

GRAPES WITH WRATH—HOW SUSTAINABLE VITICULTURE CAN SAVE WINEMAKING FOR GENERATIONS TO COME

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“Wine was one of the first signs of civilization to appear in the life of human beings . . . It is in the Bible, it is in Homer, it shines through all the pages of history, participating in the destiny of ingenious men.” – Georges Duhamel¹

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1. DON KLADSTRUP & PETIE KLADSTRUP WITH J. KIM MUNHOLLAND, *WINE & WAR* 238 (2001).

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I. PREFACE

Sustainable viticulture has arguably been around longer than winemaking itself. Today, sustainable grape growing is a buzzword that many vineyards use to promote themselves to winemakers and consumers alike. However, because sustainable viticulture doesn't have a widely accepted definition, many interpretations have spread throughout the industry that have left confusion about what exactly the practice entails. With a centralized definition in place from a government entity with the ability to enforce regulations, sustainable viticulture, and sustainable agriculture in general, can become the norm, assist with stabilizing climate change, and continue the art of winemaking for generations to come.

II. INTRODUCTION TO THE HISTORY OF VITICULTURE

A. *The Beginnings of Viticulture*

Throughout history, viticulture² and winemaking have been an integral part in the evolution of society. It has been projected that grape cultivation for fermented beverages began shortly after the cultivation of wheat in China, between 8000 to 6000 BCE.³ By 4000 BCE, the cultivation of domesticated grapes spread from the Fertile Crescent to Egypt and modern-day Turkey.⁴ When this cultivation began, many tried keeping and storing the grapes and juice in clay amphoras, but found the juice would turn into a euphoric substance.⁵ Of course, we now know that a fermentation process had begun in those amphoras as a result of the natural sugars found in the juice and the natural yeast found on the grape skins.⁶ Since then, cultivating grapes for the purpose of making wine spread around the world; reaching Iran around 5000 BCE and arriving in Europe by way of Sicily in 4000

2. See KAREN MACNEIL, *THE WINE BIBLE* 17–36 (Suzanne Rafer ed., 2d ed. 2015) (Viticulture is the science of grape growing. In the context of wine grapes, primarily those of the *Vitis Vinifera* family, areas such as climate, environmental stressors, soil types, clones and genetic variations, rootstock, pruning, trellising, spacing, picking, and yield are all encompassed within this topic.).

3. Goran Blazeski, *The Oldest Winery in the World is 6100 Years Old & It's Located in a Cave in Armenia*, *THE VINTAGE NEWS* (Oct. 11, 2016), <https://www.thevintage-news.com/2016/10/11/the-oldest-winery-in-the-world-is-6100-years-old-its-located-in-a-cave-in-armenia/> [<https://perma.cc/CAU9-24GH>]; Tom Oder, *How Grapes Changed the World*, *TREEHUGGER* (Apr. 18, 2022), <https://www.treehugger.com/how-grapes-changed-the-world-4863659> [<https://perma.cc/9JDA-ZAQQ>].

4. Oder, *supra* note 3.

5. TOM STANDAGE, *A HISTORY OF THE WORLD IN 6 GLASSES* 47 (2006).

6. *Id.*

BCE.⁷

In the early days of cultivation, wine was a source of status.⁸ If an individual was able to afford wine for themselves and guests, they would be considered a part of the upper echelon of society.⁹ But with the spread of wine westward, the ability to cultivate wine grapes became easier and more individuals of all classes were able to have access to wine.¹⁰

B. The Spread of Viticulture to Europe

Fast forward to the fifth century BCE, Greece had been steadily exporting its wine to France and other areas of the Mediterranean.¹¹ In France, what began as the importing of wine gradually transformed into a love affair between the French and their own wine.¹² Soon thereafter, the region's incorporation into the Roman empire helped to establish vineyards throughout Southern France.¹³

When the Roman Empire collapsed in the fifth century CE, vineyard control fell to the Catholic Church.¹⁴ Under monastic order, various grape varietals were planted across the French countryside and vineyards flourished for hundreds of years.¹⁵ Some believe the careful attention monks gave to their vineyards is the reason for France's current obsession with particularity in their vineyards.¹⁶ Today's French wine law has provided a name for the external factors that pertain to this particularity: *terroir*.¹⁷ *Terroir* is a term for "the sum entity and effect . . . of every environmental factor on a given piece of ground."¹⁸ Under current French wine law, *terroir* includes "a vineyard's soil, slope, orientation to the sun, and elevation, plus every nuance of climate."¹⁹ *Terroir* is an incredibly complex topic and continues to be a leading discussion point amongst French viticulturists

7. Josephine Platt, *The Oldest Vineyard in the World is 6,100 Years Old*, CULTURE TRIP (Apr. 23, 2020), <https://theculturetrip.com/europe/armenia/articles/the-oldest-vineyard-in-the-world-is-6100-years-old/> [<https://perma.cc/YKL8-4XWA>].

