

**Sustainable Wine Professional Course**  
**by Whitney Beaman & Richard Olsen-Harbich**  
**Bedell Cellars & Long Island Sustainable Winegrowing**  
**36225 Main Road, Cutchogue, NY 11935, 631.734.7537**  
**June 15, 2019**

**Thank you for enrolling in the Sustainable Wine Professional Course!**

Long Island Sustainable Winegrowing (LISW) is a 501(c)(3) not-for-profit that provides education and third-party certification to sustainably farmed vineyards in the Long Island wine region. Long Island Sustainable Winegrowers are a group of small farmers who love our planet, our people and our wine.









Sustainable winegrowing has been widely adopted on Long Island where the region's winegrape growers and vintners have a long-term commitment to practices that protect soil, air and water for the benefit of communities, consumers and employees.

This course provides wine professionals and interested consumers with an opportunity to learn about the dynamic sustainability movement in the United States. The curriculum includes an overview of sustainability with an explanation of sustainable winegrowing. You will learn common strategies for winegrowers to reduce their environmental impact and sustainable certification logos found on wine labels in the U.S. Once successfully completed, students will have a clear understanding of sustainable winegrowing and be able to share this information with others. A key element of sustainability is to engage industry, consumers and communities about how we treat our planet. Whether you are already a wine professional, or just love wine, this course is for you!

Students can complete the entire course by clicking through the navigation at the top of the page. Quizzes will be provided at the end of each lesson. Students must complete each lesson before progressing to the next. The course concludes with a 25 question test, which is only accessible after all lessons have been completed. Students may logout and return to the lessons and/or test at any time. Individuals who answer all 25 questions correctly will be able to download a personalized Long Island Sustainable Wine Professional Certificate. The test can be repeated as often as necessary to reach a passing score.

## Course Content

This course is divided into six lessons followed by a quiz to prepare students for the final test.

	<b>1. Sustainable Viticulture</b>	This lecture will define sustainability and explain sustainable winegrowing practices.
	<b>2. Sustainable Winemaking</b>	This lecture will discuss winery sustainability, including water, energy, packaging and emissions.
	<b>3. Long Island Sustainable Winegrowing</b>	This lecture will provide an overview Long Island Sustainable Winegrowing and Long Island wine.
	<b>4. Western U.S. Sustainable Winegrowing</b>	This lecture will describe the four sustainable winegrowing certifications available in the Western U.S.
	<b>5. USDA Organic Certification</b>	This lecture will discuss the USDA Organic certification and labeling requirements for wine.
	<b>6. Demeter Biodynamic Certification</b>	This lecture will discuss the Demeter Biodynamic certification and labeling requirements for wine.

## Section 1



### Sustainable Viticulture

#### **Definition of Sustainability**

In 1987, the United Nations World Commission on Environment and Development published a report titled *Our Common Future* (also known as the Brundtland Report), which defined sustainability as that which "meets the needs of the present without compromising the ability of future generations to meet their own needs." In other words, the goal of sustainability is to conserve valuable and limited resources.

In the context of agriculture, resource conservation is illustrated by the concept of "put less in and take less out." Sustainable agriculture seeks to reduce the use of off-farm inputs by recycling on-farm resources, including water and compost.

Sustainability as a business practice measures economic, social and environmental performance. This "triple bottom line" approach strives to maximize the social and environmental value a business generates in addition to economic gains.

Key drivers for sustainability in business include resource depletion, climate change and consumer demand for sustainable products. The triple bottom line is sometimes illustrated as the intersection of the "Three P's" for people, planet, and profit or the "Three E's" for ethics, environment and economics.

## Triple Bottom Line



## Climate Change & Global Warming

Climate refers to the regional or global average of temperature, humidity and rainfall over the years, decades or centuries. The earth's climate system has a major impact on the timing, type and viability of agriculture practiced around the world.

Global warming refers to the long-term warming of air and ocean temperatures that began in the late 19th century with the modern industrial economy. Global warming is a fundamental driver of human-made climate change.

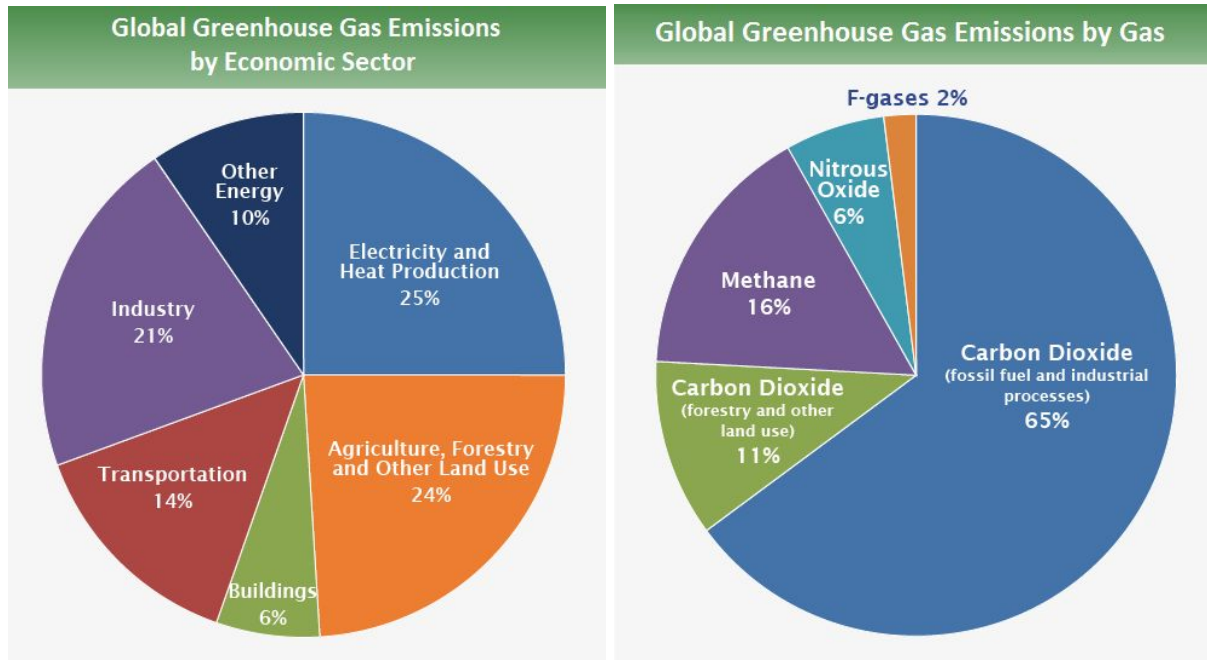
Fossil fuel emissions from industry, energy, transportation and other sectors add heat-trapping gases to Earth's atmosphere, creating a greenhouse effect. These greenhouse gas (GHG) emissions contribute to the increased temperature trends described by global warming. Since 1880, the average surface temperature of the earth has increased by about 2 °F, relative to the mid-20th-century baseline of 1951-1980.

For more information: <https://climate.nasa.gov/resources/global-warming/>

Effects of climate change include irregular precipitation patterns, sea level rise and severe weather events. These impacts can cause increased drought and pest pressure for agriculture. Farmers need to adapt crops and practices in order to remain viable in the face of climate change.

## Greenhouse Gas Emissions

According to the United States Environmental Protection Agency (EPA), Agriculture, Forestry and Other Land Use account for 24% of all global GHG emissions. This represents both a significant contribution to global warming and a significant opportunity to make positive changes for the future.



Source: <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>

Through the process of photosynthesis, agriculture and forestry are the only economic sectors that have the inherent ability to remove atmospheric CO<sub>2</sub> by sequestering carbon in plant tissue and soils. Carbon sequestration from sound plant-based agricultural practices and reforestation offset approximately 20% of global emissions annually, creating a closed loop system.

### Conventional Agriculture

Conventional farming is the most common form of agriculture practiced in the United States due to its cost-saving benefits for producers and consumers. This system of agriculture maximizes efficiency by increasing the quantity of crops produced while minimizing land use and human labor.

Certain conventional farming practices can negatively impact the environment. This is true of larger 'industrial' farms as well as small-scale farms. For this reason, it is

important for farmers to participate in eco-friendly programs that help them monitor and manage their environmental impact.

