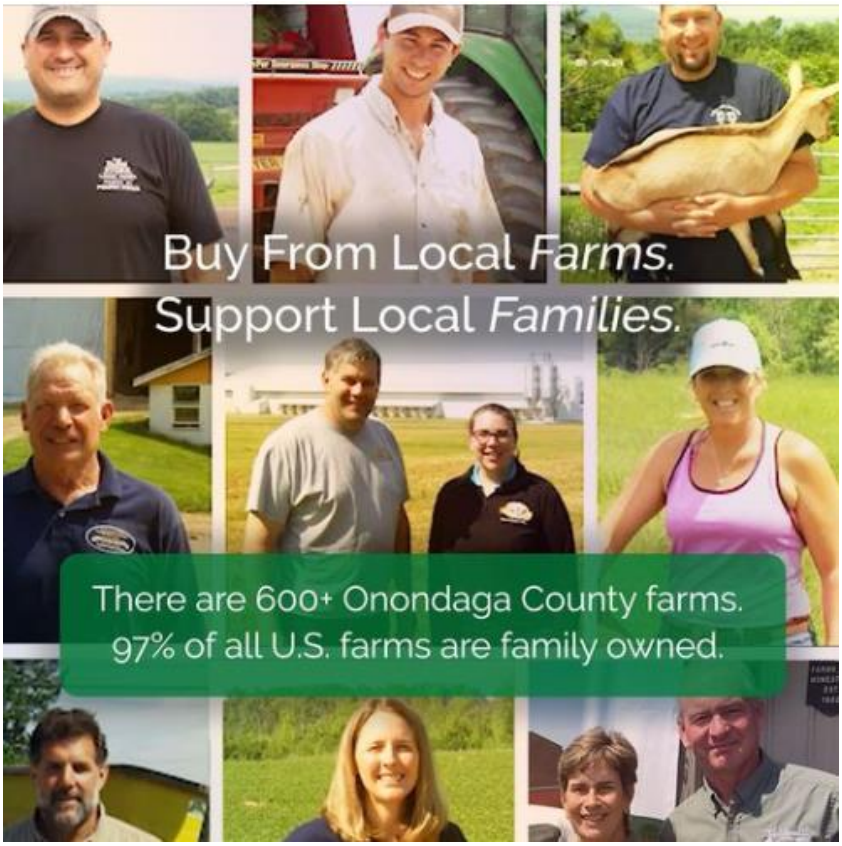
AGRICULTURAL COMMUNITY PROFILE

This section identifies existing conditions and trends facing the farming community, including those related to demographics, the natural environment, Onondaga County's food system, land use, and land-use change, related planning efforts, policies, and programs, and climate change.



DEMOGRAPHIC OVERVIEW

Farmers are a small but fundamental component of Onondaga County's population. According to the 2017 USDA Census of Agriculture, Onondaga County has a total of 1,068 agricultural producers or people involved in making decisions for a farm. Of these producers, USDA estimates there are 533 producers in the County whose primary occupation is farming (USDA NASS, 2017a). These producers operate 623 farming operations, averaging 258 acres per operation (USDA NASS, 2017a). This section compares the age, gender, and race/ethnicity of agricultural producers against the general population in Onondaga County. See the Economic Profile for more information on operations.

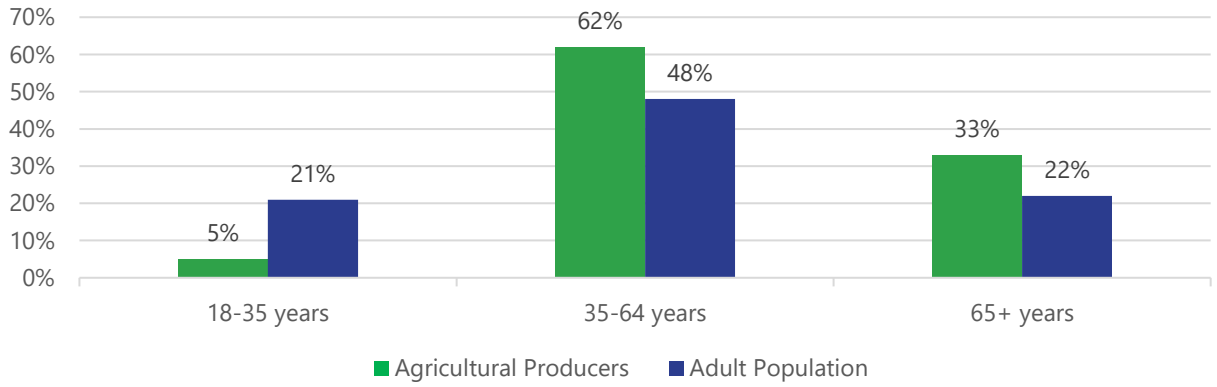
AGE

Agricultural producers in Onondaga County tend to be older than the adult population of Onondaga County. Nearly one-third (32.9%) of agricultural producers are 65 years or older, which is higher than the

adult population of Onondaga County, where 22% of the population is 65 years or older (USDA NASS, 2017a; US Census, 2019).

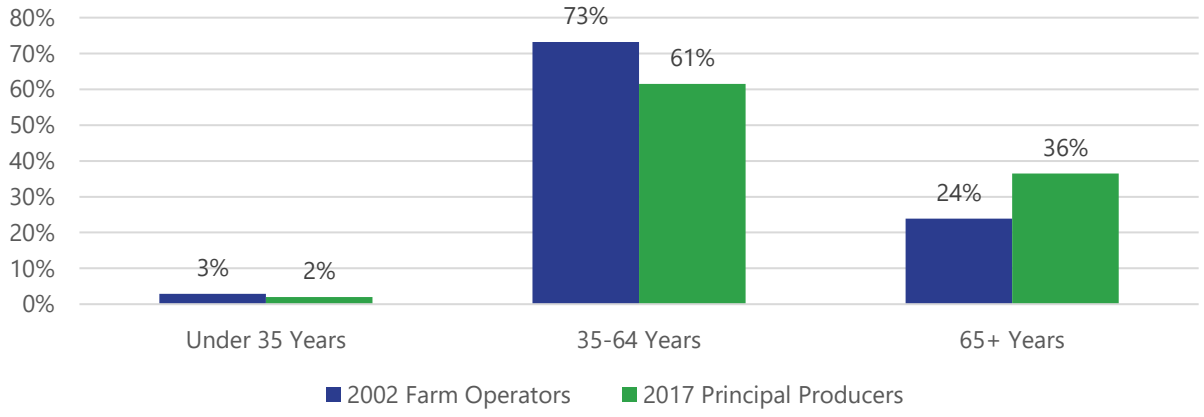
Additionally, the low percentage of agricultural producers under the age of 35 indicates a potential future shortage in the agricultural workforce as older producers age out of the workforce. This raises concerns for farm succession and the future leadership of farms; an issue facing farmers in Onondaga County that follows statewide, national, and even international trends (USDA Census of Agriculture 2017a; Henriques 2019). Young people are increasingly seeking work in urban areas and non-agricultural sectors. Without a new generation to take on the job, food production becomes uncertain.

Figure 2. Age distribution of agricultural producers and adult population in Onondaga County



Source: USDA NASS, 2017a and ACS 1-Year Estimates (U.S. Census Bureau, 2019). Table S0101.Note: For comparison, US Census data represents ages 18-35. The 2017 Census of Agriculture defines a producer as someone involved in making decisions for the farm, and young producers as those ages 35 or younger. It is assumed that these young producers are primarily adults over the age of 18.

Figure 3. Age distribution change of operators & principal producers in Onondaga County



Source: USDA NASS, Agricultural Census from 2002 and 2017. Note the change in terminology between 2002 and 2017; these two terms are comparing the same demographic groups. Before 2017, operator was used to refer to the person who

runs the farm. The 2017 Agricultural Census expanded the metric of farmers (i.e., "operators") to become "producers," which included all those involved in farm decision making. This could include up to 4 producers per operation). Principal producers, however, are the primary person involved in decision making. Therefore, they are comparable to prior Ag Census metrics.

Following national trends, the average age of operators continues to increase as fewer young people enter the occupation. Over recent years, there are larger numbers of older operators, while the share of young farmers in the agricultural workforce has remained relatively unchanged since 2002 when it was already a very small portion of the farming community (see Figure 3). Young producers are defined as 35 years or younger by the US Department of Agriculture. Young producers are less likely to be operators/principal producers; farms with young producers represent just 8% of all farms in the County and less than half of those farms have a young producer as the principal producer. This is consistent with state and national trends, which have 11.5% and 9% of their producer population being under the age of 35 as illustrated in Figure 4.

Figure 4. Farms with young producers

	Producers	Farms	Land in farms (acres)
Onondaga County	1,068	623	160,717
All farms with a young producer	63	50	27,409
Farms with a young principal producer	20	18	12,329
New York State	58,870	33,438	6,866,171
All farms with a young producer	6,718	4,853	1,202,099
Farms with a young principal producer	3,925	3,307	627,350
United States	3,399,834	2,042,220	900,217,576
All farms with a young producer	321,261	240,121	114,588,706
Farms with a young principal producer	208,462	174,944	25,844,296

Source: 2017 USDA NASS Census of Agriculture Young Producers in US and NYS, 2017 USDA NASS Census of Agriculture County Profile: Onondaga County. Notes: Per the USDA NASS Census of Agriculture, a farm is any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year.

