 (20%)	60,015 (78%)	5,458 (7%)	7,941 (10%)	3,841 (5%)
Butler	133,954 (27%)	86,232 (64%)	11,806 (9%)	24,321 (18%)	11,595 (9%)
Cambria	79,341 (18%)	50,486 (64%)	5,107 (6%)	16,992 (21%)	6,756 (9%)
Cameron	5,278 (2%)	1,452 (28%)	D*	2,886 (55%)	D*
Carbon	19,498 (8%)	13,099 (67%)	796 (4%)	4,321 (22%)	1,282 (7%)
Centre	149,858 (21%)	88,338 (59%)	11,344 (8%)	39,285 (26%)	10,891 (7%)
Chester	150,514 (31%)	105,752 (70%)	22,440 (15%)	12,999 (9%)	9,323 (6%)
Clarion	100,344 (26%)	52,458 (52%)	11,085 (11%)	29,874 (30%)	6,927 (7%)
Clearfield	60,957 (8%)	30,998 (51%)	5,663 (9%)	19,383 (32%)	4,913 (8%)
Clinton	40,057 (7%)	26,531 (66%)	2,480 (6%)	8,893 (22%)	2,153 (5%)
Columbia	106,748 (35%)	78,936 (74%)	5,078 (5%)	16,774 (16%)	5,960 (6%)
Crawford	194,447 (30%)	120,986 (62%)	16,271 (8%)	47,286 (24%)	9,904 (5%)
Cumberland	169,654 (49%)	140,836 (83%)	12,092 (7%)	10,274 (6%)	6,452 (4%)
Dauphin	81,252 (24%)	63,353 (78%)	5,382 (7%)	8,877 (11%)	3,640 (4%)
Delaware	2,385 (2%)	733 (31%)	D*	304 (13%)	D*
Elk	22,982 (4%)	9,344 (41%)	2,519 (11%)	9,345 (41%)	1,774 (8%)
Erie	153,403 (30%)	93,529 (61%)	12,903 (8%)	33,549 (22%)	13,422 (9%)
Fayette	112,285 (22%)	59,117 (53%)	18,492 (16%)	27,946 (25%)	6,730 (6%)
Forest	4,170 (2%)	1,709 (41%)	829 (20%)	1,442 (35%)	190 (5%)
Franklin	269,530 (55%)	213,922 (79%)	19,680 (7%)	25,631 (10%)	10,297 (4%)
Fulton	100,465 (36%)	52,861 (53%)	8,240 (8%)	35,261 (35%)	4,103 (4%)
Greene	114,089 (31%)	37,513 (33%)	31,551(28%)	33,414 (29%)	11,611 (10%)
Huntingdon	120,157 (21%)	67,488 (56%)	10,948 (9%)	37,414 (31%)	4,307 (4%)
Indiana	148,288 (28%)	95,169 (64%)	12,596 (8%)	31,239 (21%)	9,284 (6%)
Jefferson	80,411 (19%)	46,632 (58%)	7,634 (9%)	21,947 (27%)	4,198 (5%)
Juniata	85,640 (34%)	55,725 (65%)	7,371 (9%)	18,287 (21%)	4,257 (5%)