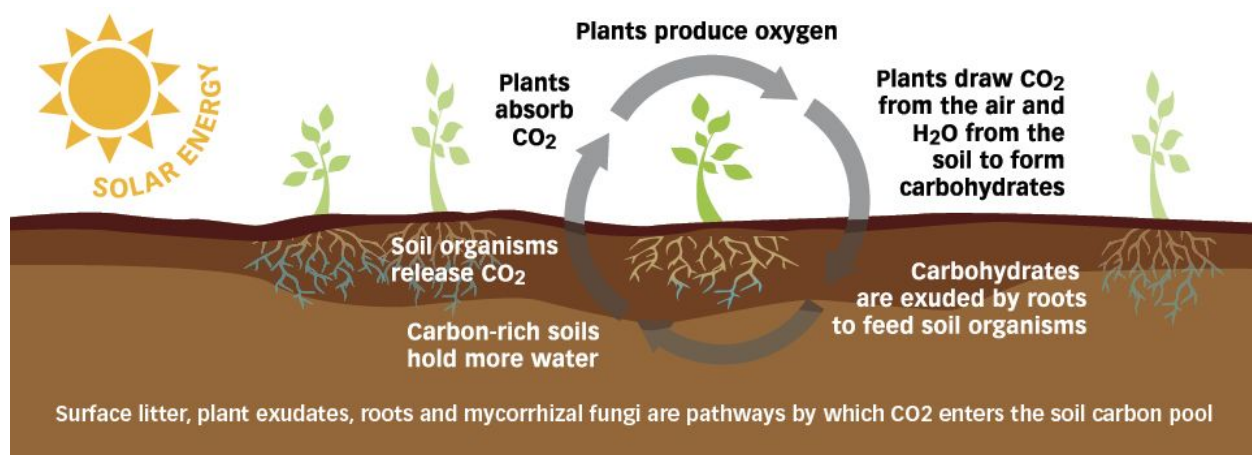
Conventional agriculture relies partly on chemical intervention to fight pests, control weeds and provide plant nutrition. Fertilizers, particularly nitrogen and phosphorus, can pollute ground and surface waters when applied in excessive amounts. Excessive use of pesticides can diminish the biodiversity and ecological balance in the farm ecosystem. Beneficial insects, (essential for keeping pest insects in check) and pollinating insects may also suffer as a result.

Poor soil management practices may lead to declines in soil health. Good soil structure and a diverse soil microbiome are important for carbon sequestration, nutrient cycling and root growth. Declining soil health and loss of biodiversity create an increased need for off-farm inputs to produce viable crops year after year.

By prioritizing short term savings over long term impacts, conventional agriculture may risk economic, social and environmental costs down the line. Thoughtful and well-planned agricultural practices are essential to optimize production while minimizing long-term economic, social and environmental costs.

## Carbon Farming

Farming to encourage carbon soil sequestration is known as carbon farming. The potential for carbon sequestration makes agriculture an important focus area for climate change mitigation.



Source: <https://www.cecsb.org/rethink-food/carbon-farming/>

In addition to carbon sequestration, sound farming practices release of fewer GHG emissions than other forms of industry and development. According to the American Farmland Trust, agricultural land emits approximately 66 times fewer GHGs per acre than developed land.

For more information:

<https://www.farmlandinfo.org/greener-fields-combating-climate-change-keeping-land-farming-new-york>

Unfortunately, farmland in the United States is disappearing. According to the 2017 Census of Agriculture, the amount of total land devoted to agriculture is down 2% and the total number of farms has declined 3% since 2012. This decline has been steady since the 1980's. It is vitally important that we conserve our nation's farmland!

For more information:

<https://www.nass.usda.gov/Publications/AgCensus/2017/index.php>





## Sustainable Viticulture

Viticulture is a form of agriculture that specializes in growing grapes for making juice and wine. In the vineyard, viticulturalists are responsible for planting, pruning, fertilizing, irrigating and harvesting grapevines. Viticulturalists are also on the frontlines of grapevine pest and disease management to ensure good quality yields at harvest time.



The work of vineyard managers and winemakers is closely intertwined. Grape characteristics contribute significantly to the flavor, aroma and style of finished wine. For this reason, it is often said that “great wine begins in the vineyard.”

Sustainable viticulture is a science-based approach to resource conservation in winegrowing that involves thoughtful planning with regard to environmental impacts. By focusing on practices that encourage a diverse ecosystem and healthy soils, sustainable viticulture ensures that farms can remain viable for generations to come.

Sustainable viticulture aims to achieve eco-efficiency by reducing off-farm inputs and recycling on-farm resources. Increasingly, grape growers are adopting a sustainable philosophy to ensure environmental preservation as well as economic viability.

Goals of sustainable viticulture include the following:

- **Minimize the use of fungicides, insecticides, herbicides and fertilizers**
- **Protect surrounding waterways and groundwater from chemical runoff and leaching**
- **Conserve water used for irrigation and processing**
- **Prevent erosion and maintain soil health**
- **Protect and encourage biological diversity**
- **Reduce carbon emissions**
- **Protect farmers, communities and consumers**
- **Maintain economic viability over time**

Sustainable viticulture limits chemical intervention both by encouraging the use of low impact materials and by reducing the number of spray applications throughout the growing season. For grape growers worldwide, fungal diseases are a challenge. Frequent growing season rainfall and high relative humidity can promote fungal diseases. Consequently, a certain number of fungicides are necessary to keep infections to a minimum. Sustainable viticulture programs promote and in some cases require the use of organic and low impact pesticides to control fungal diseases.

A hallmark of sustainable viticulture is the promotion of vine health in order to reduce susceptibility to pests. Robust, balanced vines are better able to withstand fungal diseases and insect infestations. Specific vine management practices are used to ensure good airflow through the vine canopy. This promotes drying after a rain, thereby reducing fungal disease pressure. An example of this is the selective removal of leaves from around ripening clusters. This is done by hand and increasingly, by machine. Leaf removal has been shown to not only reduce disease pressure but also to enhance ripening through an increase in sunlight penetration.



Practices such as scouting and vine management are also important pest management tools. Scouting, the systematic examination of a random selection of vines, is essential to help growers gauge the incidence and severity of any pest problems.

The combination of vine management techniques, scouting and the use of low impact products constitutes an Integrated Pest Management (IPM) strategy. IPM strategies are used in most agricultural industries to help growers manage pests while reducing pesticides and maintaining economic viability. An IPM strategy has the added benefit of reducing GHG emissions by reducing fuel use for tractor passes required for the sprayer.

Soil and water conservation are key aspects of sustainable viticulture. Irrigation is done only when necessary. Targeted, drip irrigation lines are used to apply a precise amount of water directly to the root system. Native plants or cover crops are grown between vine rows to minimize soil erosion, increasing carbon sequestration and water penetration into the soil. When plant material dies or gets mowed down, it returns nutrients to the soil in the form of compost. Biodiversity of plant life in the field increases organic matter in the soil, maintains soil health and encourages beneficial insects. When soil is healthy, fertilizer additions can be reduced, protecting aquatic habitats from harmful nitrogen runoff.



## Key Practices of Sustainable Viticulture

- Composting - Every vintage, nutrients are taken up by the grapevine and concentrated in plant tissues during growth. These nutrients are then returned to the soil through decomposing plant material. Throughout the winegrowing and winemaking process, plant material is discarded as waste. This includes leaves, shoots and grape clusters that are removed from the canopy, and grape skins, seeds and stems that are pressed off during winemaking. Cover crops that are mowed down during routine vineyard maintenance create plant waste as well. All of this plant material should be returned to the vineyard as a natural fertilizer in the form of compost. Mulch and compost help retain water in vineyard soils and increase soil fertility. Nutrient cycling from compost reduces the need for commercial fertilizers.



- Cover Crops - Nitrogen fixing cover crops can increase soil fertility and prevent erosion in the vineyard by holding soil in place. Cover crops can thereby increase soil water absorption during natural rain events by allowing water to trickle down into the soil system below.



- Reduced Tillage - Tillage loosens the soil and encourages erosion while also releasing GHG emissions. Therefore, tillage should be reduced to keep the soil nutrient content high, emissions low, and the soil itself in place.
- Limited Nitrogen Additions - Excessive use of nitrogen fertilizers can cause leaching into groundwater or runoff into local waterways, which can cause adverse ecological effects.

