AGRICULTURAL ECONOMIC PROFILE

This section identifies existing economic conditions, and trends facing farming operations, including those related to specific types of agricultural products, labor and support resources, market trends, technology, land value dynamics, and land ownership.

FARM OPERATIONS

According to the most recent USDA NASS Census of Agriculture (USDA NASS, 2017a), there are 623 farms (i.e., operations) within Onondaga County. These farms are defined as any operation from which $1,000 or more of agricultural products were produced and sold or would normally sell each year (USDA Economic Research Service, 2022)[3]. Of these 623 operations, 428 were fully owned by the primary producer, 175 were partly owned by the primary producer, and 20 were leased by the primary producer (USDA NASS, 2017a).

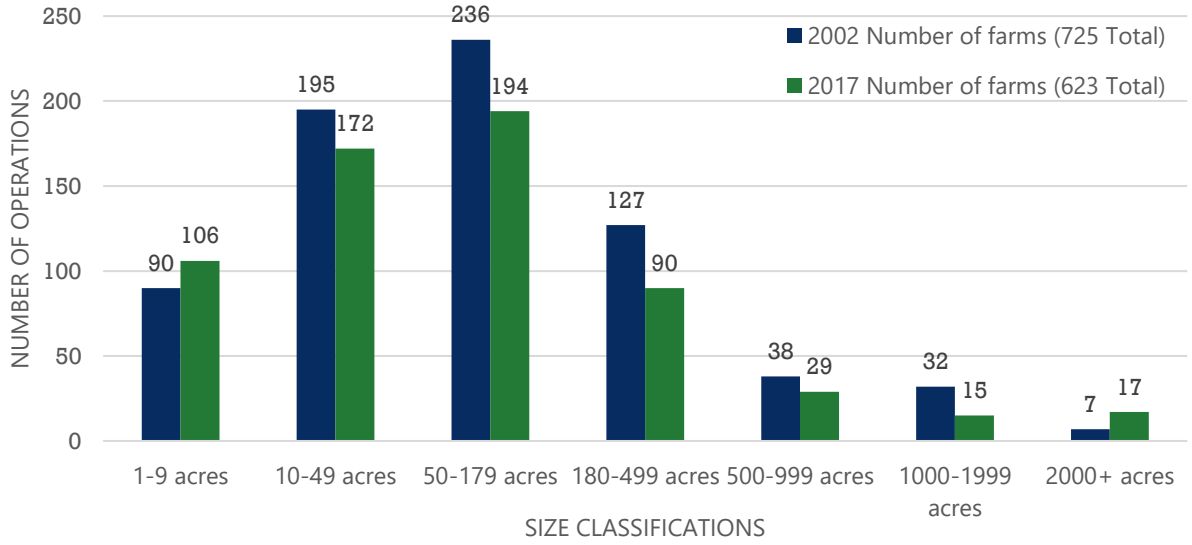
The overall number of farm operations in Onondaga County decreased by 102 farms since 2002, yet the total acres of farmland operated has increased by 4,433 acres. As of 2017, Onondaga County is experiencing more acres being farmed through fewer farming operations. Essentially, there has been a notable consolidation of farms, with a growth in the size of the largest farms (USDA NASS, 2002 and 2017).

Figure 19 displays the changes in the size of farm operations across Onondaga County between 2002 and 2017. Essentially, the County lost 46% of its mid-sized farming operations (50 – 499 acres) yet experienced an increase in very small farms (an increase in 16 operations) and an increase in the number of very large farms (an increase of 10 operations) (USDA NASS, 2017a).

Another way to view this change is that although the median farm size has decreased from 80 acres in 2002 to 65 acres in 2017 (USDA NASS, 2017a), the average farm size has increased from 216 acres/operation to 258 acres/operation. Meanwhile, there has been an increase in the total acreage of land operated since 2002 (+4,433 acres according to the USDA NASS, 2002 and 2017a). This reflects the trend towards consolidation of farm operations (see Land Use and Land Use Change sub-section in the Community Profile).

[3] Note that the USDA definition of farm operations, used in the USDA Agricultural Census, is different from the definition used in the NYS Agricultural Assessment program. USDA defines a farm as any place that produced and sold at least $1,000 of agricultural products during a given year. To quality as a farm operation in the NYS Ag Assessment program, annual gross sales of agricultural products per operation generally must average $10,000 or more for the preceding two years, however there are some nuances. For more information, see www.tax.ny.gov/research/property/assess.

Figure 19. Changes in farm operations by size



Sources: USDA NASS, 2002 and USDA NASS, 2017a.

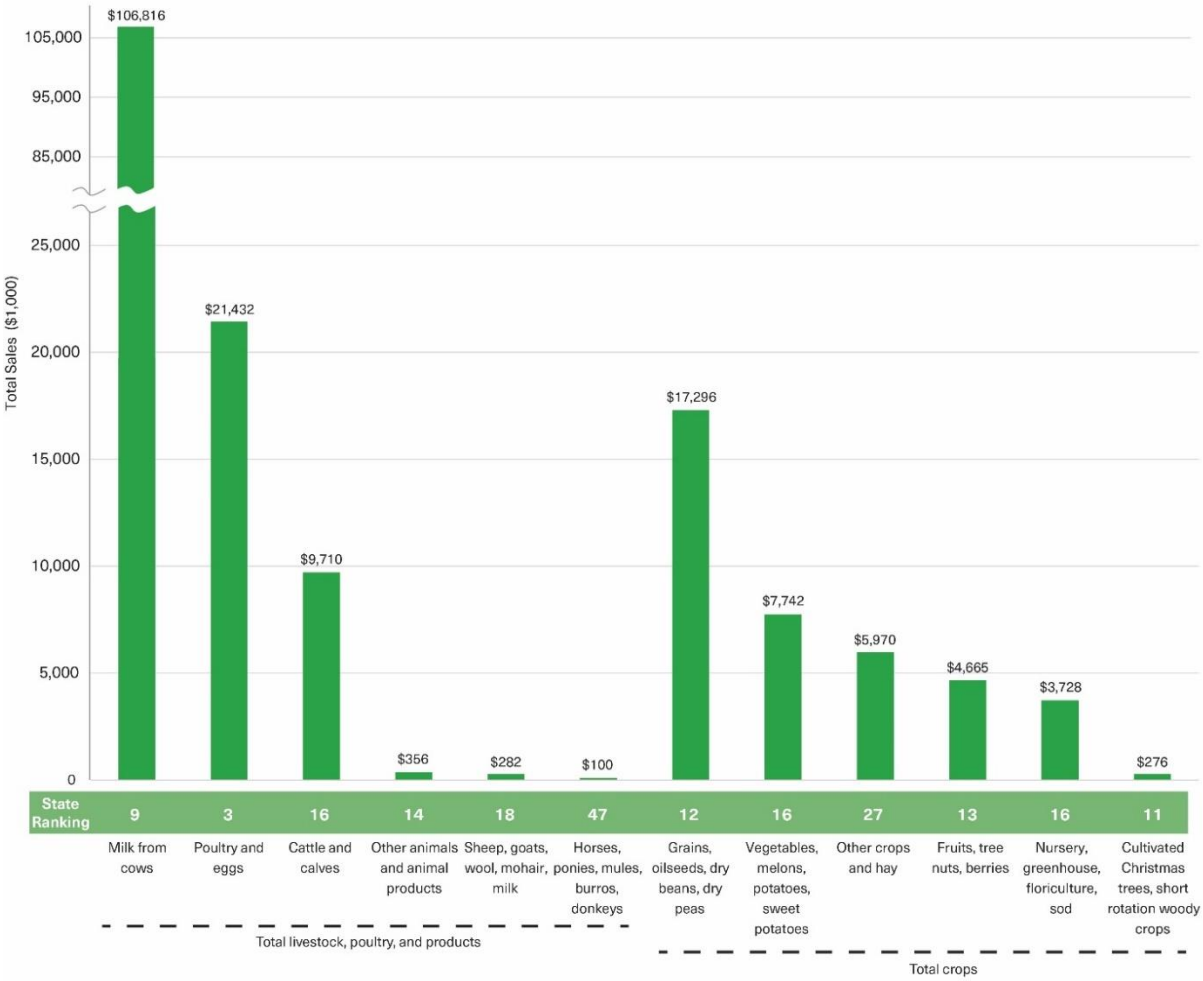
From another perspective, from 2002 to 2012, there was a 50% loss in farm sales for medium sized farms while larger farms experienced a 24% gain over the same duration (Food Plan CNY, 2021; USDA NASS, 2022 and 2017a). Medium sized farms (those with $100K through $500K in sales) face increasing pressures to compete with larger commodity production operations (Food Plan CNY, 2021).