8. See generally STANDAGE, *supra* note 5.

9. *Id.*

10. *Id.* at 49.

11. *Id.* at 67.

12. See MACNEIL, *supra* note **Error! Bookmark not defined.**, at 138.

13. *Id.*

14. *Id.*

15. *Id.*

16. See *id.*

17. *Id.* at 954 ("Each vineyard is said to have its own *terroir*.").

18. *Id.*

19. *Id.*

today.²⁰ The early monk's obsession with their own vineyards, a portion of which we now label with *terroir*, may be why French viticulturists today are intimate with their own vines.²¹

During the French Revolution, the church was forced to give up ownership of its vineyards and was replaced by local peasants who began cultivating the land.²² A little more than half a century later, disaster struck when vineyards began to be plagued with phylloxera.²³ Luckily, the spirit of grape growing did not die with the vines and France's obsession with winemaking is still alive and well.

Today, France is considered to be the leading force of the wine industry, and for good reason.²⁴ The industry is incredibly important for the French economy, bringing in €8.24 billion in exports in 2017 alone.²⁵ The industry generates economic growth, employment in both urban and rural areas, and contributes a critical amount of local tax revenues.²⁶ The French have introduced the idea of developing detailed governmental regulations, defining geographical territories²⁷ by vineyard location, and a certain '*je ne sais quoi*' that no other country has been able to replicate.²⁸

C. A History of America's Wine Scene

Wine in the United States may not have the historic culture of winemaking in comparison to that of the Old World,²⁹ but it is still just as important to the

20. *See id.*

21. *See id.* at 137–138.

22. *Id.* at 139.

23. *Id.* at 139 (The Phylloxera Outbreak occurred sometime between 1860 and 1866. The phylloxera insect arrived from the Americas and destroyed the root systems of *Vitis vinifera* plants. Luckily, a solution was finally found: *Vitis vinifera* fruit was grafted onto native American rootstock because the native American rootstock was found to be immune to the pests.).

24. *See id.* at 137.

25. THE PALGRAVE HANDBOOK OF WINE ECONOMICS INDUSTRY 17 (Adeline Alonso Ugaglia et al. eds., 2019).

26. *Id.* at 18.

27. MACNEIL, *supra* note **Error! Bookmark not defined.**, at 137, 146 (AOC or Appellation d'Origine Contrôlée: a detailed system of regulations designating a geographic origin. Wines from France are typically known by their AOC not varietal. For example, by purchasing a bottle of red wine with a Bordeaux AOC, you would know that bottle contains a blend of one or more of the following grapes: Merlot, Cabernet Sauvignon, Cabernet Franc, Malbec, Carmenère, and Petit Verdot.).

28. *See id.* at 137–142.

29. *Id.* at 942 (Old World: "As applied to wine, Old World refers to those countries where wine first flourished, namely Western or Central European countries and others ringing

current global wine industry and the United States' economy. Early on in America's history, Thomas Jefferson—President, Francophile, and wine lover—attempted to create a viticultural scene in Virginia.³⁰ He believed the Virginian soil and climate would be excellent and attempted to use the grapes that grew wild in the United States, but this wine fell short of the European standards.³¹ Many immigrants brought cuttings³² from Europe, but these vines repeatedly died due to disease and pests that native American vines were immune to.³³ Most notably, these native vines had a tolerance to phylloxera that helped save the global viticulture scene during a mass outbreak that began in the 1860s.³⁴ For a century, viticulturists and scientists worked together to create hybrids of French cuttings and by the time of the Civil War, the East Coast had what they believed to be a well-established vineyard culture filled with native grapes and French-American hybrids.³⁵

Meanwhile, the cultivation of wine grapes and the making of wine in the West was already well underway. In 1629, two Spanish clergymen successfully set up a vineyard utilizing *Vitis Vinifera* cuttings along the present-day New Mexico/Texas border.³⁶ The wine made from these grapes was primarily for ceremonial purposes within missions.³⁷ These missions began popping up all along present-day California and the Baja Peninsula throughout the 1700s.³⁸ They laid the groundwork for what would become the largest wine producing areas in the United States.

In 1849, gold was found in the western part of the United States, and European settlers, like many Americans, came in droves to strike it rich during the gold rush.³⁹ When the mines dried up and many of these settlers didn't have the outcome they had hoped for, they turned to two occupations that were well-engrained:

the Mediterranean basin and in the Near East.” Essentially, these are countries like France, Italy, Spain, and Greece. In contrast, the New World is a wine-producing country that is anywhere outside of this geographical location.).