## Section 1 Quiz

**Sustainable agriculture seeks to reduce the use of:**

- 1) Compost
- 2) Human labor
- 3) Off-farm inputs**
- 4) Organic pesticides
- 5) All of the above

**Agriculture, Forestry and Other Land Use account for what percent of all global GHG emissions:**

- 1) 6%
- 2) 24%**
- 3) 65%
- 4) 14%
- 5) 0%

**Goals of sustainable viticulture include the following:**

- 1) Conserve water used for irrigation and processing
- 2) Prevent erosion and maintain soil health
- 3) Protect and encourage biological diversity
- 4) Reduce carbon emissions
- 5) All of the above**

**Excessive use of nitrogen fertilizers can:**

- 1) Prevent excess vine vigor
- 2) Provide beneficial nutrition to cover crops
- 3) Improve wine quality
- 4) Cause adverse ecological effects**
- 5) All of the above

**The combination of vine management techniques, scouting and the use of low impact materials is known as:**

- 1) GDD
- 2) Carbon footprint
- 3) IPM**
- 4) GHG
- 5) All of the above

**The three major principles of sustainability - often referred to as the “E’s” of sustainability - include:**

- 1) Erosion management, environmental awareness, education
- 2) Economic viability, ethics, environmental stewardship**
- 3) Energy efficiency, employee relations, economic profitability
- 4) Ethics, energy, environment
- 5) Ecology, environmental stewardship, enterprise



## Section 2



### **Sustainable Winemaking**

Sustainable winemaking considers many of the same impacts as sustainability in the vineyard, including water conservation, recycling and waste reduction.





Goals of sustainable winemaking include the following:

- Water Management
- Waste Management
- Energy Efficiency
- Emissions Reduction
- Sustainable Packaging

Winemaking is water intensive process. Water is used to clean tanks, drains and barrels. Simple procedures like pre-cleaning equipment before using water and providing clear guidelines for water use to employees can conserve water in winemaking. Wineries can increase their commitment to the environment by sustainably sourcing, using and reusing water. This can be achieved through water metering and wastewater recycling. The use of biodegradable cleaning products that avoid chemicals like chlorine and trisodium phosphate (TSP) can also help protect water quality.



Energy efficient appliances and procedures can greatly reduce the carbon footprint of winemaking. Installing energy efficient LED light bulbs, timers and motion sensors is an effective strategy for reducing energy use. The use of energy efficient refrigeration, heating and cooling systems make the largest impact on energy reduction in winemaking. Some wineries have harnessed the natural temperature moderating effects of the ground by installing geothermal climate systems. The temperature beneath the upper 20 ft of Earth's surface maintains a nearly constant temperature between 50 and 60 °F. Geothermal climate systems pump heat below ground in the summer where it is naturally cooled in a heat exchange before being pumped back into the winery. The same process warms ambient cold air in the winter.

Emissions from energy generation are also reduced through clean energy sources. Incorporating renewable energy such as wind, solar and geothermal all minimize the footprint of winemaking. Many wineries have installed solar panels and wind turbines to supplement their energy mix.



Emissions from vehicles can be reduced through the use of electric cars, trucks and forklifts that don't run on diesel or gasoline. Many wineries have electric vehicle charging stations and bicycle racks to encourage visitors to choose sustainable forms for transportation to and from the winery.



The use of lightweight packaging that can reduce emissions in the supply chain by increasing the efficiency of shipping and transport. Forms of alternative packing that can be used to reduce the cost and emissions of transport include lightweight glass bottles, plastic PET bottles, kegs (kegs result in little or no waste because they are either repurposed or recycled), cans, boxes and tetra packs. Wineries can also increase their commitment to the environment by using packaging made from recycled materials, including recycled glass bottles and recycled paper labels.



Operational waste in wine production is diverted from the landfill through composting, recycling and reuse. Most sustainable wineries have onsite recycling programs for glass, metal, plastic and cardboard. Biomass, such as grape pomace, can be composted to reduce the amount of waste that is sent to the landfill.



## Section 2 Quiz:

**Goals of sustainable winemaking include the following:**

- 1) Water Management
- 2) Waste Management
- 3) Energy Efficiency
- 4) Packaging
- 5) **All of the above**

**Wineries can increase their commitment to the environment by:**

- 1) Using screw caps
- 2) Using diesel powered vehicles
- 3) Using chlorine based cleaners
- 4) **Recycling cardboard and glass**
- 5) All of the above

**What uses the most energy in a winery?**

- 1) Lighting
- 2) **Refrigeration**
- 3) Laboratory equipment
- 4) none of the above

**Method(s) of reducing the amount of water used in a winery include:**

- 1) Providing clear cleaning procedures for employees to follow
- 2) Pre-cleaning equipment before using water
- 3) Installing flow meters to track water use
- 4) Wastewater recycling
- 5) **All of the above**

**What are some ways that wineries can reduce energy use?**

- 1) Lighting timers
- 2) Lighting motion sensors
- 3) Energy efficient light bulbs
- 4) Natural lighting
- 5) **All of the above**



## Section 3



### Long Island Sustainable Winegrowing

Long Island Sustainable Winegrowing is a not-for-profit that provides education and third-party certification to sustainably farmed vineyards in the Long Island wine region. Founded in 2012, it is the only third-party sustainable certification available to winegrowers in the Eastern United States. As of 2019, LISW includes 22 small farms and over 1,000 acres of vineyard, representing half of the Long Island wine region.



Long Island Sustainable Winegrowers believe that vineyards should work in harmony with our natural world leaving the land we steward in better condition than when we found it, building a community between vineyards, workers and the land. This system is kept in balance through a series of vineyard best practices, finely tuned over the past 40 years.

The LISW certification program is based on the New York VineBalance Guide to Sustainable Viticulture. VineBalance is a grower self-assessment workbook that was developed in 2004 through a joint effort by Cornell Cooperative Extension and the New York Department of Agriculture and Market's Soil and Water Conservation Committee. The self-assessment provides a baseline for potential modifications detailed in an action plan drawn up after completing the workbook. The workbook is designed to both document and promote sustainable grape growing practices that:


- Protect the environment (specifically water quality and soil health)
- Protect the health of workers, neighbors, and consumers
- Increase or maintain the profitability of grape production
- Improved neighbor relations and industry reputation

The LISW version of this workbook includes 18 core criteria for sustainably farming grapes on Long Island. LISW certification requires an annual self assessment that is reviewed by a third-party certifier and an onsite inspection every three years.

**VineBALANCE**  
Sustainable Viticulture  
in the NORTHEAST

[www.vinebalance.com](http://www.vinebalance.com)

**New York Guide to Sustainable Viticulture Practices**  
Long Island Grower Self-Assessment Workbook

 **Cornell University**  
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 **VineBALANCE** New York Guide to Sustainable Viticulture Practices  
Sustainable Viticulture  
in the NORTHEAST

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For more information: <http://www.lisustainablewine.org/vinebalance-workbook>

LISW Certified Sustainable wines and vineyards can be identified by the logo of certification below. This logo can be found on wine labels and wine trail signage, although its use is optional at the discretion of the winery. This logo indicates that the wine is produced from grapes grown from a vineyard that has achieved annual certification from Long Island Sustainable Winegrowing. Wines labeled with this logo must contain a minimum of 95% fruit from a LISW certified vineyard.



For more information: [www.lisustainablewine.org](http://www.lisustainablewine.org)

### **Principles of Sustainability**

The LISW program was developed around the following principles of sustainable winegrowing:

**Holistic View of the Vineyard** - Vineyards as evolving ecosystems that grow in complexity with proper management. Sustainable viticulture acknowledges that vineyards are part of the larger surrounding ecosystem affecting the health of nearby wildlife, woodlands, soils and waterways.

**Soil Conservation and Fertility** - Balanced vine nutrition means promoting the natural microbiology of our living soils through composting, cover cropping, reduced or no tillage, and limited nitrogen additions.

**Protecting Watersheds** - Farm land has a vital impact on the health of local watersheds. It is crucial to apply conservation methods which avoid soil erosion, runoff, and the overuse of nitrogen fertilizers.

**Biodiversity** - Vineyards should contain wild and planted areas among the vines and on the farm's perimeter that are allowed to bloom and go to seed, ensuring the health of native flora and fauna, including beneficial insects and native bird populations.