FARM PRODUCTS

Onondaga County is in the top ten counties for all agricultural sales in New York State (Office of the New York State Comptroller, 2019). Onondaga County's farm operations offer a diverse array of agricultural products, particularly in the types of crops grown.

The total sales of agricultural products typically rank high in comparison to other counties across New York State, most notably in dairy and poultry. Figure 20 shows a breakdown of the market value of agricultural products sold in Onondaga County for 2017, and their state rankings.

Figure 20. Market value and statewide rank of agricultural products sold in Onondaga County



Source: USDA NASS 2017a. Note: Value of sales for Hogs and Pigs and Aquaculture operations has been withheld to avoid disclosing data for individual operations. Sales value is measured in 2017 dollars. State ranking is based on New York State's 62 counties.

Onondaga County farm operations are the enterprises behind one of the most productive agricultural regions in the state. Dairy is by far the highest commodity in the County by sales, making up over half of all agricultural sales in the County. Onondaga County ranks 9th in dairy production for New York counties, and in the top 5% of U.S. counties for milk production (USDA NASS, 2017a). Dairy sales are followed by poultry (12% of sales and ranked 3rd of NYS counties) and grains/oilseeds/dry beans/dry peas (10% of sales and 12th in NYS) rounding out Onondaga County's top three agricultural products. Proximity to markets coupled with its diverse natural landscape supports the production of specialty crops such as vegetables (4% of sales) and fruits/nuts/berries (3% of sales).

There are also products not measured by sales in the USDA Agricultural Census, such as maple syrup, which is a significant product from Onondaga County and New York State. In 2021, NYS was the second top producer of maple syrup (USDA NASS, 2021). Onondaga County's maple syrup garnered $750,000 in sales according to the NYS Maple Producers Association based on 2017 maple syrup production levels.

An additional up-and-coming crop to note is cannabis (both industrial hemp and adult-use cannabis). In February 2022 New York State passed a law creating a new Conditional Adult-Use Cannabis Cultivator license that will allow existing hemp producers with grower authorization to obtain temporary conditional licenses to cultivate and process adult use cannabis (New York State Office of the Governor, 2022). As of 2018, the Central New York region had only seen a handful of authorized research partners for hemp production, however that number will likely increase as people become more familiar with the crop and the policies related to its production (Syracuse Post Standard, 2018).

Figure 21. Animal and crop sales

	Sales value[4]	% of total
Total market value	$178,409,000	100%
Crop sales	$39,678,000	22%
Livestock sales	$138,731,000	78%

Source: USDA NASS, 2017a.

As reflected in Figures 20 and 21, a substantial share of the market value of Onondaga County's agricultural sector comes from livestock, and more specifically dairy. Livestock sales account for a greater proportion of total sales, since many field crops are not sold on the market but instead used to feed livestock. Livestock sales have been increasing as dairies consolidate. In 2017, Onondaga County had 25,553 dairy cows across 76 operations, with approximately 336 cows per operation (USDA NASS, 2017a).

The concentration of dairy operations has increased since the 2007 and 2012 agricultural census, which found 196 cows per farm and 280 cows per farm, respectively. Of the total acreage of cropland harvested in 2017 (91,655 acres), the USDA estimates that more than one-third of the acreage was used for forage land (i.e., hay, haylage, grass silage, and green chop). Figure 22 shows the USDA's estimate for the top five crops by harvested acreage in Onondaga County in 2017.

Figure 22. Changes in harvested acreage of top crops between 2012 and 2017

Crop/cover	Acres		% change
	2012	2017	
Total harvested cropland in Onondaga County	94,478	91,655	-3%
Forage-land (i.e., hay, haylage, grass silage, green chop)	34,370	34,950	2%
Corn for silage or green chop	15,453	18,422	19%
Corn for grain	21,879	18,107	-17%
Soybeans for beans	11,674	8,908	-24%
Wheat for grain, all	4,216	5,290	25%

Source: USDA NASS, 2012 and 2017a.

[4] Measured in 2017 dollars

The farm average value of sales in Onondaga County is $286,371 (USDA NASS, 2017). However, this average sales per farm is likely inflated by a relatively small proportion of more profitable farm operations, as the net income per farm in Onondaga County was reported to be much lower (see Figure 23). Approximately 36% of all operations reported farm sales of less than $2,500, and an additional 31% reported sales of between $2,500 and $24,999.

As a result, many farm businesses are reliant on farm-related income that is not generated by the direct sale of crops and livestock, but instead through avenues such as custom work, government programs, forest products, and building rentals. In 2017, Onondaga County farmers with such sources of income received an average of $33,512 (USDA NASS, 2017a).