NEW AND BEGINNING FARMERS

New and beginning farmers are those who have spent 10 years or less on any farm. Typically, new and beginning farmers are younger than the average farmer and, like young producers, have smaller farm sizes with lower values of production (USDA NASS2019). However, it is important to note that they are not exclusively young people and may include people of any age who decide to enter into farming. The average age nationally for new and beginning farmers is 46 years old (USDA NASS, 2017a).

See Figure 5 for an overview of how Onondaga County compares to New York State and the United States when it comes to new and beginning farmers. The percentage of new and beginning farmers in Onondaga County (24%) is slightly lower than in New York State (26%) and the US (27%). Farms with new

and beginning producers represent just one-quarter of all farms in Onondaga County. The average size of a farm with new and beginning producers is 120 acres smaller than the national average of 441 acres (Abbott, 2019).

Figure 5. Farms with new and beginning producers

	Producers	Farms	Land in farms (acres)
Onondaga County	1,068	623	160,717
All Farms with a new and beginning producer	252	175	43,240
Farms with a new and beginning principal producer	162	129	19,525
New York State	58,870	33,438	6,866,171
All Farms with a new and beginning producer	15,602	10,089	1,605,239
Farms with a new and beginning principal producer	10,970	8,406	1,080,501
United States	3,399,834	2,042,220	900,217,576
All Farms with a new and beginning producer	908,274	597,337	193,405,614
Farms with a new and beginning principal producer	674,940	516,235	140,687,442

Sources: 2017 USDA NASS Census of Agriculture New and Beginning Producers in US and NYS, 2017 USDA NASS Census of Agriculture County Profile: Onondaga County.

GENDER

In Onondaga County, like across the US, females are underrepresented as agricultural producers, with just over one third (36%) of all producers being female (USDA NASS 2017b). These county rates mirror the national rates of female producers. The United States had 1.2 million female producers in 2017, which also accounted for 36% of the total producers. Female producers tend to be slightly younger on average than male producers (57.1 years versus 57.7 years in 2017) and are more likely to be new and beginning farmers (USDA NASS, 2017b).

Figure 6. Farms with female producers

	Farms	Number of Producers	Land in farms (acres)
Onondaga County	623	1,068	160,717
All farms with a female producer	357	395	51,254
Farms with a female principal producer	247	258	23,477
United States	2,042,220	3,399,834	900,217,576
All farms with a female producer	1,139,675	1,227,461	387,892,663
Farms with a female principal producer	766,474	798,500	238,157,861

Source: 2017 USDA NASS Census of Agriculture Female Producers in US and Onondaga County. Note: The 2017 Census of Agriculture revised the demographic data collected to better capture the contributions of all persons involved in agricultural production. In response to detailed questions about farm decision making, more farms reported multiple individuals involved in farm operations. As a result of the new approach to counting producers, the total number of U.S. female producers increased by 27%. The number of farms with female producers increased by 23%. Caution should be used when working with comparisons until more consistently measured data is released (Pilgeram, et al., 2020).

RACE/ETHNICITY

Most farmworkers in Onondaga County are people of color, while most farm owners are white. Specifically, approximately 80% of farmworkers in Onondaga County are Hispanic or Caribbean migrant workers, as reflected anecdotally by representatives of the Agricultural and Farmland Protection Board. Meanwhile, 99.8% of Onondaga County's agricultural producers are white (USDA NASS 2017). As farmers age out of farming, there should be opportunities for current farmworkers to take on leadership roles within farming operations. The current lack of racial and ethnic diversity in farming is dramatic and is likely due to the historic and continuing tradition of farms staying within families from generations prior, starting from when Onondaga County property owners were not as diverse as they are today.

NATURAL RESOURCES

Abundant natural resources are the foundation for productive agriculture in Onondaga County. Plentiful precipitation, surface water, and groundwaters complement the County's excellent soil base. Nearby Lake Ontario and the Finger Lakes provide a buffer to seasonal temperature extremes and extend the growing season for local farmers.

Despite the abundance of natural resources in the area, there are strains on natural resources from both agriculture as well as other types of development. Strains on natural resources can in turn harm agricultural operations. For example, decreasing prime soil availability or declines in pollinator populations weaken overall agricultural productivity.

Fortunately, there are several avenues to practice agriculture and promote development in a way that is balanced with the protection of natural resources. In fact, many farms in the region operate in this manner.

IMPORTANT FARMLAND SOILS

Soil characteristics directly influence the distribution of farmland across the County's landscape. Map 2 shows the distribution of important soils, including prime farmland, within Onondaga County. The County has many soil types considered to be agriculturally important, including calcareous soils over glacial till on undulating to rolling terrain, limestone soils over glacial lake sediments on level to undulating terrain in the northernmost regions, alluvial soils in valley bottoms through much of the southern and central regions, and some deep acidic soils over glacial till on hilly terrain in the south-central border region.

Young, acidic soils are found throughout much of the County. Prime soils are generally deeper, well-drained (but not dry) and feature a combination of biophysical and chemical properties (e.g., acidity, alkalinity, sodium content, permeability) that are most conducive to the production of food, feed, forage, and fiber. Many upland soils are considered "soils of statewide importance", indicating that they can be farmed economically with proper care and management. However, these soils are generally shallower and more prone to drying than their counterparts (i.e., prime soils); meaning that they are riskier and more expensive for farmers to work with and profit from when compared to prime farmland and unique farmland.

Nearly seventy percent of the County's total land area has been classified by the USDA Soil Conservation Service as Important Farmland Soil. Three farmland categories are included in this classification. They are Prime Farmland, Farmland of Statewide Importance, and Prime Farmland if Drained. Maps contained in the Analysis of Important Farmland show the countywide distribution of Important Farmland Soils.

Map 2. Important Farmland Soils in Onondaga County

Source: 2021 Soil Survey Geographic (SSURGO) Database, USDA Natural Resources Conservation Service

The countywide categorical soil breakdown is outlined in Figure 7.

- **Prime soils:** These soils are generally deeper, well-drained (but not dry) and feature a combination of biophysical and chemical properties (e.g., acidity, alkalinity, sodium content, permeability) that are most conducive to the production of food, feed, forage, and fiber. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops. In general, the characteristics of prime farmland soils include adequate moisture and drainage, adequate soil depth and texture, are not susceptible to erosion or flooding, and sustain high yield production with minimal fertilizer and energy requirements.
- **Farmland of Statewide Importance:** Many upland soils are considered "soils of statewide importance", indicating that they can be farmed economically with proper care and management. These soils produce fair to good yields of crops when treated and managed according to sound agricultural practices. These farmlands are important to the state to produce food, feed, fiber, forage, and oilseed crops. Under favorable conditions, these lands can produce yields as high as those of prime farmland. However, these soils are generally shallower and more prone to drying than their counterparts (i.e., prime soils); meaning that they are riskier and more expensive for farmers to work with and profit from when compared to prime farmland and unique farmland
- **Prime Farmland if Drained:** These soils have the same characteristics as prime farmland, apart from the depth to water table. This can result in limitations to their use unless properly drained.

Figure 7. Important Farmland Soil Types

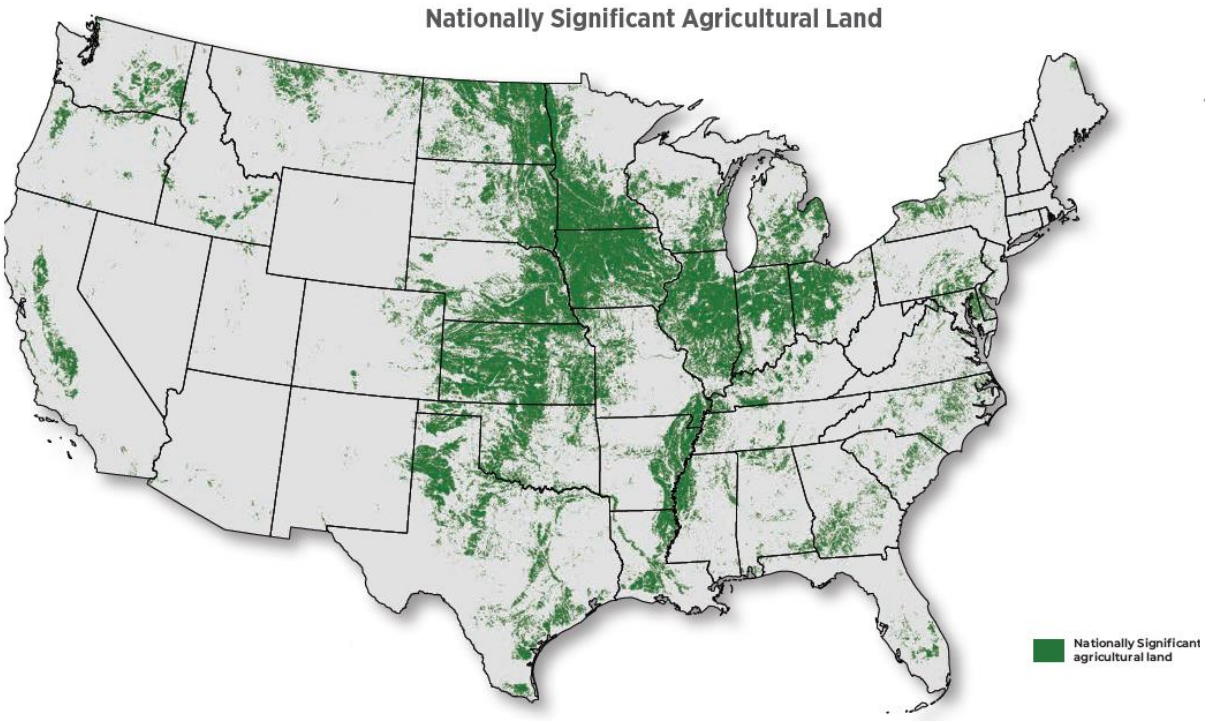
Important Farmland Soil Types	% of Onondaga County Land Area	
Onondaga County	**515,161**	**100%**
Prime Farmland	186,529	36%
Farmland of Statewide Importance	106,412	21%
Prime Farmland if Drained	61,664	12%
Total Important Soils	**354,606**	**69%**

Source: NRCS SSURGO Soil Data, 2020

Protection of prime soils is critical due to the recent increase in development demand from commercial-scale solar as well as the continued pressure from other residential and commercial development. Once development occurs on areas of farmed prime soil, it is very difficult to restore the soil to its original state. The United States is home to 10% of the planet's arable soils, more than any other country on Earth (American Farmland Trust, 2020a).