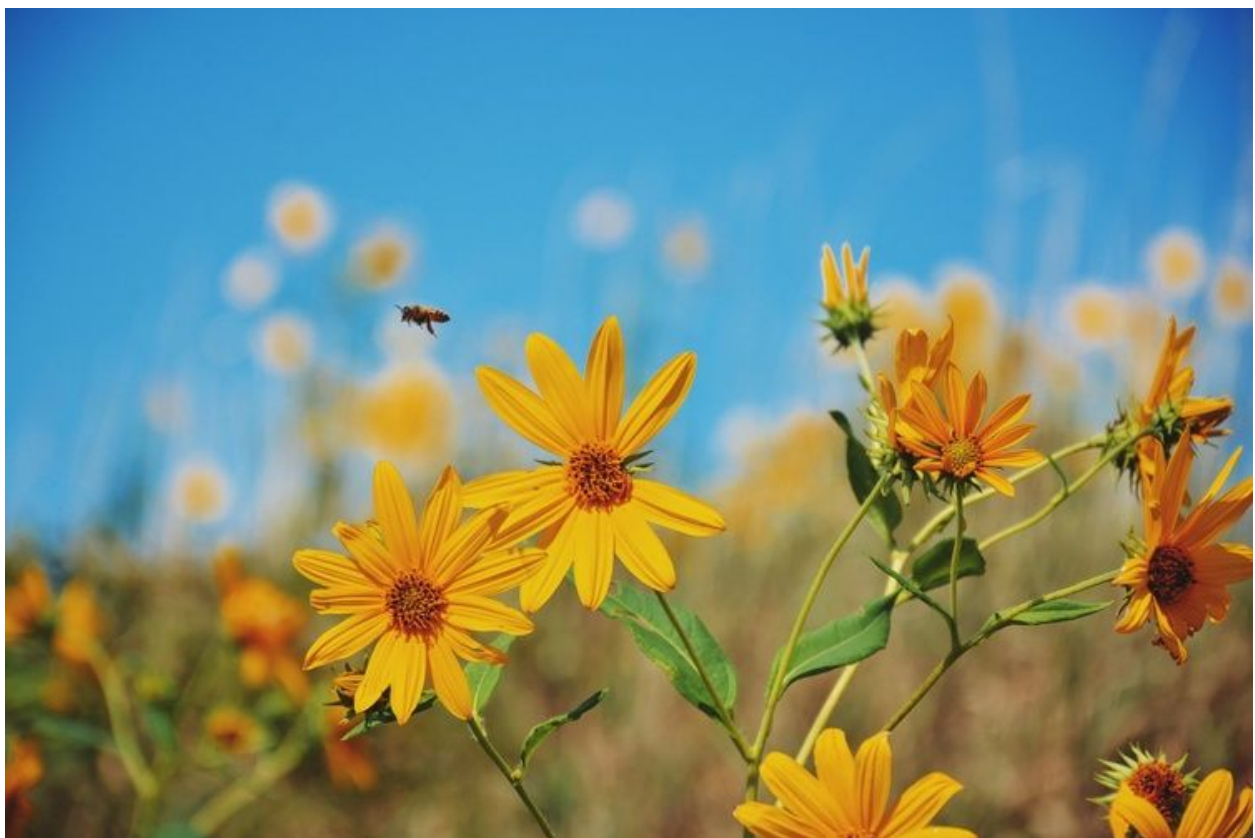
**Low Input Farming** - Before intervening, vineyard managers scout for pests and disease and then make a decision on how to proceed while being mindful to make every effort to use reduced risk and low impact materials.

**Community Stewardship** - The wine industry supports a large and diverse labor force of men and women all over the country. It is important that this bring positive economic and social impacts for the community including safe environmental practices, fair labor standards, social equity and worker health and safety.

## Triple Bottom Line

LISW uses a triple bottom line approach to address sustainable winegrowing, including environmental stewardship, social equity, and economic viability.

**Environmental Stewardship** - Stewardship of the environment refers to protecting the environment through conservation, recycling, regeneration, and restoration. The viability of agriculture is dependent on our ability to steward our land in a way that allows it to stay healthy and productive for generations to come. Vineyards are a holistic ecological system that must be kept in balance by environmentally sensitive farming practices.



**Ethics** - An important component of sustainable winegrowing is social equity for the people at every aspect of the supply chain. This includes a commitment to social responsibility, fair labor practices, worker safety and the community in which wineries do business. In addition to resource management, sustainable wineries also dedicate time to engage and educate their community, consumers, employees and business partners around sustainable practices.



Ethical theory states that the actions of an individual must benefit the whole of society. In this way, there must be a balance between economic growth and the welfare of society and the environment. Sustainable development supports economies and communities that allow people to provide for their social needs and sustain a high level of social well-being in the long-term. The factors involved include: Health, Safety, Standard of Living, Equality, Freedom, Opportunity, and Individual Empowerment.



LISW encourages members to take social well-being into account when evaluating their business practices. Part of this is the development of a clear and concise employee handbook that includes clear job descriptions, company policies, explanations of employee benefits and standards and expectations. LISW also encourages members to be good neighbors in the community, hire local labor, participate in local government and support local charitable causes. A good neighbor also manages noise, dust, and emissions levels as to not impact the health or well-being of the community.

**Economic viability** - Long term economic viability is an important factor of sustainability. Sustainable vineyards and wineries help stabilize the economies of the rural communities where they reside. Economic success is important for the long term implementation of sustainable practices; the more successful a vineyard is, the more sustainable practices it can implement. Some sustainable practices can actually lower the cost of winegrape production. Economic success is also achieved by adding value by making high quality wines, promoting the uniqueness of the region's wines and supporting practices that enhance local tourism. Vineyards and wineries are sources of employment and providers and consumers of goods and services that sustain the local

economy. Their operation should support the local ecology, minimize energy use and waste, and utilize recycled products and materials as much as possible.



It is extremely important that Long Island Sustainable Winegrowers produce grapes and wines that are of high quality, sold at a competitive price and are produced using techniques and practices that are both good for the environment and society at large. LISW encourages members to participate in local government and become active in the process of cooperative efforts in land preservation, regional planning, appropriate development of rural resources, and improved agricultural land use and tourism. The bottom line is that a successful sustainable business is one that can continue to be beneficial to the community and the environment while progressing along the sustainable winegrowing continuum.





Sustainability in practice leads to improving environmental stewardship, worker safety, job satisfaction and economic fairness, and results in economic success over generations. It is a pathway to greater awareness of the consequences of one's actions on the farm, in the workplace, in the community, and the wider world around us. Sustainable vineyards and wineries help stabilize the economies of the communities where they reside.

### **Northeast Climate**

The Northeast region includes the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and the District of Columbia. The climate of the Northeast is diverse and varied with geography. The Atlantic Ocean has a moderating effect on temperatures of coastal areas; the inland regions are influenced by large bodies of water such as the Great Lakes and the Finger Lakes. Northeast summers are warm and humid, especially to the south where there is a maritime influence. The average annual temperature in the coastal region is between 50°F and 60°F. Average temperatures decrease to the north with elevation and distance from the coast. The coldest average

temperatures (between 35°F and 40°F) are observed along the northern border of Maine. Winter temperatures can drop below 0°F for extended periods of time, especially to the north.

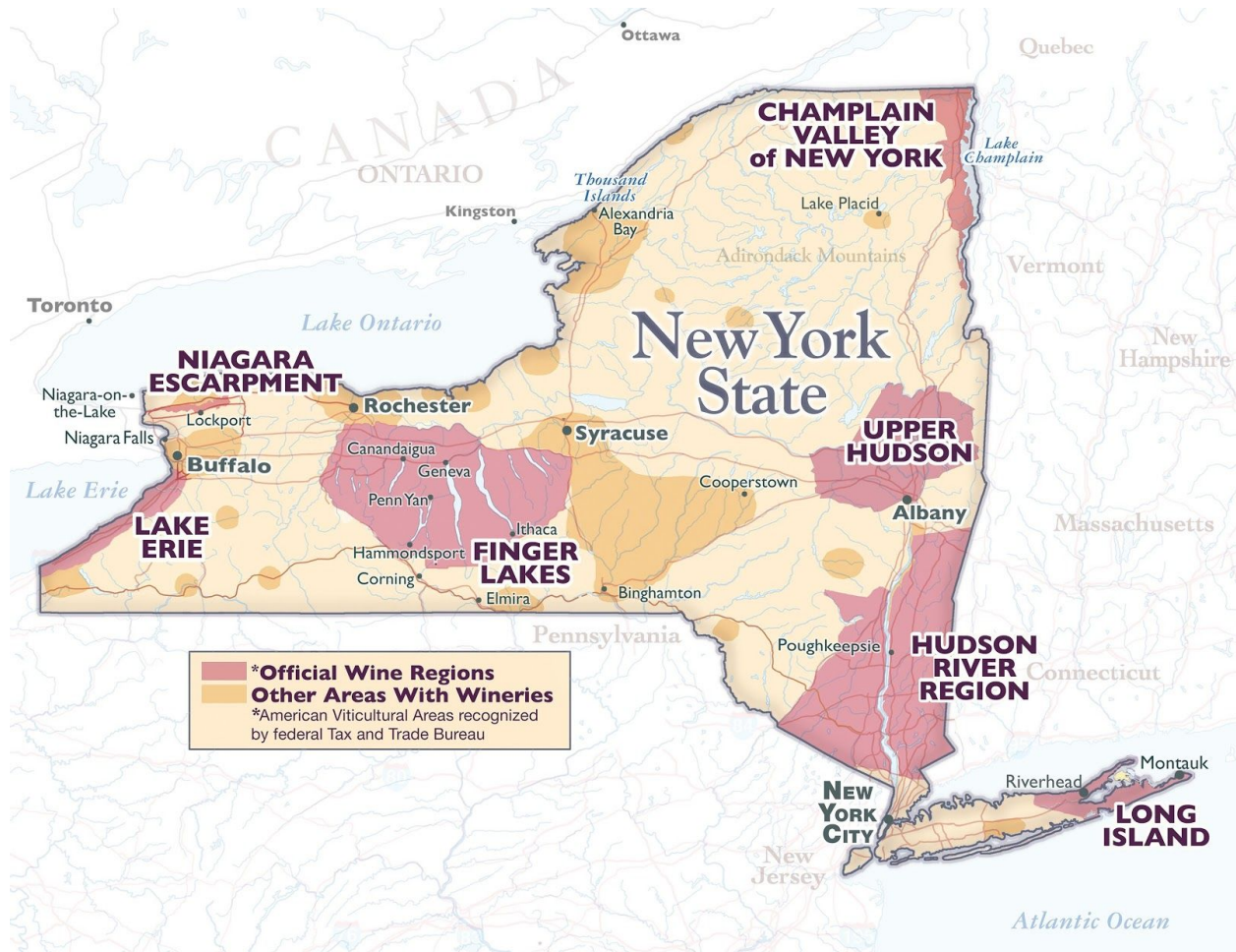
The Northeast is subject to strong seasonal variation and can be affected by extreme weather events such as ice storms, floods, draughts, heat waves, hurricanes and nor'easters. Nor'easters are defined as east coast winter storms. These storms derive their energy from the contrast in temperature between the cooler interior of North America and the warmer western Atlantic region, bringing snow, ice and hurricane-force winds. Lake effect snows are another phenomenon affecting areas adjacent to the Great Lakes, especially Lake Ontario and Erie.