Relatively low sales and increasing expenses result in most farm operations experiencing net losses of farm income. USDA's estimated net incomes, gains, and losses for both 2012 and 2017 are shown in Figure 23. While the overall income of farm operations is higher than what it was in 2012, the overall trend of more operations enduring losses than gains remained unchanged between the two agricultural census years. This underscores the risk and tight profit margins for agricultural operations and the need for affordable, innovative products, processes, or market development to increase profit margins (see also the Value-Added Economic Development Initiative Venture Proposal).

Figure 23. Farm operation income

Net cash farm income	2012	2017
Net income of operations	$27,136,000	$46,610,000
Average net income per operation	$39,847	$74,816
Operations with gains	279	262
Average gains per operation	$149,224	$223,074
Operations with losses	402	361
Average loss per operation	$33,788	$32,784

Source: USDA NASS, 2012 and 2017a. Note: dollar values shown here do not account for inflation.

One of several reasons for the lower profit margins of farming is the continuously increasing cost of doing business. Figure 24 reflects farm production expenses in 2017, with an average value of expenditures per operation of $228,293. This average expense per operation has increased 181% since 1997, outpacing national averages of farm expenses which increased 124% during the same duration (USDA NASS 1997 and 2017a). The largest expense categories are feed and hired labor, both averaging more than $100,000 per farm with expenses in these categories.

Figure 24. Farm production expenses

Expense Category	Farms	Total Expenses	Average per farm
Feed	362	$39,280,000	$108,508
Labor	-	$22,245,000	-
Hired	181	$21,261,000	$117,464

Expense Category	Farms	Total Expenses	Average per farm
Contract	33	$984,000	$29,818
Ag services	-	$17,976,000	-
Custom work and custom hauling	123	$1,745,000	$14,187
Machinery and equipment rental and leases	53	$1,085,000	$20,472
Other	308	$11,761,000	$38,185
Utilities	474	$3,385,000	$7,141
Supplies & repairs (excl. lubricants)	538	$13,714,000	$25,491
Depreciation	324	$13,703,000	$42,293
Fuels (incl. lubricants)	595	$8,705,000	$14,630
Seeds & plants totals	282	$7,315,000	$25,940
Property taxes	601	$6,523,000	$10,854
Fertilizer totals, incl. lime & soil conditioners	307	$6,587,000	$21,456
Interest	200	$5,678,000	$28,390
Non-real estate	137	$3,146,000	$22,964
Real estate	137	$2,532,000	$18,482
Livestock and poultry purchased or leased	149	$3,947,000	$26,490
Other livestock and poultry	104	$3,229,000	$31,048
Breeding livestock	69	$718,000	$10,406
Chemical totals	276	$3,809,000	$13,801
Rent, cash, land & buildings	148	$2,869,000	$19,385

Source: USDA NASS, 2017a. Note: Values represent 2017 dollars.

LABOR AND SUPPORT RESOURCES

In 2017, 1,399 workers were hired to work either seasonally or year-round on farm operations, with approximately 47% of these workers working more than 150 days of the year (USDA NASS, 2017a). Of these hired workers, 301 migrant workers worked on 32 farms in Onondaga County.

These hired migrant workers likely were hired through the H-2A Temporary Agricultural Workers program, which exists to bring in labor when there are not enough US workers who are able, willing, qualified, and available to do temporary work (USDA NASS, 2017a; US Citizenship and Immigration Services, 2022). Furthermore, many sole proprietorships on smaller farms do not have hired labor. In 2017, 313 farms reported having 670 unpaid workers (USDA NASS, 2017a). Note that these figures are likely undercounted total farm employment due to under-reporting among USDA Agricultural Census survey respondents.

Most hired farmworkers work full time, and some work more than 40 hours per week (US Department of Labor Bureau of Labor Statistics, 2020a). In May 2020, Central New York region farmworkers on livestock

operations had an annual mean wage ranging from $34,210 to $48,160, while farmworkers on cultivated operations had an annual mean wage ranging from $32,680 to $44,680 (US Department of Labor Bureau of Labor Statistics, 2020a). Regarding staff size, most Onondaga County farm operations with hired staff employ between one and four hired farmworkers (Figure 25).

Figure 25. Farm operations by size (hired staff)

Farm size	Number of Farms	% of Total Farms with Hired Staff
Total farms with hired labor	181	-
Farms with 1 worker	40	22%
Farms with 2 workers	38	21%
Farms with 3 to 4 workers	46	25%
Farms with 5 to 9 workers	24	13%
Farms with 10 or more workers	33	18%

Source: USDA NASS, 2017a.

Agriculture was a growing sector from 2015 to 2020 in Onondaga County according to a recent analysis conducted in the development of the Onondaga County Comprehensive Plan, with an increase of roughly 50 jobs (EMSI, 2020). Specifically, the following agricultural and food-related sectors employed more individuals as a share of the overall County employment than national employment rates, as indicated by their employment location quotients greater than one[5]

- specialty food stores (1.81)
- grocery wholesalers (1.78)
- dairy product manufacturing (1.71)
- cattle ranching and farming (1.53)
- grocery stores (1.36)
- alcoholic beverage retailers (1.30)
- support activities for animal production (1.06).

The agricultural labor sector in Onondaga County faces many challenges. Overall, there is a labor shortage. Due to the low income and financial risks of farming, fewer young people within farming families are remaining in the family businesses (see the Demographic Overview section in the Agricultural Community Profile and the Farm Succession section in this profile for more discussion). Agricultural workers face low wages, long workdays, and difficult working conditions across the country.

Many farms require the use of the federal H-2A program to bring in able, willing, qualified, and available migrant or immigrant farmworkers. While some larger farm operations have sought to accommodate the unique challenges faced by migrant farmworkers (e.g., shuttle services to transport workers to facilities), migrant farmworkers often face complications from language barriers, lack of adequate transportation, isolation from the broader community (in the case of those living in on-farm housing), and immigration policy (Fox et al., 2017)

[5] Beverage manufacturing and fruit & vegetable preserving also employed more individuals as a share of the overall County employment than national employment rates, however, due to the small number of establishments, total employment data is not disclosed due to confidentiality concerns (US Department of Labor Bureau of Labor Statistics, 2020b).

To address these difficult working conditions, the Farm Labor Wage Board, as part of their authority under the 2019 New York State Farm Laborers Practices Act, made a resolution to phase in a 40-hour work week for farmworkers by 2032, lowering the threshold by four hours per week every two years beginning January 2024 (anything over 40 hours will require overtime pay) (New York State Department of Labor, 2022). This recent change has sparked concerns from farm operators, who already faced labor shortages while balancing the increasing labor costs with the slim profit margins of farms, all while retaining a quality workforce here in NY (workers may easily choose to work for higher earnings in other states that participate in the federal H-2A program for immigrant and migrant farmworkers but do not require a 40-hour work week). In addition, federal policies relating to visas and other immigration programs have increased restrictions on migrant workers.