Despite this relative wealth, only 18% of the continental US is Nationally Significant farmland, meaning that it is in the top 39% of the most productive, versatile, and resilient farmland in the US (American Farmland Trust, 2020a). Onondaga County is fortunate to have some of these rich soil types (see Figure 8). It is vitally important to protect land that is best suited for intensive food and crop production as global demands for food production are colliding with the environmental impacts of eroding soils, declining aquifers, and extreme weather events (American Farmland Trust, 2020a). Large-scale solar development is also competing with these lands, both locally in Onondaga County, and across the nation.

Figure 8. Nationally Significant Agricultural Land



Source: American Farmland Trust, 2020a (used with permission). Note: Nationally Significant agricultural land, which has excellent productivity, versatility, and resiliency, is best suited to intensive food and other crop production, with few environmental limitations.

WATERSHEDS

Onondaga County is composed of eight primary watersheds: Onondaga Lake, Chittenango Creek, Oneida River, Lower Seneca River, Oswego River, Tioughnioga River, Skaneateles Creek and Owasco Lake. Of these watersheds, Skaneateles Lake and Otisco Lake are used as a public drinking water supply. More detailed information about the specific locations of these watersheds is found in the Analysis of Important Farmland chapter. These watersheds include many important natural resources that provide ecological services for both the agricultural and non-agricultural communities (e.g., private residences and recreationalists), including irrigation water, drinking water, recreational opportunities, and scenic vistas. It is important to acknowledge the interconnectedness between these ecological services and the quality of the natural resources.

One of the critical ecological services provided by these watersheds is clean potable water sources. Agriculture is the predominant land use in the Onondaga County drinking water source watersheds. As such, agriculture tends to come under suspicion when there are water quality concerns (e.g., harmful algal blooms or HABs). However, agriculture is just one of the several factors that contribute to water quality, and other activities such as septic systems and eroding streambanks in the watershed need to be considered. It is worth noting that HABs also occur in lakes with no agriculture (e.g., Lake Placid in the Adirondacks), as well as forested lakes with no development along the lakeshore (Hemlock Lake, a small Finger Lake surrounded by state forest).

Onondaga County agriculture, like in many counties throughout the state, needs to keep a constant focus on the implementation of best practices to protect water quality in these irreplaceable watersheds. The removal in hedgerows, for example, without the use of BMPs (e.g., water and sediment control basins, diversion waterways) can contribute to soil erosion and water quality issues. As new farming techniques and programs become available, it is important they are assessed for their suitability to protect and enhance the watershed health of specific waterbodies.

WETLANDS

The presence of wetland areas within agricultural parcels benefits countywide resiliency due to the increased absorption of runoff, maintenance and protection of water quality, and diminished soil erosion in flat wetland areas. Preserving wetlands also can provide advantages for farms. While wetlands themselves are not used for agricultural production, they can greatly benefit farmers by improving water quality for livestock and irrigation and by providing insect-eating bird and pollinator habitats that benefit cropland.

Wetlands can also provide important supplemental income for farmers through wetland protection incentive programs, like the Conservation Reserve Program (CRP) through the United States Department of Agriculture National Resources Conservation Service (USDA NRCS), one of the largest private-land conservation programs in the United States. More detailed information about the specific locations of wetlands and their occurrence on farmland is found in the Farmland Analysis section.

The watershed map at right may be found in the Onondaga County Map Gallery at http://ongov.net/planning/map_gallery.html.

FLOODPLAINS

Floodplains are land areas susceptible to being inundated by floodwaters from any sourced. The use of floodplains in agriculture allows the land to continue providing beneficial functions to society, including diminished flood velocities, runoff filtration, and habitat protection for diverse plant and animal species. Floodplains also help to "recharge" productive soils in the County; some of the productive lands have benefited from periodic flooding spanning millennia.

These productive areas occur in or adjacent to floodplains and include places like the Seneca River corridor in Lysander and Van Buren, in the Tully Valley, and along Butternut Creek in Fabius and LaFayette. More detailed information about the specific locations of floodplains, as well as the locations of productive soils is found in the Important Farmland Analysis section.

STEEP SLOPES

Steep slopes are areas with significant topographic changes of a 15% gradient or more. They occur throughout the southern half of Onondaga County, forming majestic vistas such as Morgan Hill in the Town of Fabius, Bare Mountain and Mason Hill in the Town of LaFayette, Bennett Hollow in the Towns of Tully and Spafford, and the Onondaga Creek/Ninemile Creek corridors in the towns of Marcellus and Onondaga. Proper management of steeply sloped areas can protect against runoff pollution, soil loss/sedimentation of waterways, and other erosion issues that decrease resiliency. Steep slopes can also be important in defining scenic landscapes, and thereby important for agritourism development as well. Detailed information about the specific locations of steep slopes is found in the Farmland Analysis section. Additionally, there are BMPs for the protection of agricultural soils on steep slope. More information about that is available through the Soil and Water Conservation District.

ORGANIC FARMING

Organic farming is a growing sector of agriculture, with numerous benefits, particularly in relation to natural resource protection. In addition to the potential for increased profitability, natural resource benefits of organic farming can include reduced use of pesticides and herbicides, higher biodiversity and soil quality, and lower rates of antibiotic-resistant infections in livestock and poultry.

A global meta-analysis including 60 crops published in the Proceedings of the National Academy of Sciences (PNAS) in 2020 found that organic farms had 18% lower yields than conventional sites; however, organic sites had 50% greater profits and 34% greater biodiversity than conventional sites (Smith et al., 2020). Another meta-analysis from 2015 found that organic agriculture was significantly more profitable, 22-35%, than conventional agriculture, even with the lower yields of organic agriculture (Crowder and Reganold, 2015). Organic farming may also reduce antibiotic resistance, which are used on conventional farms in livestock and poultry to treat disease, prevent and manage disease events, and/or promote animal growth. (Sapkota et al, 2011).

Organic farming is growing as the demand for organic food increases. The 2019 Organic Survey, a 2017 Census of Agriculture special study, showed that the number of certified organic farms grew in the U.S. by 17% between 2016 and 2019. According to the survey, there were 10,903 certified organic farms in 2008, and this number increased to 16,585 farms in 2019 (USDA, Organic Survey, 2020).

New York was the third highest state on the list of organic farms in 2019, with 1,321 farms, and the fourth highest state in organic land with 323,081 acres. The market value of certified organic products sold grew 31% in just 3 years (2016-2019), and New York was seventh on the list in terms of organic products sold, with $298 million in organic sales in 2019. (USDA, Organic Survey Data Release, 2020). With organic milk in high demand with annual sales of over $1.5 billion, and over half of annual processing sales in the County in the dairy industry, this may be an opportunity for local dairies that may be considering going organic.

While the benefits of organic farming can be significant, the costs of transitioning to organic farming, however, can be challenging and future markets unpredictable. Transitioning to organic requires a three-year window when organic practices must be followed but farms are not able to realize the higher profitability of selling as a certified organic farm. Costs include more expensive organic seeds, higher labor costs, and certification costs. Some farmers on smaller family farms choose to use organic practices without going through the process and associated costs of becoming certified.

IMPACTS OF CLIMATE CHANGE

Climate change is impacting New York State's agricultural sector. With an increase in temperatures and fluctuations in extreme wet and dry seasons and events, agriculture across the state faces a range of vulnerabilities (see Figure 9).