For more information:

[https://www.nesdis.noaa.gov/sites/default/files/asset/document/NOAA\\_NESDIS\\_Tech\\_Report\\_142-1-Climate\\_of\\_the\\_Northeast\\_US.pdf](https://www.nesdis.noaa.gov/sites/default/files/asset/document/NOAA_NESDIS_Tech_Report_142-1-Climate_of_the_Northeast_US.pdf)

## Long Island Wine Region

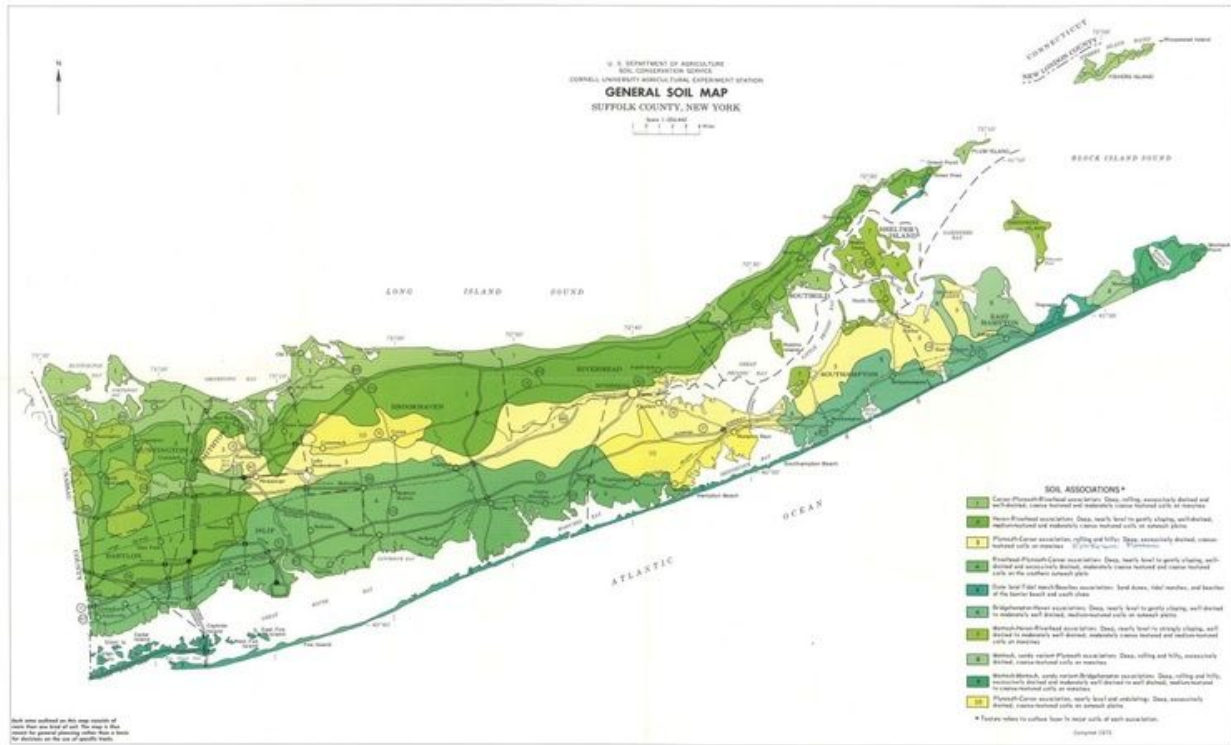
The Long Island wine region contains 3 of New York's 11 American Viticultural Areas (AVAs): The North Fork AVA, The Hamptons AVA, and the broader Long Island AVA. Other New York AVA's include Hudson River Region AVA, Upper Hudson AVA, Finger Lakes AVA, Cayuga Lake AVA, Seneca Lake AVA, Lake Erie AVA, Niagara Escarpment AVA, and Champlain Valley of New York AVA.



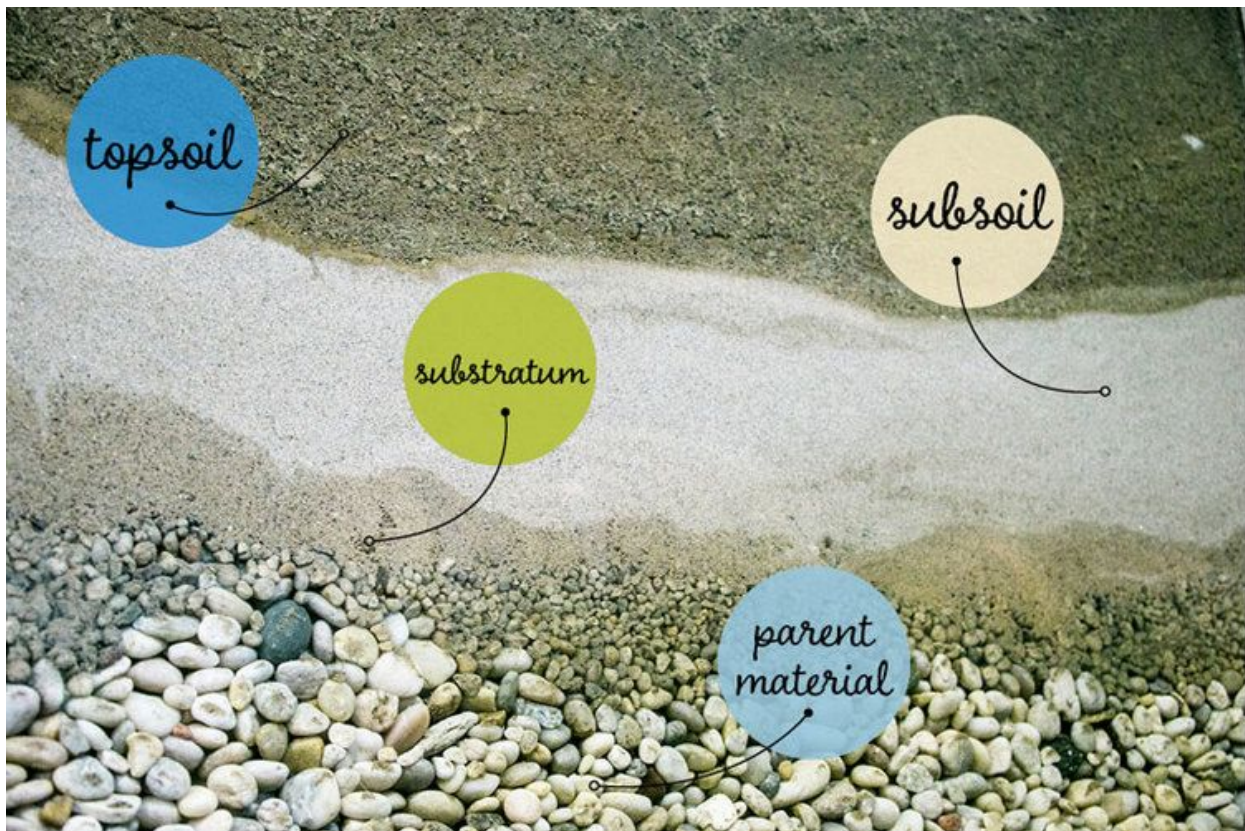
Source: <https://www.newyorkwines.org/wine-regions>

The North and South Forks of Long Island were created by two separate glacial events that occurred around 11,000 years ago. The South Fork was created first by the Ronkonkoma Moraine while the North Fork was formed later by the Roanoke Point Moraine. During this time, the glaciers carried large quantities of rock, much of which was ground into gravel, sand and silt-sized soil particles. When the advancing ice stopped and began to melt, enormous quantities of water ran from the glacier, carrying

and sorting the soil materials. Most of the material was sand and gravel which was deposited on a broad plain in front of the moraine. This area is known as the glacial outwash plain and makes up the majority of the farmland on Long Island.