As labor and related technology needs continue to evolve, many of the needed workforce skillsets in agriculture will likely evolve as well. This may help to expand the potential workforce. For example, increased job opportunities in warehouse distribution and drone technology may spill over into the agricultural sector as well and help attract people who would have otherwise not considered a career in agriculture. Moving forward, a resilient agricultural workforce will be contingent on reaching all potential workers, the ability of farms to pay workers competitive wages while providing adequate support resources, including job and safety trainings, quality housing/transportation, and safe and healthy working conditions. Much of this is contingent on federal immigration and farmworker policies as well as the price of food.

LOCAL AGRICULTURE MARKET TRENDS

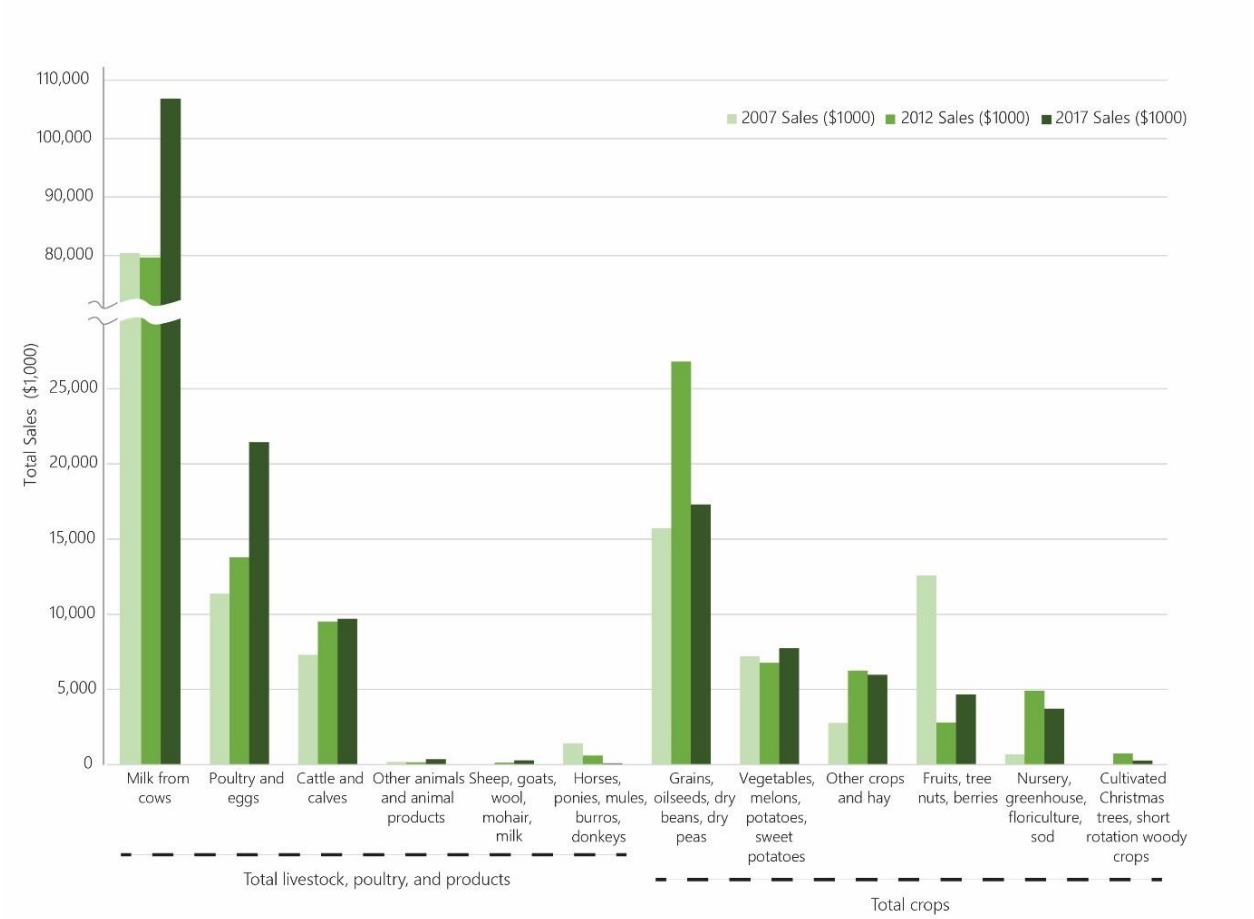
Farm income is notoriously unstable from year to year. Farmers are particularly susceptible to changes in income due to weather conditions that affect crop output, yearly variations in market prices of agricultural products, and rising costs for maintenance and farm technologies. Yet Onondaga County agriculture as a sector has been consistently growing within Onondaga County's economy over the past 15 years, most recently producing $178 million in annual sales from a total of 623 farms (USDA NASS, 2017a). This is up 23% from 2007 (USDA NASS, 2007).

As demonstrated in Figure 26, dairy has been a primary driver of this growth, due to its significant market share of agricultural products and 27% growth in sales between 2012 and 2017 (USDA NASS2012; USDA NASS, 2017a). Poultry and egg sales have also consistently grown over recent years.

This trend of dairy sales aligns closely with New York as a whole. New York has more than 35,000 farms covering 7.3 million acres, nearly one quarter of the state's land area. New York's U.S. rankings rose in 2017 compared to 2011 in milk, snap beans, and maple syrup. In 2019, New York State produced 820,000 gallons of maple syrup, marking a 75-year record (NYS Department of Agriculture and Markets, 2020).

Milk is by far the state's largest agricultural commodity, with $2.7 billion in sales in 2017, more than half of the total for all agricultural products (Office of the New York State Comptroller, 2018).

Figure 26. Changes in Crop Sales by Product



Source: USDA NASS, 2007, 2012, and 2017a. Note: dollar values do not account for yearly price inflation.

Agriculture provides approximately 2.1% of the total taxable sales in Onondaga County, which is a slightly lower ratio than that of New York State as a whole (2.5%, Schmidt 2019). Albeit a relatively small share of the county's total sales, dollars received in agricultural sales are important and cause ripple effects to the broader economy. The economic impact is especially important to consider for rural communities.