Figure 9. Impacts of climate change to agriculture in New York State

Climate Impact	Anticipated Vulnerabilities to Agriculture in New York State
Temperature Changes	• Apple trees may not receive the extent of winter chilling hours required to produce fruit • Maple sap flow may shift to earlier in the year, even starting in December • Increasing heat stress days (above 90°F) may stress livestock and some crops • More pest pressure from insects, diseases, and weeds may harm crops and cause farms to increase pesticide use • New crops could become more viable, but crop transitions may be costly
Precipitation Changes	• Increased river flooding, due to increased precipitation, is likely to cause soil erosion, soil loss, and crop damage • Wetter springs may delay planting for crops and reduce yields • Drier summers and intermittent droughts may strain irrigation water supplies, stress crops, and delay harvests
Extreme Weather	• Extreme storms may cause catastrophic damage to crop and fields, farm buildings, equipment, and drainage systems • Floodwaters may spread invasive plants • Heavy rainfall is likely to wash away fertile soils and damage water resources

Source: New York Climate Change Science Clearinghouse, 2021

There are several on-farm adaptation strategies that local farmers may consider as climate impacts are felt locally, including livestock diet and feeding management, use of fans, sprinklers, and other cooling systems for dairy barns, shifting planting dates, diversification of crop varieties, and freeze and frost protection for perennial fruit crops. Other support tools for farm operations to implement climate adaptation and resiliency strategies include:

- Locally available design and planning assistance
- Disaster-risk management and insurance
- Financial assistance
- Policy and regulatory decisions

Although climate change is a significant concern for agriculture, it may also bring new opportunities for agriculture, including new crop varieties and new markets to producer renewable energy options, such as biomass fuel crops or other forms of agriculturally friendly renewable energy, like small, on-farm solar or wind (New York Climate Change Science Clearinghouse, 2021). There are several types of biomass energy for agricultural operations to consider, including agricultural crop or animal wastes (such as dairy manure), dedicated energy crops and trees, and other types of crops. One example of dedicated energy crops is willow.[1]

Because agriculture and food production are responsible for approximately a third of global greenhouse gas emissions worldwide, the agricultural sector is critically important in addressing climate change (United Nations Food and Agriculture Organization, 2021). It is notable, however, that this is a share that is gradually declining - it was 44 percent in 1990 - even as food system emissions increase in absolute amounts. There are several agricultural technologies that have been utilized locally and across the world that are known to reduce the current output of greenhouse gas emissions, while increasing efficiency of farming operations. These strategies to further reduce greenhouse gas emissions caused by agriculture include:

- Precision farming (e.g., digital technology to apply lime and nutrients fertilizer more efficiently)
- No-till farming
- Renewable energy in place of fossil fuels for on-farm activities, including an array of options, ranging from small-scale solar and wind, methane biodigesters, and geothermal heat pumps that offset the costs of heating and cooling.
- Pairing cattle grazing and crop rotations to reduce reliance on synthetic nitrogen fertilizers (Northrup et al., 2021).
- There have also been significant developments in technology to use single-cell proteins as a more climate-friendly alternative to meat (Northrup et al., 2021).

Climate change will bring with it increases and changes in precipitation patterns, which have already been noticeable by local farm operators. Meanwhile, technology or other strategies used to mitigate or adapt to climate impacts (for instance renewable energy development or precision technologies) can provide new opportunities for maximizing agricultural viability. Although it does require investment and change,

[1] SUNY ESF and Cornell University have been working for two decades to facilitate the commercialization of willow biomass (see www.esf.edu/willow for a financial analysis tool to see its potential viability for specific areas). More information about biomass and agriculture in New York State are found at https://www.nyserda.ny.gov/Researchers-and-Policymakers/Biomass.

appropriate climate adaption and mitigation actions have the potential to benefit future agriculture and its resiliency across Onondaga County.

AGRICULTURAL LAND USE AND LAND COVER

Given its rich soils and access to fresh water, there is a long history of agriculture as a land use in Onondaga County. Agriculture includes a variety of markets, ranging from orchards, cornfields, open fields, dairy operations, fruit or vegetable crops, or other specialty crops. Agriculture provides most of the scenic landscapes throughout the County, as viewed along rural scenic corridors like Route 20 or 80. Anywhere from 20-30% of the County in recent years has been cultivated or has been used for cropland, grassland, or other types of agricultural activities (USDA NASS CropScape Data Layer; USDA NASS Census of Agriculture, 2017a).

There are three primary ways to categorize, understand, and map farmland and farmland uses. These categorizations can help to understand the changes that are occurring in the agricultural community.

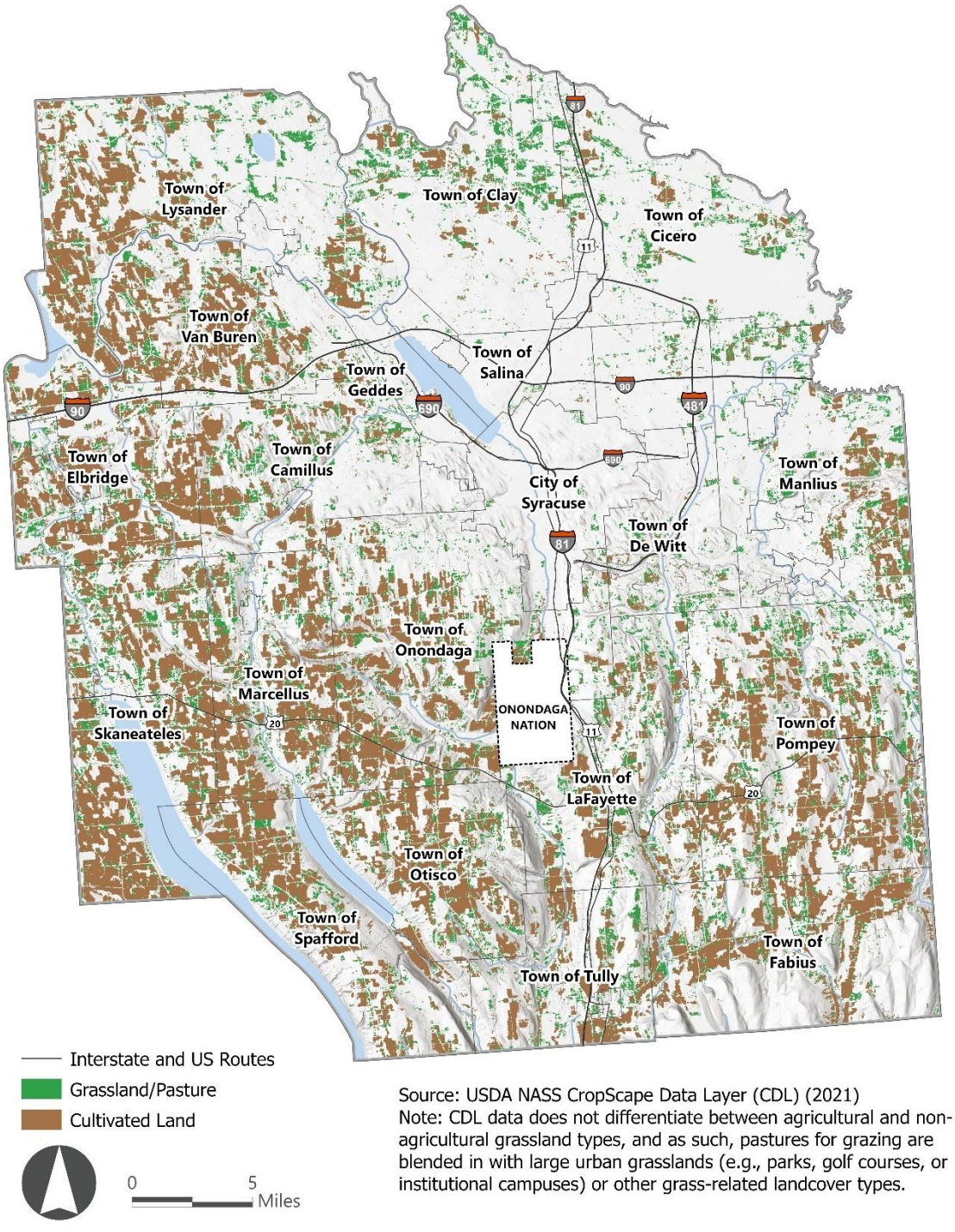
1. The first is through pixel-based satellite imagery, which can be collected for all areas across the US to compare between states in a consistent manner (USDA NASS CropScape Data Layer, 2021b).
2. The second is through the parcel-based New York State Real Property Classification system, which uses property class codes assigned to individual parcels to evaluate specific uses of agricultural lands based on reported property assessments (New York State Department of Taxation and Finance, 2022).
3. The third source is operation-specific information that is collected through the USDA NASS Census of Agriculture administered to individual farm operators (USDA NASS, 2022). Precise acreage estimates vary depending on the specific sources.

Map 3 demonstrates agricultural land cover using satellite imagery. A large portion of the total land in Onondaga County has agricultural land cover, meaning that it has been cultivated or used for grassland or pasture at least once in the past five years (USDA NASS CropScape Data Layer, 2021a).

Map 4 shows the variety of land uses related to agriculture throughout Onondaga County by parcel data. Agricultural land uses occur in properties throughout Onondaga County in nearly all towns (none in the Town of Geddes) surrounding the City of Syracuse and even some of the villages (e.g., Village of Tully). Farmland is primarily concentrated in the western and southern portion of the County, although there is a diverse array of smaller agricultural properties occurring in the northern reaches of Clay and Cicero, as well as the eastern portion of Manlius.