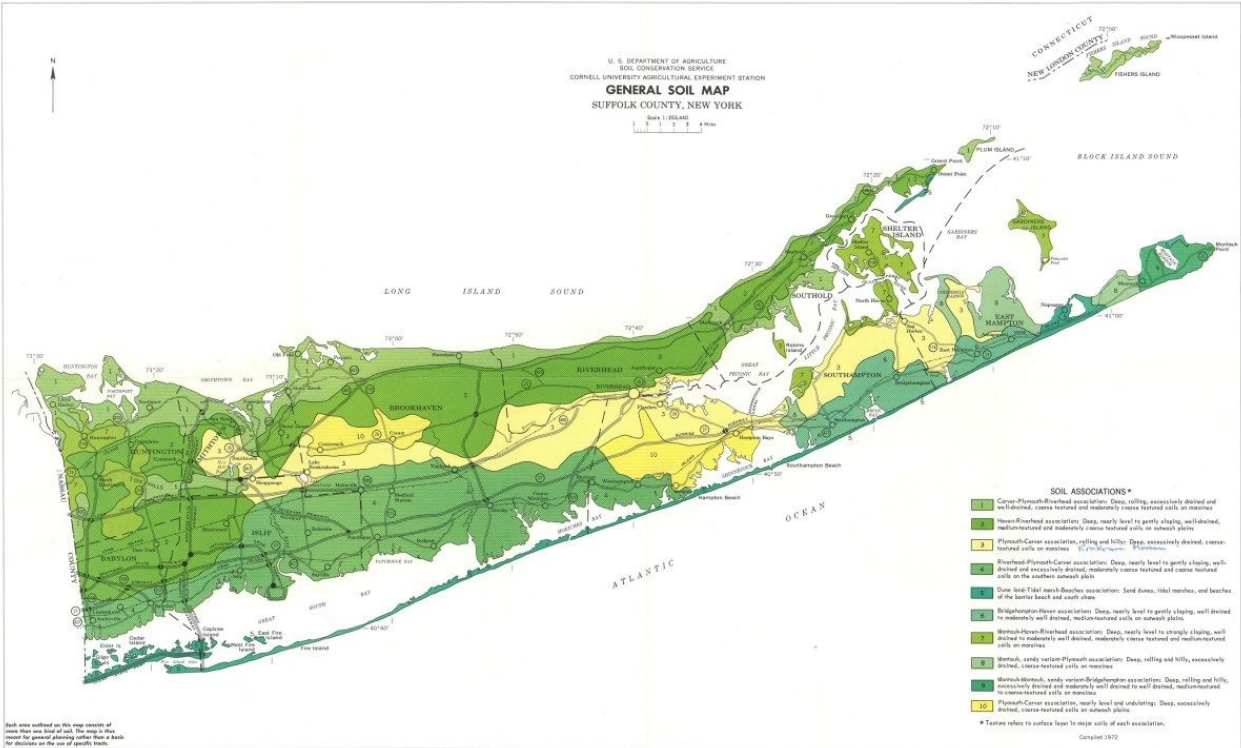
The main North Fork soils are classified into two main soil associations: the Carver-Plymouth-Riverhead association which makes up the coastal perimeter along the Sound and Peconic Bay and the Haven-Riverhead association which makes up the heart of the region. The main South Fork soil is Bridgehampton Silt Loam which is heavier and darker in color than the Haven Loam soils of the North Fork. Both soils rest atop subsoil layers of gravel and sand, resulting in excellent drainage capacity.



Due to the proximity of the Long Island Sound and the Atlantic Ocean, the maritime climate of Long Island is heavily buffered by these large bodies of water. Winters are significantly warmer than expected for the latitude; 15°F to 45°F is a common winter range. Spring and autumn will see much milder temperatures but with greater variation - generally between 35°F to 70°F. Summers are solidly between 70°F to 85°F with temperatures ranging between 5°F to 10°F cooler than in New York City and the adjacent mainlands. Long Island summer temperatures rarely rise above 90°F.

Eastern Long Island receives an average of 40 inches of rainfall annually; typical growing season precipitation is approximately 18 inches from March 1st through October 31st. Winters on Eastern Long Island are comparatively mild with temperatures rarely going below 0°F. There is little snowfall in most years.

The waters surrounding the North Fork help to create a 215 to 233 day growing season - the longest in the Northeast. Due to the coastal effects of the Atlantic, the South Fork growing season averages around 206 to 215 days.



## Long Island Wine

Winegrowing in the Northeast is unique compared to other U.S. regions. Cool ripening conditions create wines of elegant balance, low alcohol and crisp natural acidity. There are 54 wineries on Long Island, with 2,041 acres of vineyards, producing 500,000 cases of wine annually. Long Island wines are well-known for having low levels of alcohol, refreshing acidity and high-toned aromatics. The wines feature elegance over power. The best wines are produced from the traditional Atlantic varieties of Bordeaux – Merlot, Cabernet Franc, Petit Verdot and Sauvignon Blanc.



The Long Island wine harvest typically extends from September 1<sup>st</sup> for sparkling winegrapes to November 1<sup>st</sup> for late-ripening red winegrapes.

Unlike other northeastern wine districts, Long Island is planted exclusively to European (*Vitis vinifera*) grape varieties.

- Chardonnay (450 acres)
- Sauvignon Blanc (100 acres)
- Gewurztraminer (60 acres)
- Other whites (230 acres)
- Merlot (800 acres)
- Cabernet Franc (250 acres)
- Pinot Noir (110 acres)
- Cabernet Sauvignon (150 acres)

Syrah, Albariño, Pinot Gris and Malbec are also grown. Long Island growers are increasingly diversifying their vineyards in order to offer unique and interesting varietal and blended wines.

### Section 3 Quiz:

**The LISW certification program is based on:**

- 1) Demeter Biodynamic Certification
- 2) The National Organic Program
- 3) The VineBalance Workbook**
- 4) Conventional farming techniques

**Which areas are officially recognized AVAs in NYS?**

- 1) Long Island**
- 2) Lower Hudson River
- 3) Central Leatherstocking
- 4) Lake Ontario
- 5) All of the above

**The region of Long Island was created by glaciers**

- 1) True**
- 2) False

**Long Island has what type of climate:**

- 1) Valley
- 2) Maritime**
- 3) Boreal
- 4) Mediterranean
- 5) Continental

**Sustainability in practice leads to:**

- 1) Improving environmental stewardship
- 2) Worker safety
- 3) Economic viability
- 4) Community stabilization
- 5) All of the above**

**LISW certifies vineyards that:**

- 1) Practice conventional farming
- 2) Pass a self-certification exam
- 3) Exist outside of the Long Island region
- 4) Use sustainable techniques**
- 5) All of the above



**Sustainable certification of a vineyard or winery ensures:**

- 1) Only biodynamic grapes are used in wine production
- 2) Third-party verification of sustainable practices**
- 3) Wines must include a sustainable logo on the bottle
- 4) Only organic grapes are used in wine production
- 5) none of the above

**Biodiversity in the vineyard indicates:**

- 1) A vineyard requires more water
- 2) A healthy ecosystem**
- 3) Soil has appropriate nutrients
- 4) A lack of beneficial insects
- 5) All of the above

**The three Long Island American Viticultural Areas are: (choose 3)**

- 1) North Fork of Long Island**
- 2) South Fork of Long Island
- 3) Ronkonkoma Moraine
- 4) East End of Long Island
- 5) The Hamptons, Long Island**
- 6) Long Island**

**Sustainable Winegrowing does the following:**

- 1) Conserves water
- 2) Maintains healthy soils
- 3) Protects air and water quality
- 4) Enhances relations with employees and communities
- 5) All of the above**

## Section 4



### **Western U.S. Sustainable Winegrowing**

All vineyards, wineries and wine regions face the same set of challenges to a different degree. Sustainability goes beyond pest and soil management to encompass water conservation, groundwater protection, carbon emission reduction, fair labor practices, social equity and economic viability. When a process is sustainable, it can be carried out over and over again without negative environmental consequences or impossibly high costs to anyone. Sustainable farming is focused on creating healthy relationships across the supply chain including farmers, laborers, consumers and the community. Some strategies to achieve sustainability include reduced chemical applications, renewable energy and alternative packaging strategies. Distinct from organic and biodynamic farming that focus solely on environmental impact, sustainability also considers climate change, social equity and economic viability.