The USDA's Local Food System Economic Impact Calculator is a useful input-output model that can determine the ripple effects that agricultural sales can have in a local economy. The upper bound of economic impact that agriculture sales have in Onondaga County, based on 2017's total agricultural sales, is estimated to be $282,231,240 annually (USDA Agricultural Marketing Service & Colorado State University, 2022). This is a rough estimate that includes direct effects (e.g., sales farmers make at a market) as well as indirect effects (e.g., how farmers spend those extra revenues by hiring or paying a local business to help them move product).[6]

[6] As noted on its website, the calculator may underestimate economic impacts of agriculture in NYS, due to the state's high population levels, strong agricultural sector, many input suppliers, and strong local labor market.

Recently, an evaluation was conducted to assess the indirect and induced economic impacts from sub-sectors of agriculture across New York State. Through the single economic multiplier for all agricultural output sales in New York State was calculated to be 1.49; meaning that for every dollar directly generated in NYS agriculture, $0.49 are indirectly generated in NYS (non-agricultural) businesses (Schmit, 2021). These indirect impacts represent a combined effect due to business-to-business activity and labor income spending (Schmidt, 2021).

Additional market trends to consider are the types of markets in which farm operations participate. Onondaga County's agricultural operations are proportionally strong in direct sales (selling directly to consumers via farmers markets, farm stands, CSAs, etc.) and direct wholesale (selling directly to local restaurants, grocers, institutions, etc.).

Figure 27. Direct market participation (retail and wholesale)

Retail Direct Market Participation	United States	New York	Onondaga County
Number of Farms	130,056	5,697	132
Percent of Farms (%)	6.4%	17.0%	21.2%
Total Sales	$2,805,310,000	$222,711,000	$4,361,000
Percent of Sales (%)	0.7%	4.2%	2.4%
Sales Per Capita	$8.57	$11.40	$9.44
Wholesale Direct Market Participation	**United States**	**New York**	**Onondaga County**
Number of Farms	28,958	1,587	37
Percent of Farms (%)	1.4%	4.8%	5.9%
Total Direct Market Sales	$9,036,103,000	$316,286,000	$25,069,000
Percent of Sales (%)	2.3%	5.9%	14.1%

Source: USDA NASS 2017a.

AGRITOURISM

Agritourism (agriculture tourism) is an additional market that has become more popular in recent years, both nationally and locally. Agritourism sites can include wineries, farmers markets, pumpkin patches, farmsteads, apple orchards, and more – all of which can be found in Onondaga County.

Because agritourism is a relatively new term, the USDA NASS Agricultural Census only recently started measuring it. Figure 28 shows only 9 agritourism sites and the USDA Agricultural Census does not include farmer's markets in their count of agritourism market participation. While it likely underestimates the total rate of agritourism in the county, it may provide a point of comparison to other geographies (see Figure 28).

As evidence of the likely undercounting, according to the 2017 Central New York Regional Recreation and Heritage Plan, there are 19 agritourism sites in the county and since then the total numbers have likely increased. Major local destinations include u-pick fruit or vegetable operations like Emmi Produce or Tim's

Pumpkin Patch and multi-use venues like Beak & Skiff and Heritage Hill. Benefits of agritourism includes its role as an additional revenue source for farmers and its ability to improve the public awareness about the importance of local agriculture.



According to the USDA NASS Agricultural Census, the rate of Onondaga County farms with agricultural tourism sales is nearly identical to national levels (1.4% of farms), but lower than the New York State overall (2.5% of farms). Meanwhile, Onondaga County's agritourism brings in twice the revenues compared to US rates of agritourism, but less than New York State. On average, a farm participating in agritourism generates about $101,000 in sales, which is much higher than a typical agritourism operation in New York State or in the US overall (see Figure 28).

Perhaps a way to explain this higher rate of revenues per farm in Onondaga County is that there are fewer smaller scale operations participating in agritourism locally than compared to other places. This indicates that Onondaga County may have room to build up small scale agritourism to mirror the rates of agritourism participation and revenues throughout New York State and the US. More information about the planning considerations for agritourism can be found in the **Farm Friendly Toolbox**.

Figure 28. Participation in agritourism

Agritourism Market Participation	United States	New York	Onondaga County
Number of farms	28,575	826	9
Percent of farms (%)	1.4%	2.5%	1.4%
Total agritourism sales	$949,323,000	$36,847,000	$907,903
Average value of agritourism sales per farm	$33,222	$44,609	$100,878
Agritourism revenue for every $100,000 in total agricultural sales	$2.44	$6.86	$5.09

Source: USDA NASS, 2017a. Note: the USDA Agricultural Census provides a Coefficient of Variation (CV) measure of uncertainty for estimates. In this case, Onondaga County has a 53% CV for 2017 agritourism sales, indicating a relatively high amount of uncertainty in the data compared to the US (2% CV) and New York State (12% CV). Measures of agritourism are only measured for farm operations if receipts of sales can be provided.

An additional type of agricultural market trends to consider is value-added products, which can enable farmers to increase profit margins if done effectively. Value-added products refer to changes to the physical state, form, or production of the product in a manner that enhances its value. Examples include making apples into pie or obtaining organic crop certification.

Many more Onondaga County farms have some form of value-added product sales compared to national and statewide rates; however, total dollars from value-added sales are relatively low for Onondaga County, falling under statewide rates and only slightly higher than national rates. This suggests there may be more profitable innovations of current value-added products, such as producing higher price point products, packaging products more efficiently and selling products to higher paying purchasers (for example local higher educational institutions that could purchase in bulk). Large-scale investments should be linked with feasibility studies prior to implementation to make sure investments are viable for the market.

Figure 29. Participation in value added production

Value-Added Market Participation	United States	New York	Onondaga County
Number of Farms	33,523	1,977	51
Percent of Farms (%)	1.6%	5.9%	8.2%
Total Sales	$4,043,356,000	$182,305,000	$4,454,000
Percent of Sales (%)	1.0%	3.4%	2.5%

Source: USDA NASS, 2017a.

Despite the production and strong economic base in Onondaga County, there remains an unmet demand for certain types of agricultural produce, specifically local meats, poultry and eggs, and fruits and vegetables. Figure 30 illustrates the results of a surface-level analysis of the demand for local agricultural products within Onondaga County. This analysis describes local production and market demand in four ways:

- Local quotient is the percentage of category food sales produced within the area (in this case, Onondaga County). Location quotients identify export industries in an area (those industries producing more of a good or service than is needed to meet area demand) and import industries (those producing less than enough to meet area demand). A result of greater than 100% indicates that local demand could be met entirely with local production if it were directed to these markets through a local food system.
- Local food demand is the approximate value of category wholesale sales which could come from local sources if supply were available.
- Local food supply is the approximate value of category wholesale sales produced within the area based on the county-level local quotient, some of which may be shipped to other states.
- Unmet market for local food is the difference between the value of local food demand and area production (supply) in the chosen categories.