County	Total County Ag Land	Share of Agricultural Land in County			
		Cropland	Pastureland	Woodland	Other Land
Lackawanna	36,556 (12%)	20,276 (55%)	5,169 (14%)	6,974 (19%)	4,137 (11%)
Lancaster	393,949 (65%)	314,913 (80%)	32,993 (8%)	24,717 (6%)	21,326 (5%)
Lawrence	82,125 (36%)	55,136 (67%)	11,076 (13%)	11,231 (14%)	4,682 (6%)
Lebanon	107,577 (46%)	86,697 (81%)	10,969 (10%)	5,362 (5%)	4,549 (4%)
Lehigh	74,511 (34%)	63,121 (85%)	2,094 (3%)	4,119 (6%)	5,177 (7%)
Luzerne	49,087 (9%)	27,625 (56%)	1,866 (4%)	14,117 (29%)	5,479 (11%)
Lycoming	186,130 (24%)	78,970 (42%)	8,871 (5%)	87,755 (47%)	10,534 (6%)
McKean	43,084 (7%)	17,532 (41%)	5,438 (13%)	17,540 (41%)	2,574 (6%)
Mercer	156,397 (36%)	98,360 (63%)	17,546 (11%)	29,856 (19%)	10,635 (7%)
Mifflin	80,970 (31%)	49,932 (62%)	11,277 (14%)	16,476 (20%)	3,285 (4%)
Monroe	27,607 (7%)	13,380 (48%)	897 (3%)	11,552 (42%)	1,778 (6%)
Montgomery	30,896 (10%)	20,460 (66%)	5,046 (16%)	3,086 (10%)	2,304 (7%)
Montour	38,635 (46%)	29,379 (76%)	1,806 (5%)	5,466 (14%)	1,984 (5%)
Northampton	59,195 (25%)	51,560 (87%)	2,022 (3%)	3,092 (5%)	2,521 (4%)
Northumberland	124,136 (42%)	92,664 (75%)	6,566 (5%)	19,462 (16%)	5,444 (4%)
Perry	114,746 (33%)	77,198 (67%)	6,920 (6%)	25,572 (22%)	5,056 (4%)
Philadelphia	284 (0.33%)	117 (41%)	63 (22%)	56 (20%)	48 (17%)
Pike	24,700 (7%)	1,360 (6%)	460 (2%)	21,359 (86%)	1,521 (6%)
Potter	97,780 (14%)	45,547 (47%)	10,992 (11%)	34,950 (36%)	6,291 (6%)
Schuylkill	96,886 (19%)	69,745 (72%)	3,470 (4%)	18,374 (19%)	5,297 (5%)
Snyder	98,978 (47%)	71,419 (72%)	5,661 (6%)	16,307 (16%)	5,591 (6%)
Somerset	219,046 (32%)	136,257 (62%)	20,499 (9%)	50,740 (23%)	11,550 (5%)
Sullivan	43,424 (15%)	20,931 (48%)	3,523 (8%)	16,389 (38%)	2,581 (6%)
Susquehanna	154,409 (29%)	71,720 (46%)	23,089 (15%)	45,399 (29%)	14,201 (9%)
Tioga	212,797 (29%)	123,246 (58%)	23,936 (11%)	50,805 (24%)	14,810 (7%)
Union	65,719 (33%)	49,804 (76%)	3,442 (5%)	9,573 (15%)	2,900 (4%)
Venango	53,338 (12%)	30,117 (56%)	5,170 (10%)	14,755 (28%)	3,296 (6%)
Warren	68,153 (12%)	30,447 (45%)	7,608 (11%)	24,380 (36%)	5,718 (8%)
Washington	190,447 (35%)	90,941 (48%)	45,922 (24%)	41,335 (22%)	12,249 (6%)
Wayne	100,696 (22%)	46,257 (46%)	14,967 (15%)	33,018 (33%)	6,454 (6%)
Westmoreland	144,278 (22%)	93,364 (65%)	20,347 (14%)	22,363 (15%)	8,204 (6%)
Wyoming	61,303 (24%)	29,479 (48%)	5,297 (9%)	21,974 (36%)	4,553 (7%)
York	252,713 (44%)	199,235 (79%)	18,154 (7%)	25,398 (10%)	9,926 (4%)
Pennsylvania Total	7,278,668 (25%)	4,651,210 (64%)	706,136 (10%)	1,487,550 (20%)	433,772 (6%)

Table A1 (continued). Number (Percent) of Agricultural Land Acres by Land Type: Pennsylvania, 2017

* D indicates that data is withheld from the Census of Agriculture dataset to maintain privacy for individual farms.

Source: USDA Census of Agriculture, 2017

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This report is part of a series called "**Understanding Pennsylvania Agriculture: 2017 Update**," which explores different aspects of the 2017 USDA Census of Agriculture. This series was created by the Center for Economic and Community Development in partnership with Penn State Extension.

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