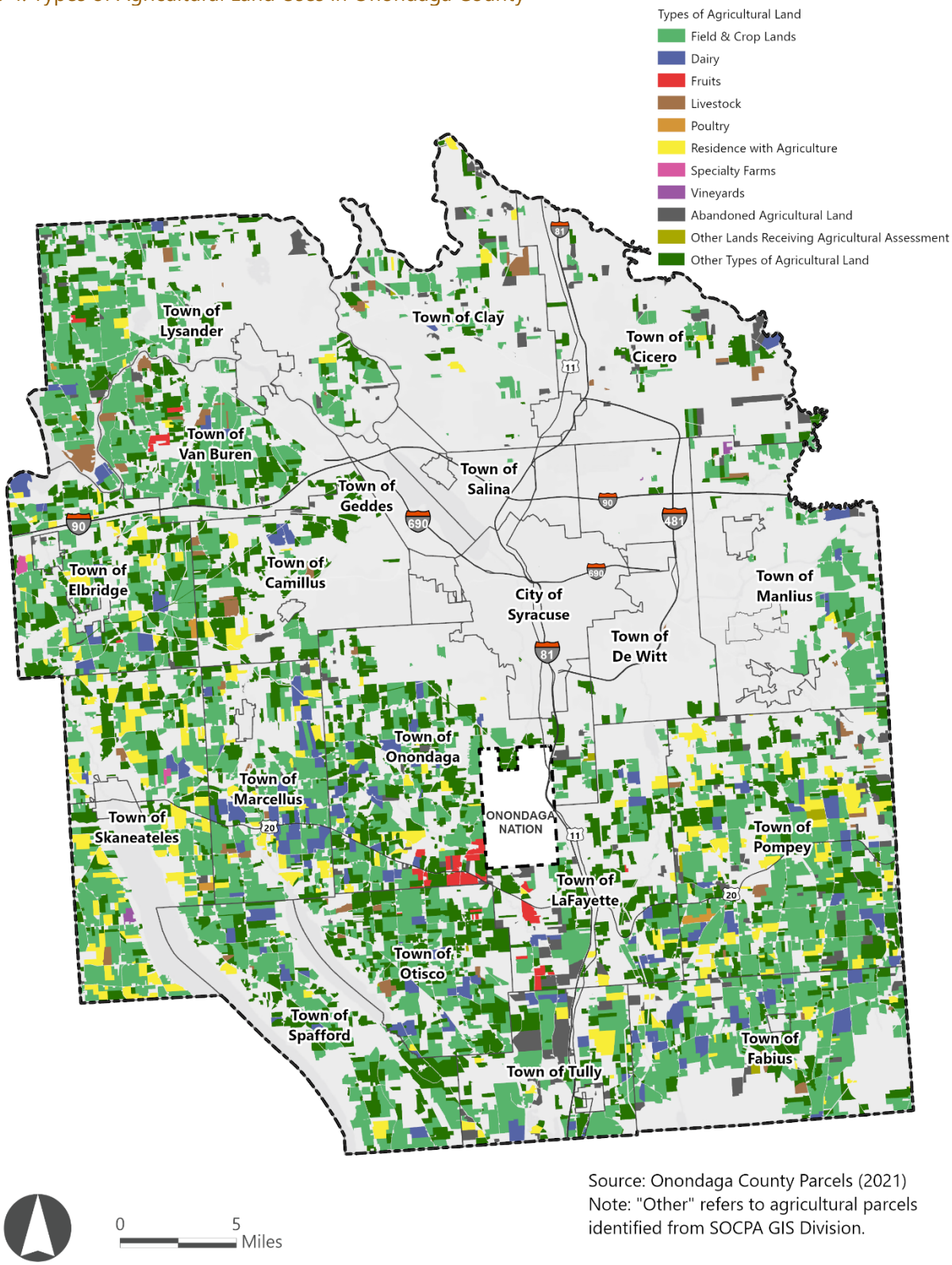
Dairy farming is a predominant agricultural land use in the County, primarily occurring throughout the southern and western portions of the County. Agricultural activities associated with dairy farming include fields used for grazing and cropland for growing feed (e.g., corn, alfalfa and soy). There are also nodes of other crops, including vegetable and berries in the northern part of the County and apples in the south-central portion of the County. Notably, there are also areas used for urban agriculture not shown on the map, including community gardens and the Brady Farm in Syracuse. (For more discussion on the types of agricultural operations in the County, see the Economic Profile).

Map 3. Agricultural land cover in Onondaga County



Source: USDA NASS CropScape Data Layer (CDL) (2021)
Note: CDL data does not differentiate between agricultural and non-agricultural grassland types, and as such, pastures for grazing are blended in with large urban grasslands (e.g., parks, golf courses, or institutional campuses) or other grass-related landcover types.

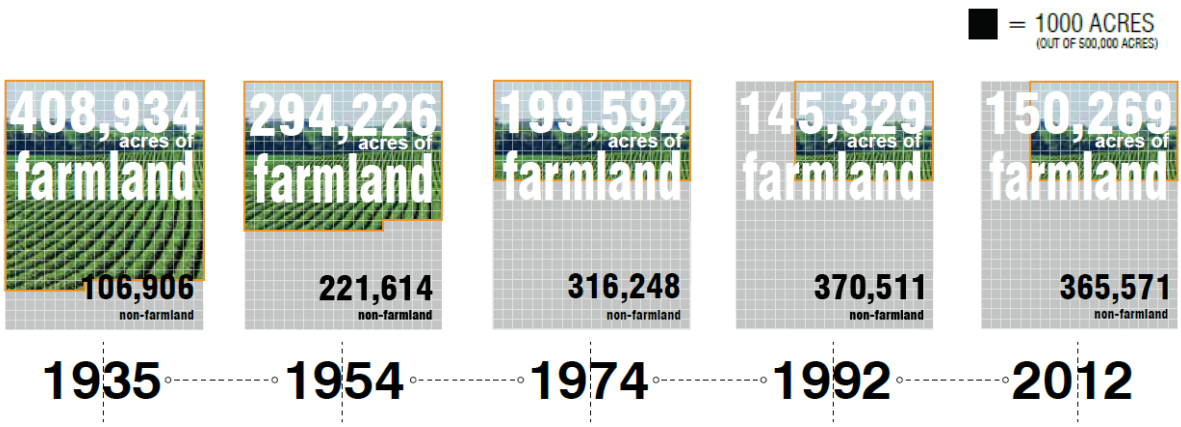
Map 4. Types of Agricultural Land Uses in Onondaga County



Source: Onondaga County Parcels (2021)
Note: "Other" refers to agricultural parcels identified from SOCPA GIS Division.

Onondaga County, like many areas in New York State and across the U.S., has experienced an overall decline in the land used for farming as well as the number of active farms over the past century, particularly after the post-WWII population boom and the popularity of single-family housing in suburban communities. Currently, mirroring what is occurring across the nation, the proportion of land in agriculture is around one-third of the total land in the County, a steep decline from four-fifths in 1935 (Food Plan CNY, 2021).

Figure 10. Farmland changes in Onondaga County since 1935



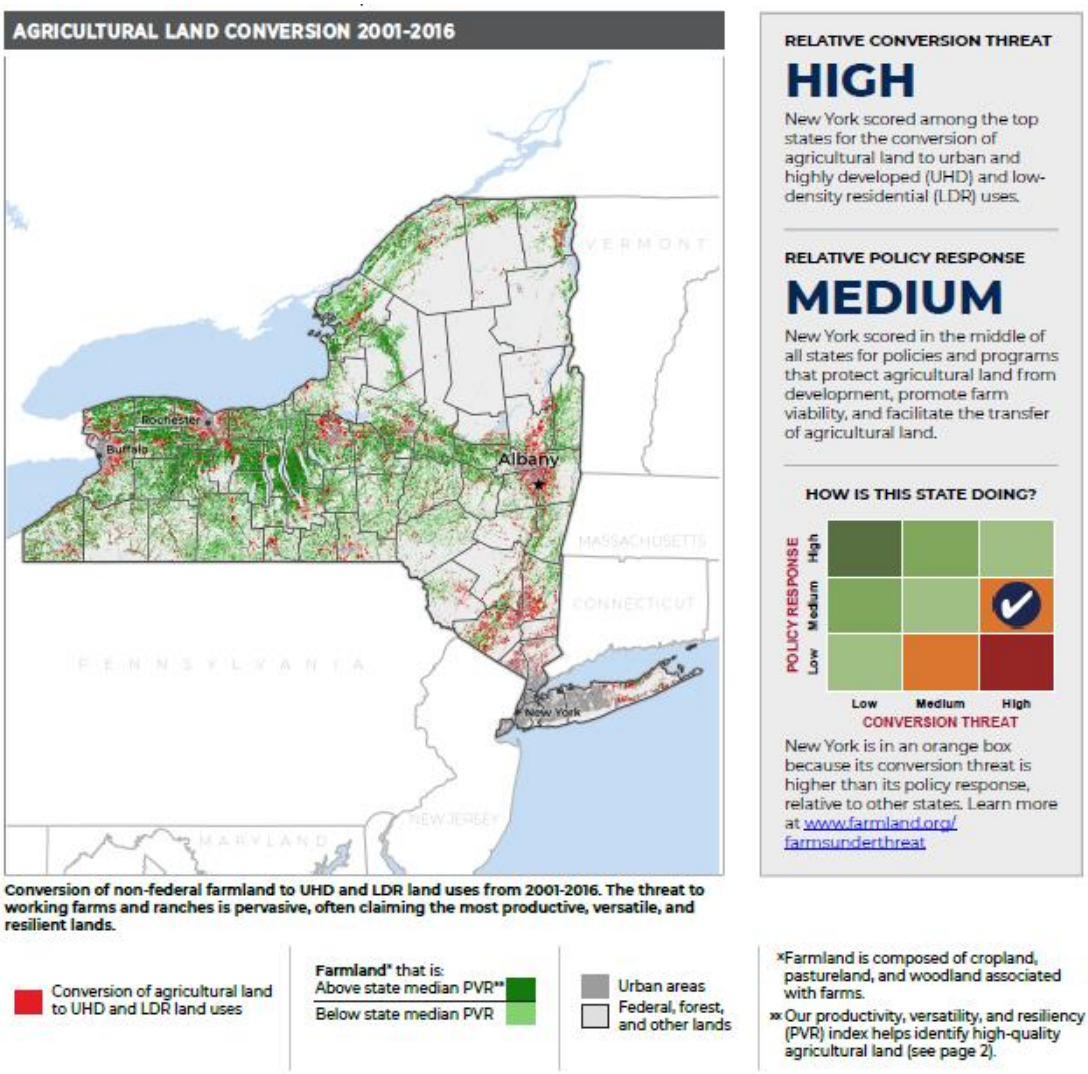
Sources: USDA NASS Agricultural Census; SOCPA; Food Plan CNY. Note: Graphic adapted from Food Plan CNY. Percentage of farmland loss based on acres of farmland from the USDA NASS Census of Agriculture, 1935 and 2012. These figures were divided by the total of 515,840 acres in Onondaga County to estimate percentage of agricultural land use in the County.