The analysis summarized in Figure 30 relies partially on statewide data, therefore an additional investigation of regional productive capacity and consumer purchase intent (and the gap between these two metrics) that is specific to Onondaga County and/or Central New York is required. Nonetheless, the magnitude of the potential market for local food shown here suggests that the marketplace could accommodate more production of poultry and eggs, and significantly more production of local fruits, vegetables, and meats.

Figure 30. Potential unmet market demand for local food in Onondaga County

	Dairy	Poultry & eggs	Fruits & vegetables	Meat
Local quotient	214 %	59 %	12 %	12 %
Local food demand	$ 48,000,000	$ 20,000,000	$ 140,000,000	$ 44,000,000
Local food supply	$ 100,000,000	$ 12,000,000	$ 17,000,00	$ 5,500,000
Unmet market for local food	See note*	$ 8,100,000	$ 120,000,000	$ 39,000,000

Source: New Venture Advisors (2018) Note: Per New Venture Advisors, in this instance, local demand could be fully met with local supply if it were directed to these markets through a robust local food system.

According to Food Plan CNY, urban agriculture and community gardening in Syracuse has expanded over the past decade providing new sources of food to consumers, often in the form of fruits and vegetables. This is one of many potential avenues for meeting local demand for these products. The Brady Faith Community Supported Agriculture and community gardening through Syracuse Grows are two programs that increase access to local fruits and vegetables to meet local demand.

TECHNOLOGY

Although agriculture has a reputation as being an established and traditional industry, the sector is always innovating and will continue to innovate into the future using technology. To meet rising demand in the future with a shift in workforce, climate change challenges, and limitations in the natural environment, technology will continue to drive agricultural innovation to create new types of products, develop efficiencies in food systems, and foster new synergies between industry sectors.

Recently an examination of New York State's Agrifood System revealed that large scale investments in NY were occurring in the following ways: indoor farming, consumer packaged goods and food delivery services, and food safety technologies to improve traceability, logistics, and transport (Grow-NY, 2021). This report also identified a gap in investment for robotics, despite the numerous benefits that it can provide given current and anticipated labor shortages in the future[7].

The farm robotics category is large, including technology-enabled mechanical harvesters, drones, and autonomous robots. For now, however, robotics and automated harvesting are still some distance away from widespread, practical applicability across all sectors in New York State (Grow-NY, 2021). Technologies

[7] Over the past two years, Grow-NY has funded start-up business awards for companies working in farm robotics, ag-related biotechnology, food safety technology, and more.

like drones and robotics are important to certain types of agriculture in Onondaga County as they are used in precision technology (e.g., pesticide/fertilizer application), palletizers, and milk processing.

Broadband access is more important than ever, with internet being a key tool for marketing, participating in retail, and reaching customers. Despite this, as of 2019, over 11 million Americans in rural areas and over 846,000 Americans in tribal lands lacked access to broadband that meets the federal definition for minimum standards (National Association of Counties, 2019). While Onondaga County is relatively connected to broadband compared to other areas of the country, there are still anywhere from 17- 21% of households without broadband access (National Association of Counties, 2019). Recently Onondaga County has committed the Coronavirus State and Local Fiscal Recovery Fund (Recovery Fund), part of the American Rescue Plan Act (ARPA), to invest $15 million to bridge this digital divide and provide equal access to broadband in all areas of the county currently not served by providers.

LAND VALUE DYNAMICS

MUNICIPAL FISCAL IMPACTS

Conversion of agricultural land can have significant impacts for rural and suburban municipalities facing growth pressure. Fragmented, unplanned development of farmland can create inefficiencies in services, and environmental impacts such as traffic congestion, air and water pollution, loss of open space, and increased demand for costly public services. Outward growth of land development, often in the form of residential roadside development and subdivisions, into rural and suburban communities, predominantly in the form of residential development, is sometimes characterized as growth beneficial to a community's tax base, rather than agricultural uses, when the opposite is often the case. According to a 2016 report from the American Farmland Trust, specific misconceptions about farmland as it applies to municipal finances include:

- **Myth 1: Open lands, including productive farms and forests, are an interim land use that should be developed to their "highest and best use."**
- **Myth 2: Agricultural land receives unfair tax breaks when it is assessed at its current use value for farming instead of at its potential use value for residential or commercial development.**
- **Myth 3: Residential development will lower property taxes by increasing the tax base.**

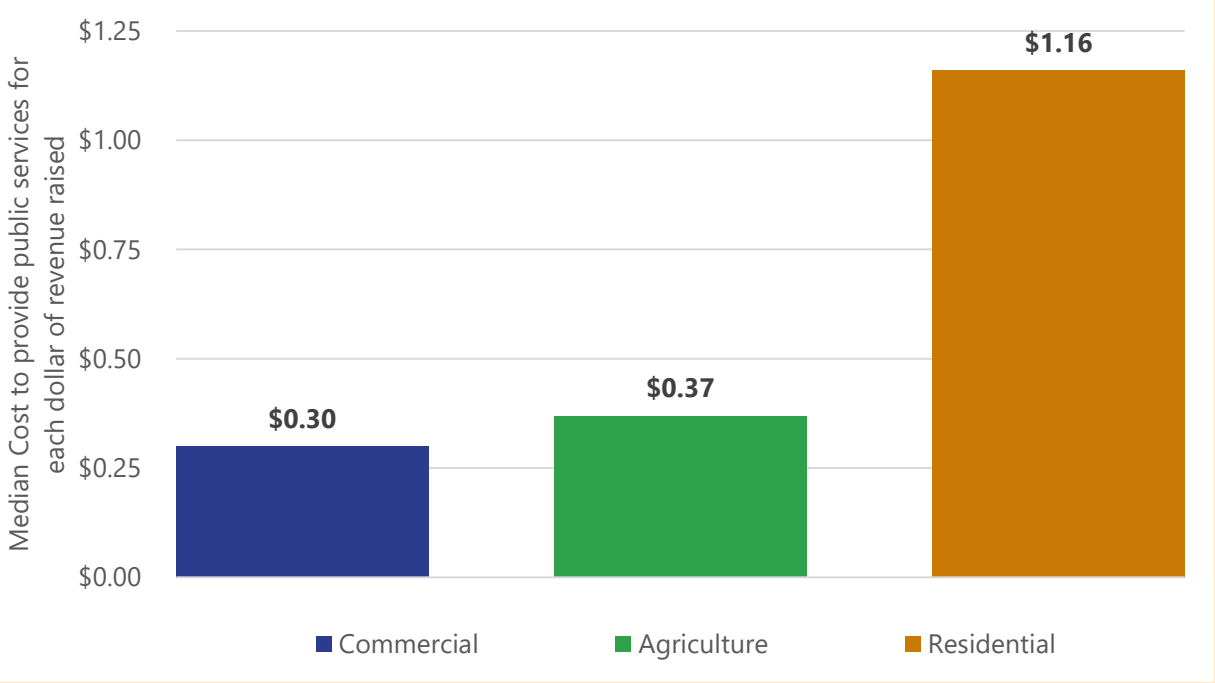
Working lands and open space may generate less revenue than residential, commercial, or industrial properties, but they require minimal public infrastructure and services. A tool to examine the cost of community services was developed by the American Farmland Trust to consider how much agricultural lands contribute to the local tax base through comparative revenue-to-expenditure ratios to other land use classifications (i.e., residential, commercial, and industrial). As of 2016, over 150 of these studies had been conducted across the United States with 12 occurring in New York municipalities (American Farmland Trust, 2016).