There is no single agency that certifies vineyards as sustainable. Rather, there are national, state and regional initiatives that set standards based on local conditions. For example, Chile, New Zealand and South Africa have national sustainable winegrowing programs. In the U.S., sustainability programs are either statewide or regional. Many states in the U.S. have access to a sustainable winegrowing certification, including California, New York, Oregon, Washington and Idaho. Some sustainable winegrowing programs focus on environmental performance in the vineyard, while others focus on the overall process, including winery and tasting room operations. The five U.S. sustainable winegrowing programs are Lodi Rules, the California Sustainable Winegrowing Alliance, Sustainability in Practice, Long Island Sustainable Winegrowing and LIVE. Each program is slightly different, but most address priorities that are general to all regions, plus those that are specific to local conditions.

## Lodi Rules

Lodi Rules is the pioneer of sustainability initiatives among all programs. Established in 1992 by the Lodi Winegrape Commission, it was the first sustainable certification for winegrowers in California. This set the standard for all subsequent wine sustainability programs. Lodi Rules has two key components: a list of 101 measurable standards that address environmental health, social equity and economic viability, and a Pesticide Environmental Assessment System (PEAS). PEAS is a model used to quantify the total environmental and human impact of annual pesticide applications, including risks to birds, fish and bees. As of 2018, over 47,000 acres were certified under the program and 30 wineries were producing wines with this seal of sustainability. In order to use the 'Lodi Rules Certified Green' logo on a wine label, at least 85% of the grapes used in the bottle must be certified by Lodi Rules.



For more information: <https://www.lodigrowers.com/certification/>

## California Sustainable Winegrowing Alliance

The California Sustainable Winegrowing Alliance (CSWA), established in 2003 by the Wine Institute and the California Association of Wine Grape Growers, is a not-for-profit whose purpose is to promote the benefits of sustainable winegrowing practices and implement a statewide sustainable winegrowing program. In 2010 they announced a third-party verification and certification for the sustainable winegrowing program. This process based certification includes 227 criteria designed to continually improve the sustainability of vineyards. In order to use the California Certified Sustainable logo on a wine label, 85% or more of the grapes must be from certified vineyards (grapes can be sourced from CSWA, Lodi Rules and/or Sustainability In Practice Certified vineyards) and 100% of the grapes must come from California.



For more information: <https://www.sustainablewinegrowing.org/>

## Sustainability in Practice

The Sustainability in Practice (SIP) certification program was launched in 2008 by the Central Coast Vineyard Team - a not-for-profit dedicated to sustainable winegrowing. It began as a self assessment workbook that transitioned into third-party certification. It was designed for the Central Coast wine region but it is available throughout California. The certification standards include required practices and management enhancements, which are not required but suggested. Also included in the certification is a required farm plan that includes documentation and reporting. In order to use the SIP Certified logo on wine labels, 85% of the grapes must be certified under their program.



For more information: <http://www.sipcertified.org/>

## LIVE

LIVE stands for “Low Impact Viticulture and Enology.” LIVE was founded in 1999 by a small group of Willamette Valley growers. The practices in this program employ integrated science-based, environmentally sensitive production practices that conserve raw materials. This program certifies vineyards in Oregon, Washington and Idaho. LIVE goes beyond most other sustainable certification programs in that it includes the entire operation, including non-grape crops, landscaping, the winery and building operations. In order to use the LIVE Certified Sustainable logo on wine labels, 97% of grapes must be grown according to the LIVE vineyard certification requirements.



For more information: <https://livecertified.org/>

#### Section 4 Quiz:

The first third-party sustainability certification program for winegrowers in the U.S. was:

- 1) LISW
- 2) Demeter
- 3) Lodi Rules**
- 4) LIVE
- 5) CSWA

**LIVE stands for:**

- 1) Long Island Viticulture and Enology
- 2) Low Impact Viticulture and Enology**
- 3) Long Island Vineyard Ecosystems
- 4) Living in Victory Everyday

In order to be 'California Certified Sustainable' wines must be certified by: (Select all that apply)

- 1) Lodi Rules**
- 2) CSWA**
- 3) SIP**
- 4) LIVE
- 5) All of the above

**Sustainability in Practice was established by:**

- 1) Lodi Rules
- 2) Central Coast Vineyard Team**
- 3) California Sustainable Winegrowing Alliance
- 4) Long Island Sustainable Winegrowing
- 5) USDA

## Section 5



### USDA Organic

Organic certification is a third-party certification program that is regulated by the government in the United States. The National Organic Program (NOP), housed within the United States Department of Agriculture (USDA) Agricultural Marketing Service, is responsible for developing national standards for organically-produced agricultural products within the U.S. There is no international organic standard, so the requirements for organic wine labeling differ among countries.

For more information:

<https://www.ams.usda.gov/about-ams/programs-offices/national-organic-program>

Organic viticulture aims to reduce the use of pesticides and fungicides. The USDA Organic program also restricts the use of genetically modified (GMO) crops and irradiated materials, but neither of these are used in winegrowing.

The organic program is distinct from sustainable viticulture in that it does not address water conservation, carbon emissions, nitrogen management or human resources.

The Organic Program has restrictions on what pesticides and fungicides are allowed. However, the number of applications of allowable materials is unlimited. Copper and sulfur are the only chemicals that can be used to control mildew under the organic program. When used in moderation, these chemicals have a low impact. However, they can pose ecological risks when used in heavy quantities.

There are two different categories of wine that can be labeled as organic based on organic farming and vinification methods, specifically with regard to sulfite content. Sulfites are naturally produced by yeast during fermentation, so all wines will have small amounts of sulfite present. A wine made without added sulfites can naturally have 10-20 parts per million (ppm). Sulfites can also be added to wine during the production process as a preserving agent. Added sulfites ensure the health of wine by preventing microbial spoilage (i.e. vinegar bacteria) and by protecting the color and flavor of wine from oxidation and browning.

Conventional wines are allowed to contain up to 350 ppm total added sulfites, however this level is rarely found in commercial wines. In practice, most quality wines - whether conventional, organic, biodynamic or sustainable - contain between 10-40 ppm.

In the U.S., wines labeled as “Organic Wine” must be grown, handled and processed in accordance with uniform national standards and certified under the USDA National Organic Program. Organic Wine must contain a minimum of 100% organically farmed grapes and contain no added sulfites.

Wines that are labeled “Made with Organic Grapes” must contain a minimum of 100% organically grown grapes and can have as much as 100 ppm added sulfite.

In the E.U., sulfite restrictions are more relaxed wine can be labeled organic with up to 150 ppm added sulfite.

For more information:

<https://www.usda.gov/media/blog/2013/01/08/organic-101-organic-wine>



**Section 5 Quiz:**

**Organic vineyards do not use any chemicals for disease control**

- 1) True
- 2) **False**

**Which wine label does not allow for the use of sulfur additions in winemaking**

- 1) LISW certification
- 2) Biodynamic certification
- 3) Made with Organic grapes
- 4) **USDA Organic**
- 5) All of the above

**What materials are allowed in organic viticulture? (select all that apply)**

- 1) **Sulfur**
- 2) **Copper**
- 3) GMO
- 4) Irradiated materials
- 5) **Water**

## Section 6



**Demeter Biodynamic**

Biodynamic certification is a third-party certification that is based on the Demeter Farm Standard and granted through the International Demeter Association. Demeter International is an umbrella organization that provides uniform standards to member affiliates in 50 individual countries where certification is carried out. Biodynamic certification is unique in that there are international standards that biodynamic farms must adhere to, meaning that biodynamic wine in France is produced in the same way as biodynamic wine in the United States.

For more information: <http://www.demeter-usa.org/for-farmers/certification.asp>

Biodynamic farming is a form of organic agriculture first described by Austrian philosopher Rudolf Steiner, who was both a social reformer and an esotericist. While not a farmer himself, Steiner proposed solutions to issues faced by European farmers in a series of lectures in 1924. In his lectures, Steiner emphasized farming practices that work with the natural forces of the ecosystem to engage the spiritual and mystical properties of the universe.