In recent years, the County has experienced a slight increase in farmland, up slightly from the low of 29% farmland in 1992 to approximately 30% in 2017. During this plateau the number of farm operations has declined, indicating a trend toward larger farms via consolidation. Although the number of farming operations have been decreasing, there has been an increase in the total acreage of land operated since 2002 (+4,433 acres according to the USDA Census of Agriculture of 2002 and 2017). The increase in the total acreage of active agricultural land can be attributed to consolidation whereby the previously inactive agricultural land is reactivated.

From another perspective, from 2002 to 2012, there was a 50% loss in farm sales for medium sized farms (Food Plan CNY, 2021) while larger farms had either the same or experienced an increase in sales (+24% according to the USDA Census of Agriculture of 2002 and 2017). Medium sized farms (those with $100K through $500K in sales) face increasing pressures to compete with larger commodity production operations (Food Plan CNY, 2021). For more discussion about how the number of larger farms has increased in number, see the Economic Profile.

Despite the recent increase of active agricultural land in Onondaga County through consolidation, there has also been a loss of farmland converted to commercial and residential development. Once developed to these other uses, farmland is essentially impossible to convert back to its original state. In recent years in Onondaga County, this has primarily occurred in second-ring suburban communities like Camillus, Cicero, Clay, and Lysander (see Figure 10). The American Farmland Trust mapped agricultural land conversion throughout the US between 2002 and 2016 (see Figure 11). The spatial analysis identified the extent, diversity, and quality of each state's agricultural land—and where this land has been converted to both urban and highly developed (UHD) and low-density residential (LDR) land uses. The report also evaluated state policy responses and scored the states based on their relative conversion threat.

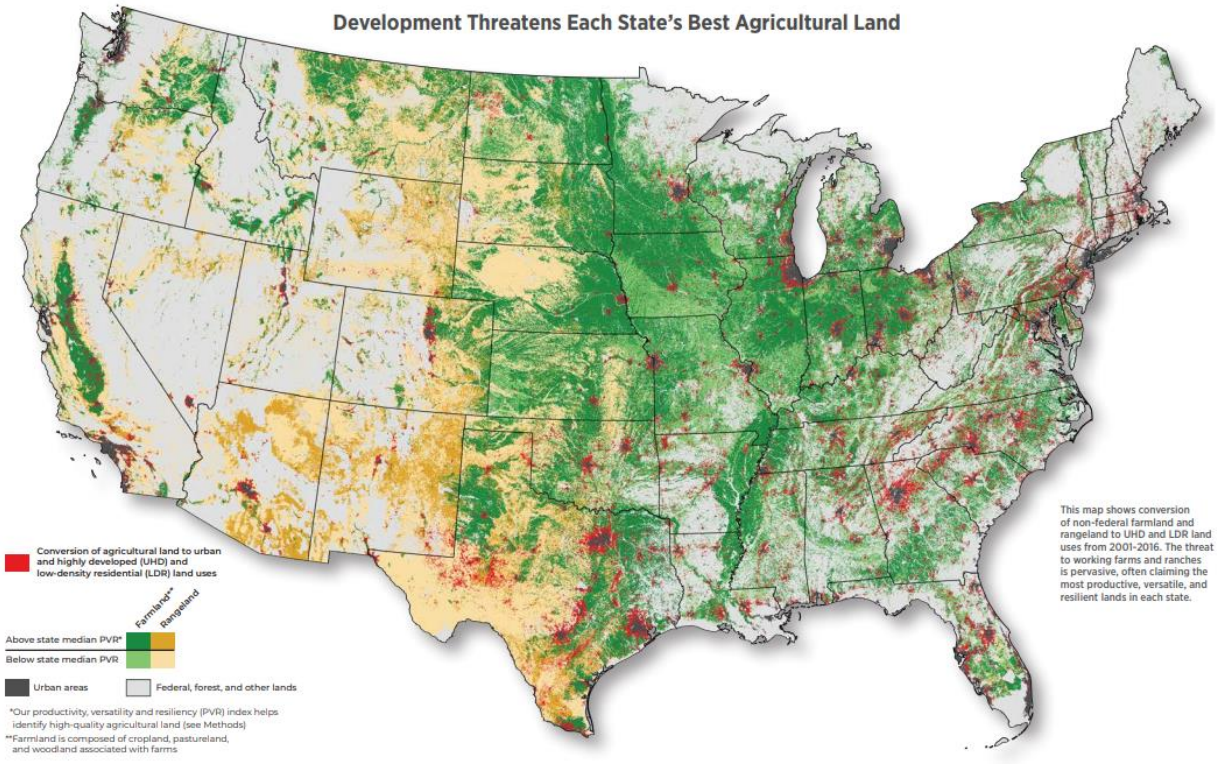
Figure 11. Conversion of Agricultural Lands in New York State



Source: American Farmland Trust. 2020b. Farms Under Threat. New York State Spatial Summary and Policy Scorecard. Available at: https://farmlandinfo.org/publications/farms-under-threat-the-state-of-the-states/ (Accessed March 2022).

The trend of farmland loss occurred in every state in the continental US (see Figure 12). Between 2001 and 2016, 11 million acres of farmland and ranchland were converted to urban and highly developed land use (4.1 million acres) or low-density residential land use (nearly 7 million acres). That's equal to all the US farmland devoted to fruit, nut, and vegetable production in 2017—or 2,000 acres a day paved over, built up, and converted to uses that threaten the future of agriculture (American Farmland Trust, 2020a).

Figure 12. Conversion of Agricultural Lands in the United States

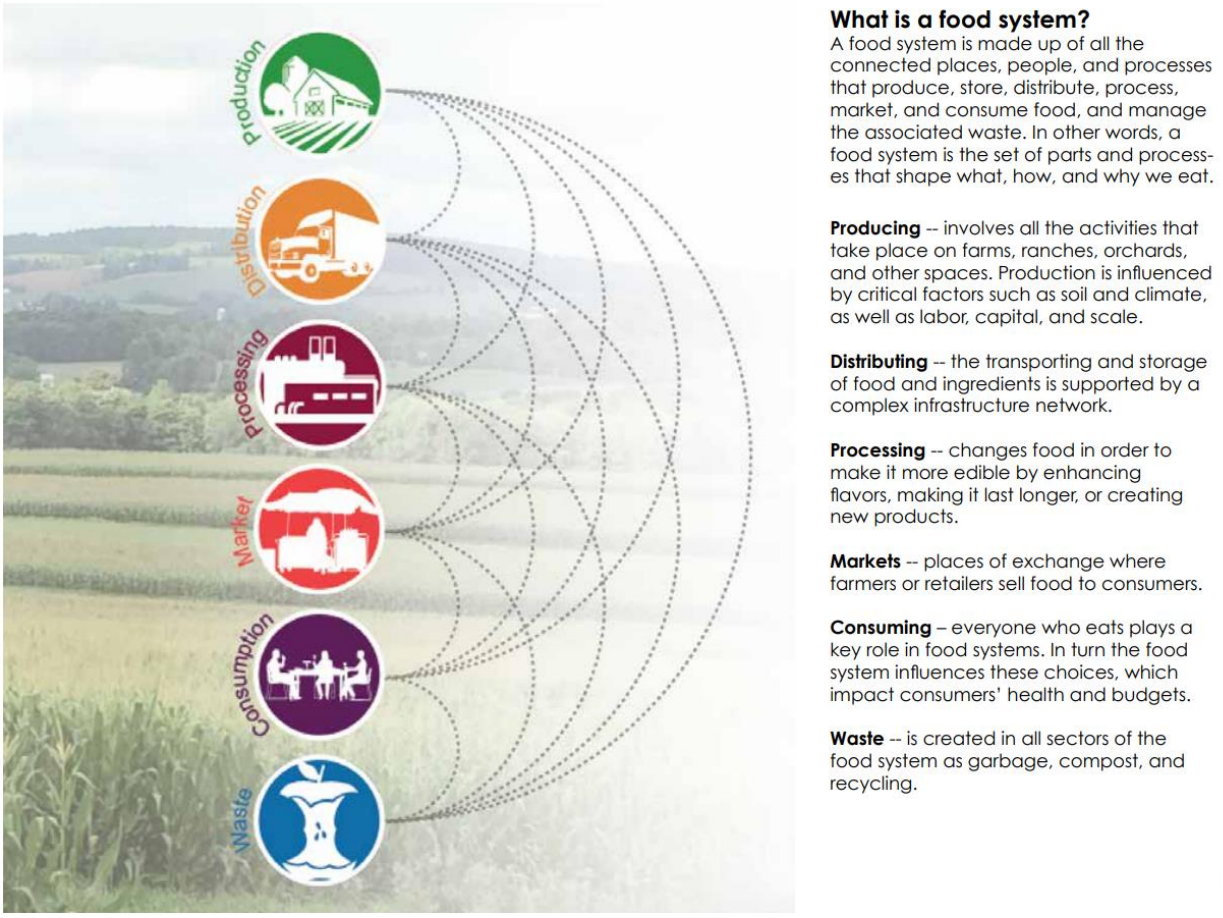


Source: American Farmland Trust. 2021. Farms Under Threat: The State of the States. Available at https://farmlandinfo.org/publications/farms-under-threat-the-state-of-the-states/ (Accessed March 2022).