Following national trends, the studies across New York State municipalities indicate that working lands generate more public revenue than they receive back in public services. Their impact on municipal budgets is like that of other commercial and industrial land uses, with a much lower revenue-to-

expenditure ratio. Median revenue-to-expenditures for land uses across these NYS municipalities are as follows: 1:1.25 for Residential, 1:0.26 for Business (Commercial + Industrial), and 1:0.29 for Agriculture (Working & Open Land).

Residential land uses have high infrastructure costs (both capital and maintenance), and consequentially must be subsidized by other community land uses like agriculture or business. Therefore, converting agricultural land to residential land use should not be viewed as a solution to increase municipal revenue. The **Farm Friendly Municipal Toolbox** further outlines methods for local governments to protect farmland and opportunities to increase local viability (Appendix A).

Figure 31. Median cost of community services nationally by land use types



Source: American Farmland Trust. 2016. Cost of Community Services Studies Fact Sheet and Technical Memo. Available at https://farmlandinfo.org/publications/cost-of-community-services-studies/ (Accessed January 9, 2021).

TAXATION OF AGRICULTURAL LAND

While property taxes in New York State are the 14th highest in the US (Tax Foundation, 2021), there are a variety of tax programs that work together to protect farmland. For newly constructed or reconstructed agricultural structures, New York State Real Property Tax Law allows a ten-year property tax exemption. Once granted, the exemption continues automatically for ten years pending no changes in use as a farming operation or conversion to a non-agricultural or non-horticultural use.

An additional opportunity for farmers to protect their farmland is through agricultural assessments. Agricultural assessments allow property owners to receive a property tax reduction for land in agricultural production by basing the assessment on agricultural land use only, rather than its full development value.

Onondaga County Real Property Tax Service parcel data indicates that approximately 1,385 individual property owners claimed an agricultural use value exemption in 2020.

An agricultural assessment applies to school, County, and town property taxes, and is based on the soil types on the farm. Agricultural assessments are limited to land used for agricultural production. If property with an agricultural assessment is converted into a nonagricultural use[8], a payment is imposed to recapture the taxes forgone for converting such land.

During the Agriculture & Farmland Protection Plan outreach process, participating stakeholders expressed dissatisfaction with local assessment of agricultural land and a lack of awareness by local assessors regarding the nuances in the agricultural assessment policy as well as the wide variety of agricultural practices.

SOLAR AND OTHER RENEWABLE ENERGY DEVELOPMENT

New York State, including Onondaga County, is experiencing a large increase of utility solar energy development (systems producing 1 megawatt of solar energy or more). The demand for solar energy has been largely driven by increased efficiency within the panel technology, as well as New York State's renewable energy policy goals aimed at reducing greenhouse gases.

Utility scale solar energy is land intensive, requiring on average five to ten acres of land per megawatt[9]. Developers often select agricultural land for solar installations due to its flat topography, minimal need for land clearing, and proximity to roads and transmission infrastructure. Approximately 40% of utility scale solar energy development in NYS occurs on agriculture lands and is anticipated to increase without any policy intervention.[10]

If coordinated carefully between developers and landowners, solar energy can provide consistent supplemental income for farm operations to remain viable during difficult market changes. Solar energy is relatively environmentally benign. It provides valuable renewable energy to address climate change, does not generate on-site pollution, and maintenance does not require extensive truck traffic. Solar energy in agricultural areas can have the potential to negatively impact the agricultural industry.

Utility scale solar, when developed in the traditional manner, removes agriculture from production, and soil disturbance can permanently affect agricultural soil qualities. While some developers have co-located solar utilities and uses on the same site (e.g., using land for sheep grazing or creating pollinator habitat), land used for utility scale solar energy is more commonly removed entirely from agricultural production. Although there are decommissioning guidelines developed by New York State Department of Agriculture and Markets[11], soil disturbance resulting from the construction of solar facilities may compromise the long-

[8] Conversion penalties apply if uses are converted within five years of last receiving an agricultural assessment if located in an agricultural district and within eight years of last receiving an agricultural assessment if located outside an agricultural district

[9] Syracuse Onondaga County Planning Agency. 2021. Solar Energy Best Management Practices for Agriculture-Friendly Projects. Available at: http://ongov.net/planning/documents/AgBestPractices05112021.pdf (Accessed February 2022).

[10] Katkar, V.V., Sward, J.A., Worsley, A., and Zhang, K.,M. 2021. Strategic land use analysis for solar energy development in New York State. Renewable Energy 173:861-975 Available from: https://www.sciencedirect.com/science/article/abs/pii/S0960148121004900 (Accessed February 2022)

[11] New York State Department of Agriculture and Markets. 2019. Guidelines for solar energy projects – construction mitigation for agricultural lands. Available at: https://agriculture.ny.gov/system/files/documents/2019/10/solar_energy_guidelines.pdf (Accessed February 2022).

term productivity of soil due to compaction, fill, and mixing soil layers. Solar energy can offer high value lease payments that are hard for farmers to refuse. This in turn can further drive the conversion of farmland, removing land from production and driving up the value and price of leasing agricultural lands. More expensive land prices can make it difficult for the farming community to access land.

Further, solar energy development on farmland may impact the way in which the land's taxable value is assessed (see Municipal Fiscal Impact section of this Economic Profile). If the primary use of the parcel changes from agriculture to energy production, the property owner may lose their agricultural tax exemptions (although solar related exemptions may also be offered).

Local land regulations can be used to facilitate a balance between agriculture and solar development. Local regulations can encourage the use of marginal farmland soils or non-agricultural areas for siting solar facilities and promoting dual uses on lands (i.e., co-located agriculture). The **Farm Friendly Municipal Toolbox** provides additional information about how municipalities can work towards protecting farmland in balance with solar development.