Biodynamics strictly times the operations of the vineyard, such as planting, pruning and harvest, on the movements of the spheres of the universe (the planet and the moon). Other biodynamic cultural practices include stuffing a stags bladder with flowers or a cow horn manure and burying these in the vineyard to make compost. The biodynamic pest management program follows many of the same guidelines as the organic program, including the use of copper and sulfur to control mildew.

What mainly distinguishes biodynamic from organic certification is the required use of nine “preparations” thought to improve soil and increase crop yields.

- These nine specific preparations or “preps” are included in compost, sprayed on plants or added to the soil. These preps are made from herbs and identified numerically (yarrow, chamomile, stinging nettle, dandelion, oak bark and valerian)

flowers - #502, 503, 504, 505, 506, and 507, respectively) as well as minerals and animal manures.

- The use of all preparations is required, however growers can also follow the allowable requirements set by the NOP.

In addition, biodynamic viticulture requires that diverse ecological systems must be present, including native plant life, livestock and a natural source of water. At least 10 percent of a farm's acreage must be devoted to indigenous flora and fauna.

Demeter Certified wines must contain 100% Demeter certified fruit and must be hand harvested, vinified with natural yeast and have a maximum of 150 ppm added sulfite.

## Section 6 Quiz:

**What distinguishes biodynamic from organic certification?**

- 1) The use of sulfur to control mildew
- 2) Prohibition of synthetic fertilizers
- 3) Use of nine specific preparations for disease control**
- 4) Encouraging biodiversity
- 5) All of the above

**What cultural practices are unique to biodynamic viticulture?**

- 1) Stuffing a cow horn with manure
- 2) Harvesting based on the moon cycle
- 3) Nine specific compost preparations
- 4) Stuffing a stag's bladder with flowers
- 5) All of the above**

**How does biodynamic viticulture differ from sustainable viticulture?**

- 1) Biodynamic practices require an ecological farm zone
- 2) Sustainable practices are based on science**
- 3) Biodynamic practices include organic practices
- 4) Sustainable practices use low impact pest management
- 5) All of the above

## **Conclusion**

Sustainable winegrowing is a practical, research-based approach to the complexities and challenges of agriculture that encourages people to care about their environment, their neighbors and their crops using a system of localized best management practices.

Vineyards and wineries in the United States have made a serious commitment to sustainable winegrowing. The concept is in full force on Eastern Long Island where the producers are small, environmentally minded and focused on quality. Sustainable winegrowing conserves water and energy, maintains healthy soils, protects air and water quality, enhances relations with employees and communities, preserves local ecosystems and wildlife habitat, and improves the economic vitality of vineyards and wineries. These practices help Long Island vintners make high quality wines and provide a healthy and beautiful environment for employees, neighbors, and wine country visitors.

Sustainable winegrowing practices protect our soil, air and water – elements that breathe life, and ultimately flavor, into our grapes and wines. Being good stewards of the land and good neighbors are principles our wineries and vineyards live by each and every day. Adopting environmentally and socially responsible practices and making them an integral part of how we do business is our way of ensuring the health of our land, our communities and our industry for generations to come.



Thank you to our partners:



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**Final Test:**

**Agriculture, Forestry and Other Land Use account for what percent of all global GHG emissions:**

- 1) 6%
- 2) 24%**
- 3) 65%
- 4) 14%
- 5) 0%

**Goals of sustainable viticulture include the following: (select all that apply)**

- 1) Conserve water**
- 2) Maintain soil health**
- 3) Maximize yield
- 4) Reduce carbon emissions**
- 5) Reduce the need for farm labor

**Excessive use of nitrogen fertilizers can:**

- 1) Prevent excess vine vigor
- 2) Provide beneficial nutrition to cover crops
- 3) Improve wine quality
- 4) Cause adverse ecological effects**
- 5) Improve groundwater quality

**The combination of vine management techniques, scouting and the use of low impact materials is known as:**

- 1) GDD
- 2) Carbon footprint
- 3) IPM**
- 4) GHG
- 5) All of the above

**Goals of sustainable winemaking include the following: (select all that apply)**

- 1) Water Management**
- 2) Energy Efficiency**
- 3) Natural Yeast
- 4) Waste Management**
- 5) No sulfur added

**The three major principles of sustainability - often referred to as the “E’s” of sustainability - include:**

- 1) Energy efficiency, employee relations, economic profitability
- 2) Emissions reduction, Energy efficiency, ethics
- 3) Ethics, ecology, education
- 4) Environment, economics, ethics**
- 5) Erosion management, environmental awareness, education

**Wineries can increase their commitment to the environment by: (select any and all that apply)**

- 1) Water metering**
- 2) Recycling**
- 3) Using chlorine based cleaners
- 4) Installing energy efficient light bulbs**
- 5) Using natural yeast

**Carbon farming includes: (select all that apply)**

- 1) Farming to reduce carbon emissions
- 2) Composting**
- 3) Farming to increase carbon sequestration**
- 4) Livestock
- 5) Cover crops**

**What uses the most energy in a winery?**

- 1) Lighting
- 2) Refrigeration**
- 3) Laboratory equipment
- 4) Dishwashers
- 5) Pumps

**The LISW certification program is based on:**

- 1) Demeter Biodynamic Certification
- 2) The National Organic Program
- 3) Conventional Farming Techniques
- 4) The VineBalance Workbook**
- 5) Conventional farming techniques



**Which areas are officially recognized AVAs in NYS?**

- 1) **North Fork of Long Island**
- 2) Lower Hudson River
- 3) **Niagara Escarpment**
- 4) **The Finger Lakes**
- 5) The South Fork of Long Island

**What type of soil is found on Long Island? (select all that apply)**

- 1) Ronkonkoma Loam
- 2) Limestone
- 3) **Bridgehampton Silt Loam**
- 4) **Haven Loam**
- 5) Shale

**Long Island has what type of climate:**

- 1) Temperate forest
- 2) **Maritime**
- 3) Boreal
- 4) Mediterranean
- 5) Continental

**LISW sustainable certification of a vineyard ensures:**

- 1) Only biodynamic grapes are used in wine production
- 2) Only natural yeast is used in wine production
- 3) **Third-party verification of sustainable practices**
- 4) Only sustainably farmed grapes are used in wine production
- 5) Third-party verification of organic practices

**Effects of climate change include: (select all that apply)**

- 1) **Warming temperatures**
- 2) **Sea level rise**
- 3) **Extreme weather events**
- 4) **Glacial melt**
- 5) No change

**Agricultural Land in the U.S. is decreasing**

- 1) **True**
- 2) False

**Agricultural land emits \_\_\_ GHG emissions per acre than developed land:**

- 1) 16 times more
- 2) 24 times more
- 3) 24 times fewer
- 4) 30 times fewer
- 5) **66 times fewer**

**The three Long Island American Viticultural Areas are: (choose 3)**

- 1) **The North Fork**
- 2) The South Fork
- 3) Brooklyn
- 4) **The Hamptons**
- 5) **Long Island**

**LIVE stands for:**

- 1) Long Island Viticulture and Enology
- 2) Long Island Vineyard Ecosystems
- 3) Low Impact Vineyard Ecology
- 4) **Low Impact Viticulture and Enology**
- 5) Low Insect Vineyard Ecology

**Organic viticulture does not use chemical intervention:**

- 1) True
- 2) **False**

**The first sustainability certification program for winegrowers in the U.S. was:**

- 1) LISW
- 2) Demeter
- 3) **Lodi Rules**
- 4) LIVE
- 5) CSWA

**Biodynamic viticulture allows the use of organic fungicides for disease management:**

1. **True**
2. False

**How does sustainable viticulture differ from organic viticulture? (select all that apply)**

- 1) Sustainable viticulture limits nitrogen additions**
- 2) Sustainable viticulture considers carbon emissions**
- 3) Organic viticulture uses copper and sulfur to control mildew
- 4) Organic viticulture limits the number of applications of allowed materials
- 5) Sustainable viticulture considers social equity**

**How does sustainable viticulture differ from biodynamic viticulture?**

- 1) Sustainable viticulture is based on science**
- 2) Biodynamic viticulture used organic fungicides
- 3) Sustainable viticulture limits nitrogen additions**
- 4) Biodynamic viticulture encourages biodiversity
- 5) Biodynamic viticulture involves composting

**Social equity includes: (select all that apply)**

- 1) Worker safety**
- 2) Community engagement**
- 3) Employee education**
- 4) Gender discrimination
- 5) Diversity**