ONONDAGA COUNTY FOOD SYSTEM

Agriculture is inseparable from the broader context of the food system. The food system includes all people and processes involved from producing to consuming food, including waste disposal and recycling. In Onondaga County, the food system operates at multiple scales with agricultural products being sold in local, regional, and global markets. The food system can be examined through the following components: production, distribution, processing, markets, consumption, and waste & recycling. The following sub-sections describe each of these components of the food system within Onondaga County as supported by research conducted by Syracuse University and the SUNY College of Environmental Science and Forestry (SUNY ESF) and published in the Food Plan CNY (Potteiger & Weissman, 2021). The Food Plan was recognized by the Onondaga County Legislature and funded through the Onondaga County Agriculture Council.

Figure 13. Food System Components



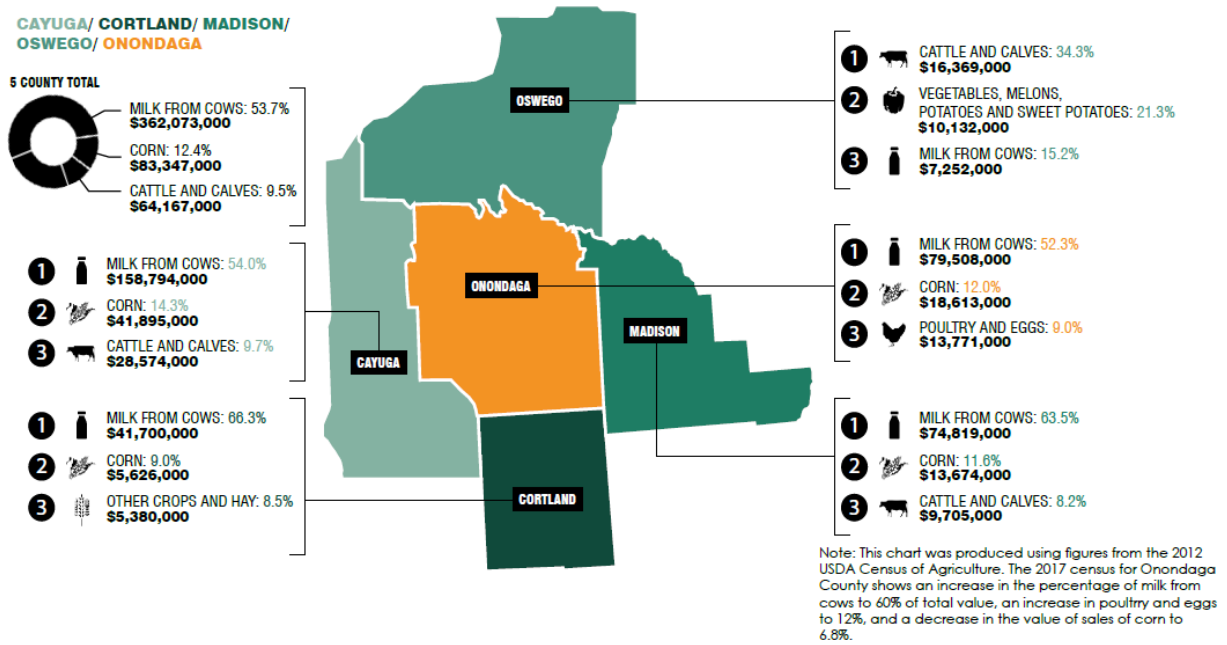
Source: Potteiger, M. & Weissman, E. 2021. Food Plan CNY. Available at: https://agriculture.ongov.net/wp-content/uploads/2021/03/Food-Plan-CNY.pdf

PRODUCTION

Producers growing for the local food system require supportive processes and infrastructure that differ accordingly to scale and commodity. For food producers of all types and scales to thrive in the future, they must be connected to consumers whether locally or elsewhere through appropriate processing, distribution, and markets that meet the needs of their operations. Given the abundance of natural resources, the potential exists for agricultural production within Onondaga County to feed the entire population of Onondaga County (Peters et al., 2008). However, today's markets reach far beyond the County.

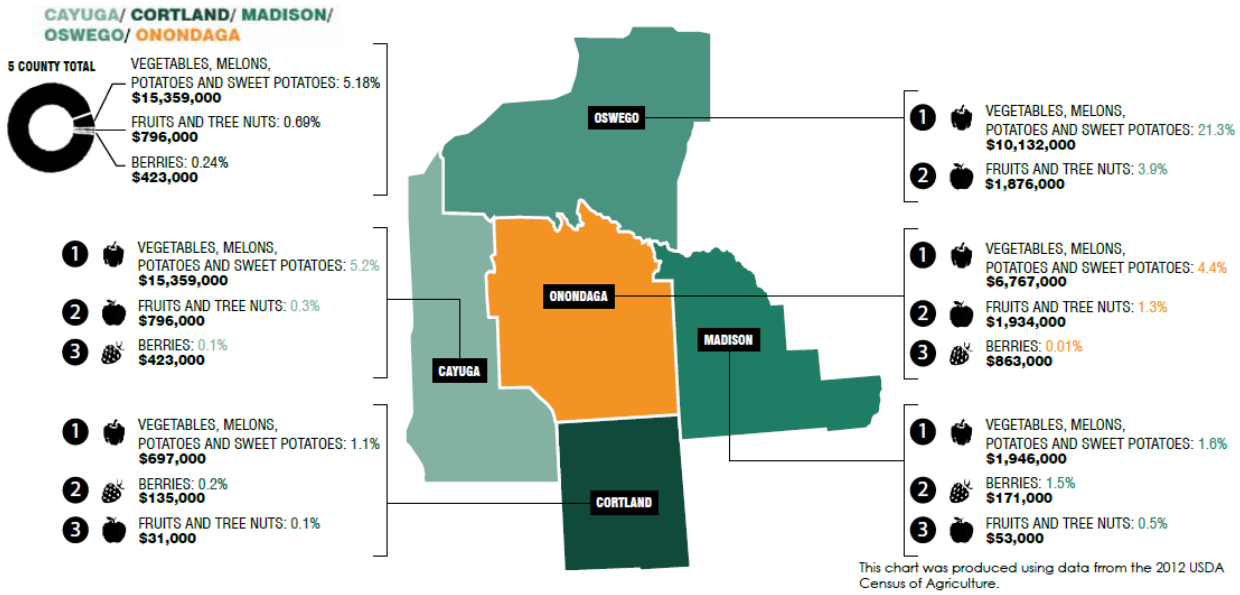
As reflected in other sections of this document, **Onondaga County's agriculture is a primary economic industry, producing $178 million in annual sales from a total of 623 farms** (USDA NASS, 2017a). These farms make the County one of the most productive in the state. Onondaga County ranks first in the state for eggs and poultry production and ninth in dairy production for New York counties. It is in the top 5% of US counties for milk production. Milk accounts for over half of the County's agriculture sales, with corn (12% of sales), and poultry (9% of sales) rounding out Onondaga County's top three agricultural products (see Figure 14).

Figure 14. Top Three Agricultural Products per County in Central New York



Source: Potteiger, M. & Weissman, E. 2021. Food Plan CNY. Available at: https://agriculture.ongov.net/wp-content/uploads/2021/03/Food-Plan-CNY.pdf

Figure 15. Crop Diversity per County in Central New York



Source: Potteiger, M. & Weissman, E. 2021. Food Plan CNY. Available at: https://agriculture.ongov.net/wp-content/uploads/2021/03/Food-Plan-CNY.pdf

Proximity to markets and natural landscape diversity supports the production of specialty crop s such as vegetables (4% of sales), fruits and nuts (1% of sales), and berries (<1% of sales) (see Figure 14). Notably, urban agriculture and community gardening in Syracuse has expanded over the past decade providing food to residents and creating jobs in agriculture. More information about the types of crops that Onondaga County provides is detailed in the Agricultural Economic Profile.

Onondaga County's agriculture also faces several challenges that have led to declines in the total number of farms, and a trend toward larger farms and consolidation. Onondaga County farms face a series of pressures that threaten farm viability. Challenges include development pressure, an aging farm population, and global competition. Fluctuating commodity prices combined with increasing production costs make it challenging for producers to stay afloat competing within a globalized food system. Increased regulation has added additional cost to operating farms. More information about these challenges is found in the Natural Resources section and the Land Use Change section.

DISTRIBUTION

The Syracuse metropolitan area is a major distribution hub due to accessibility to the NY State Thruway and Interstate 81 highway systems, and the CSX rail infrastructure and its intermodal freight hub facility in DeWitt. These corridors connect Onondaga County to major markets and population centers such as New York City, Philadelphia, Boston, Toronto, and Montreal.

The County's distribution sector employs over 1,800 people and the County is home to 39 wholesale distribution establishments that operate at international, national, and regional scales (Food Plan CNY, 2021). Distributors' networks operating at the local and regional scales include the Central New York Regional Market Authority (CNYRMA), emergency and institutional food distribution, and independent businesses. The CNYRMA, established in 1938, owns warehouses that offer distribution space for private businesses and direct retail opportunities for farmers twice each week at their public market.

Local and regional distribution networks support local producers by facilitating local and regional food sales. Syracuse is home to extensive distribution infrastructure, but this infrastructure generally serves national grocery and food service corporations which most commonly exclude regional producers.