NYS regulations are also evolving. The 2019 Climate Leadership and Community Protection Act (CLCPA) set forth a goal of having a minimum of 70% statewide electricity consumption from renewable sources by 2030 and emission-free by 2040. Under this act, the permitting of large-scale renewable energy projects (over 20-25MW) was expedited from the previous Article 10 permitting process to the more streamlined Section 94-c process. Through this process, solar developers must submit an agricultural plan to avoid, minimize, and mitigate agricultural impacts to active agricultural lands, consistent with NYS Department of Agriculture and Markets Guidelines to the maximum extent possible (New York State Office of Renewable Energy Siting, 2021).

Recently, American Farmland Trust released policy recommendations for a solar siting mitigation framework, ideas on how to increase agrivoltaic projects, and other recommendations designed to encourage solar developers to site projects in ways that strengthen farm communities and protect farmland (American Farmland Trust, 2022). Having siting tools that can consider projected capacities across regions, along with areas that are best suited for solar and agriculture, will further improve the ability to balance solar development while strengthening agricultural viability.

LAND OWNERSHIP TRENDS

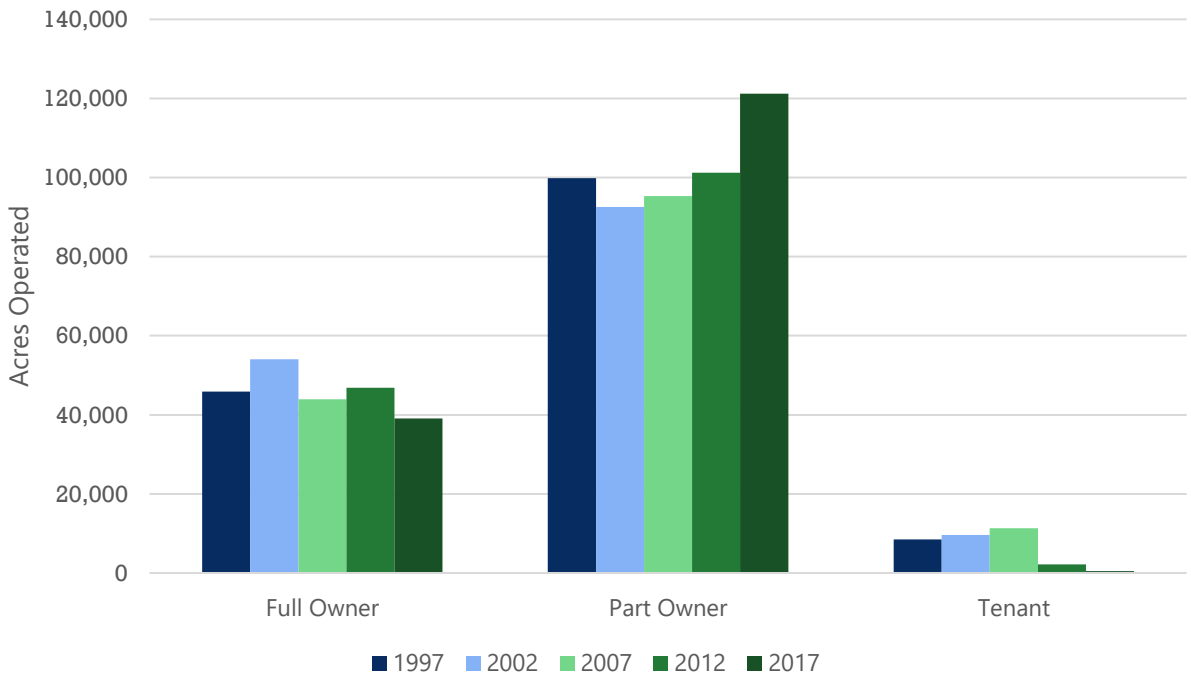
To examine land ownership trends, the USDA Census of Agriculture classifies farms by tenure of producer. The classifications are defined as: (1) *Full owners* who operated only land they owned; (2) *Part owners* who

operated land they owned and land they rented from others, and (3) *Tenants* who operated only land they rented from others or worked on shares for others. Over the past 20 years, the renting or leasing of agricultural land has increased (Figure 32).

While the total amount of operational agricultural lands in full ownership has decreased, the total amount of operational agricultural land in part ownership has increased. Typically, part owners own about 60% of the land with the remaining portion rented from others (the ratio between land owned and land rented has not changed).

Understanding the trends in leased farmland is important to consider in the context of land value and farm production. While leasing provides flexibility for farmers to "right-size" their operations, an overabundance of leased land can create a degree of uncertainty. For example, if landowners decide to take land out of production for non-agricultural uses, such as solar or residential, this can drive up land prices for farmers leasing lands elsewhere. For the purposes of this report, however, ownership data of leased lands is not available, and additional analysis of this trend and its impact on land value is warranted.

Figure 32. Area of agricultural land in operation by land tenure



Source: USDA NASS 1997, 2002, 2007, 2012, and 2017a. Note: the USDA Agricultural Census provides a Coefficient of Variation (CV) measure of uncertainty for estimates. In this case, the 2017 tenant estimates had a 59% CV, indicating a relatively high amount of uncertainty in the data compared to the full owner and part owner metrics for the same year.

FARM SUCCESSION

An estimated 70 percent of U.S. farmland will change hands over the next 20 years, but many family operations do not have a succession plan that identifies a next generation farmer who is skilled in or willing to continue farming (USDA National Institute of Food and Agriculture, 2022). This trend should be anticipated in Onondaga County due to an aging farmer population, as discussed in the Demographic Overview of the Community Profile. If a farm has not adequately planned for succession, it is likely to go out of business, be absorbed into ever-larger farming neighbors, or be converted to non-farm uses.

Fortunately, many tools exist to help manage these transitions of ownership (both in-family and out-of-family) through farm succession planning. Succession planning requires an array of financial management tools where business planning and estate planning are critical elements. There are also land link networking tools to connect existing farmers to farmers outside of the family (e.g., NY Farmland Finder).

There are also a range of land use tools that can be utilized by farmers themselves, (e.g., master planning for strategic subdivision strategies to create farmstead housing for future generations and applying for farmland protection easements), to others that require the involvement of municipalities (e.g., conservation subdivisions or fixed ratio/density averaging zoning). While there is no one single approach to succession planning, developing a plan requires a team of trusted professionals who can help navigate the process. Additional resources include the Farm Bureau, the FPIG program, and the **Farm Friendly Municipal Toolbox** of this plan, specifically the *Farm Master Plan* section.