Prior to the large-scale privatization and consolidation across the food sector occurring in the 1960's, the Central New York Regional Market Authority held distribution infrastructure that enabled the operation of several independent regional distributors who served diverse markets and retained a higher proportion of economic activity within the region (Food Plan CNY, 2021). Barriers to rebuilding regional infrastructure include market competition, institutional barriers, and food safety requirements. Workforce shortages essential for distribution have recently been identified related to logistics and off-hour shifts (Food Plan CNY, 2021).

Efforts in recent years have been made to expand or construct new intermodal inland port rail freight facilities in Onondaga County, to relieve pressure on major US ports. Expansion of freight access could provide new opportunities for providing local food to new markets in the US and abroad.

PROCESSING

The food processing sector is critical to supporting Onondaga County's agricultural producers to ensure that local food reaches local markets. The processing sector employs 1,500 people at over 150 food processors and manufacturers in the County. Onondaga County food processors and manufacturers have annual sales of over $438 million, nearly 2.5 times the County's annual agricultural sales (Food Plan CNY, 2021).

Over half of annual processing sales are in the dairy industry, which has major processing facilities in the region for Greek-style yogurt. This type of yogurt requires three times the amount of milk used in traditional yogurt production, sharply increasing the market for locally produced milk as well as the jobs it provides. Beyond the dairy sector, most food processing companies are small and include bakeries, breweries, distilleries, and ice cream stands with fewer than five employees (Food Plan CNY, 2021).

Onondaga County breweries and distilleries are supporting a resurgence of hops and barley production in the region, such as Clark Hollow Hops in Fabius, NY. Recent growth in the breweries and associated tourism has been aided by the 2012 passage of the NY State Farm Brewery Law, which reduces the regulatory burden for breweries who source ingredients from the state of New York.

Despite the recent renewal of small-scale processors, Onondaga County has lost much of its local food processing infrastructure over time. The loss in processing facilities has been attributed to growth of multi-national corporations that have dominated retail space and are able to have full control over processing plant locations (compared to smaller local processors that are limited in capacity). In particular, the closure of mills, vegetable processing, and meat packing facilities are barriers to many producers seeking access to local markets. Food Plan CNY found that lack of slaughter capacity is considered a bottleneck for Onondaga County meat producers despite an increasing demand for local meats.

Figure 16. Shelf space for multinational potato chips compared to local potato chips

Source: Survey of local supermarket aisles for FritoLay Products (multinational processor) compared to Terrell's Potato Chips (local processor) conducted through Food Plan CNY, 2021.

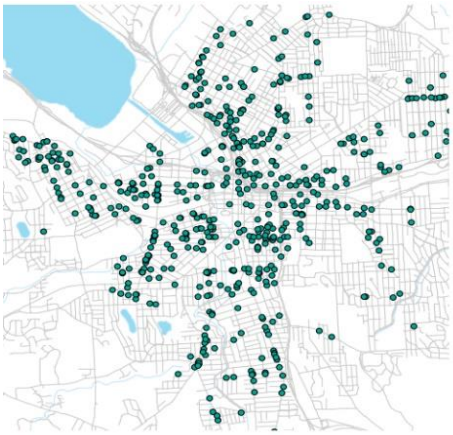
MARKETS

Onondaga County is home to 370 retail food markets (grocery stores, supermarkets, gas stations, convenience stores, and corner stores) accounting for over $1.3 billion in annual sales (Food Plan CNY 2021). Syracuse, the urban center in Onondaga County, is centrally located in an important access point for markets that consume local agriculture. Furthermore, Syracuse is an access point for goods to reach regional and even global markets as it is within just a few hours' drive from major markets across the Northeast from Boston to Philadelphia.

The Central New York Regional Market Authority (CNYRMA) is a critical asset as it serves thousands of local consumers through direct retail and warehouse distribution. Until relatively recently, this facility helped distribute and market the majority of food consumed within the County (Food Plan CNY 2021). Today, however, most food in Onondaga County is distributed through private channels such as supermarket chains and food service corporations who utilize their own respective distribution centers. Recently, small scale food markets have been and continue to be promoted to increase local food access (e.g., the Syracuse Salt City Market food and the recently opened Brady Market grocery store).

Despite Onondaga County being a major food production hub, thousands of its residents live without consistent access to healthy, affordable, and culturally appropriate food (see Figure 14). Over the past five decades, grocery stores have increased in size and decreased in number, while small markets with fresh food have primarily closed or been converted to convenience stores. This has left both urban and rural residents without sufficient access to full-service grocery stores that have healthy food (Food Plan CNY 2021). Just as many residents face barriers to accessing food, challenges exist for farmers to get their products to local markets, such as a lack of intermediate infrastructure, burdensome food safety requirements, retail consolidation, and competitive markets (Food Plan CNY 2021).

Figure 17. Historic food market infrastructure in the City of Syracuse



Food Store locations, 1938. Syracuse

Market on Oswego Ave. Syracuse, 1930's
(Photo courtesy of Onondaga Historical Association)

Source: Food Plan CNY and the Onondaga Historical Association

CONSUMPTION

Food consumption is a significant economic driver in Onondaga County and eating locally sourced foods has become an important economic trend. Census data shows a significant increase in farms with direct sales in the County, consistent with national trends (Food Plan CNY 2021).

The Onondaga Grown campaign, developed by the Onondaga County Agriculture Council, promotes the consumption of local foods at local markets, restaurants, and other venues. Various organizations, individuals, and government agencies are also partnering to address persistent food insecurity challenges. Institutional food service programs at schools, hospitals, and government agencies serve thousands of County residents each day and represent an opportunity for purchasing local foods.

Connecting food producers and consumers in Onondaga County offers the potential to address food insecurity and associated public health issues while supporting local agricultural production. Just to meet the recommended daily servings of fruits and vegetables for Onondaga County residents would require a significant increase in the production, distribution, and processing of local fruit and vegetables (Food Plan CNY 2021).

WASTE & RECYCLING

Over 40% of food produced in the US is wasted, and food waste is the single largest category of waste in landfills (Food Plan CNY, 2021). Food waste occurs in all sectors of the food system, with the majority of food waste in the US coming from consumption (43%), market (40%), and production (16%). At the consumer level, key drivers of waste stem from cooking waste and uneaten leftover waste, as well as spoilage. At the market level, overstocking, extending past the sell-by date, consumer demand for unblemished food, and packaging requirements can lead to waste. Finally, at the farm production-level, waste is generated by crop loss, pests, mechanical failures, contamination, changes in market demands, or labor shortages.

Onondaga County is a regional leader in composting of food waste, with Onondaga County Resource Recovery Agency (OCRRA) being the largest composting facility in New York State. This is important when it comes to understanding the possibilities of scaling the composted food waste in Onondaga County. Recently, according to Food Plan CNY, there has been a growth in the agriculture-related industry using OCCRA's compost (e.g., hops growers).

Reduction of food waste is also led by food rescue through emergency food distribution networks, including the Food Bank of Central New York and Interreligious Food Consortium. These networks redistribute millions of pounds of food that may have otherwise gone to waste (Food Plan CNY 2021). Despite the County's successes, opportunities exist to improve food recovery and increase residential composting.

Since the time of publishing the Food Plan CNY, it is also notable that the NYS Food Donation and Food Scraps Recycling Law was enacted in January 2022. This law requires that businesses and institutions that generate an annual average of two or more tons of wasted food per week must donate excess edible food and recycle all remaining food scraps if they are within 25 miles of an organics recycler (composting facility, anaerobic digester, etc.). See https://www.dec.ny.gov/chemical/114499.html#DFSG for more information. This applies to several large institutions, hotels, and restaurants in the Syracuse area.

It is also notable that in addition to the food waste considered by the Food Plan CNY, there are also non-food agricultural wastes and by-products, including manure, oil, silage plastics, fertilizer, pesticides, and herbicides. US farmers generate 816 million pounds of plastic waste annually, with much of this waste occurring from plastic mulch and plastic containers (Mancl, 2020). Recycling of this plastic is complicated because it can be wet, covered with dirt, and difficult to gather.

Farmers in New York State have been enlisting the assistance of the NYS Recycling Agricultural Plastics Project (ARAPP) through Cornell University to recycle plastics from farm operations, such as bale wrap, silo covers and nursery pots and trays. Collected agricultural plastics are made into sidewalk pavers, plastic lumber, oils, waxes and other products.

Animal manure is also a critical by-product of agriculture and is a renewable resource that can be recycled as fertilizer spread on cropland. While sometimes perceived as undesirable by the general public, manure from dairy and livestock farms is highly beneficial to the agricultural land base, as it is reincorporated into the land, improving soil health with nutrients and organic matter, and reducing the need to introduce synthetic fertilizers to the environment. Livestock manure is the primary nutrient source for crop growth and to build all components of soil health.

Concentrated Animal Feeding Operations (CAFOs), a term used to describe larger scale feeding facilities, are most commonly associated with livestock manure management. CAFO manure is typically collected and stored until the manure nutrients can benefit crop growth in fields. Construction of storage facilities is required to allow farmers to best time manure nutrient applications based on crop needs and weather patterns.

Proper management of manure from dairy and other animal-based agriculture is important to minimize nutrient runoff into waterways and groundwater supplies, to balance nutrient supply and crop nutrient demand for the greatest environmental benefit, and to minimize odor. CAFO operations and related manure management are regulated by New York State and are required to participate in the state's Agricultural Environmental Management Program (AEM). Federal USDA Standards for Nutrient Management (NRCS 590) also apply within the New York program.