30. *Id.* at 666–67.

31. *Id.*

32. *Id.* at 937 (“Cutting: a segment of a dormant cane . . . that is cut off a growing vine and used to propagate a new plant through grafting or direct planting.”).

33. *Id.* at 30, 667.

34. *Id.* at 30.

35. *Id.* at 667–68.

36. *Id.* at 668–69 (The grape planted was called listán prieto. This is a traditional Spanish varietal and has been dated to have been cultivated in Mexico for at least a century prior to moving North to the modern-day area of the New Mexico/Texas border.).

37. *Id.* at 669.

38. *Id.*

39. *Id.*

viticulture and agriculture.⁴⁰ In fact, one of these European settlers went on to establish the oldest operating winery in the United States.⁴¹ By the 1880s, Northern California was experiencing a viticultural boom and the thriving wine industry promised a stunning future for American wine that was sure to parallel the industries found in Europe.⁴² Both business leaders and the state government understood that California had the potential to become a formidable force in the wine world.⁴³ In fact, the California Legislature mandated that the California Regents provide instruction and research of viticulture and enology.⁴⁴ Unfortunately, traumatic events over the next 60 years proved to devastate the progress these European settlers worked so hard for.⁴⁵

Thankfully, a second boom hit. In the late 1960s and early 1970s, wealthy, well-educated individuals came to northern California hoping to create a simple life on a vineyard.⁴⁶ Due to the financial support of these newcomers, the University of California began an enology and viticulture school in the heart of the California wine country and assisted in making California wine become the modern quality standard for the American wine scene.⁴⁷

Today, every state has vineyards and produces wine, but the primary contributors are California, Oregon, and Washington.⁴⁸ In 2022, the wine industry's economic impact on the United States economy totaled \$276.06 billion.⁴⁹ Nearly \$15.5 billion has been paid in federal taxes while almost \$15.4 billion has been paid in separate state taxes.⁵⁰ Just under 119,520 acres of vines have been planted, and adventurous viticulturists are looking for new and diverse areas to set up

40. *Id.* at 670.

41. *Id.* (Agoston Haraszthy founded Buena Vista winery in 1857 in present day Sonoma; this is the oldest in Sonoma and the United States. Haraszthy was labeled the "Father of California Wine" due to his adamant promotion of growing wine grapes in California. He went as far as importing approximately 165 different varietals within his first year.).

42. *Id.*

43. *History*, UC DAVIS VITICULTURE & ENOLOGY (Jan. 19, 2023, 11:25 AM), <https://wineserver.ucdavis.edu/about/history> [<https://perma.cc/6W8Z-FHST>].

44. *Id.*

45. MACNEIL, *supra* note **Error! Bookmark not defined.**, at 670 (These events included the phylloxera outbreak, Prohibition, World War I, the Great Depression, and World War II.).

46. *Id.*

47. *Id.*

48. *Id.* at 666; Oder, *supra* note 3.

49. *Wine Industry Economic Impact Reports*, NAT'L ASS'N AM. WINERIES (Jan. 19, 2023, 11:25 AM), <https://wineamerica.org/impact/> [<https://perma.cc/PCE3-SLEM>].

50. *Id.*

viticultural areas.⁵¹

Each step along the way has led viticulturists to where they are now: from storied family vineyards in France to new experimental vines in California.

III. INTRODUCTION TO SUSTAINABLE VITICULTURE

In order for viticulture, and agriculture in general, to continue there will need to be major advancements toward sustainability.⁵² Growing concerns of climate change and over pollution have caused government officials and consumers to take notice. In France, where regulations and tradition reign supreme, rising temperatures have caused the National Wine Authority—known as Institut National des Appellations d’Origine (INAO)—to allow viticultural scientists to experiment with several different grape varieties to determine if a “warm weather” varietal can thrive in a French *terroir*.⁵³

Agriculture is a leading source of pollution for many countries around the world: pesticides, fertilizers, and other agriculture chemicals are causing drastic effects on people, wildlife, waterways, and the environment.⁵⁴ Agricultural expansion has led to deforestation.⁵⁵ Vast expansion coupled with unsustainable farming practices is leading to extreme erosion and the possibility of farmland no longer being available for cultivation.⁵⁶ Additionally, agricultural practices contribute greatly to the buildup of greenhouse gasses in the atmosphere.⁵⁷ Something needs to be done to preserve the future of agriculture, viticulture, and the Earth as a whole. In 1987, the United Nations described the ideals of the sustainable development that we need now: development that “meet[s] the needs of the present without compromising the ability of future generations to meet their own needs”⁵⁸

51. *Id.*

52. See generally *Sustainable Agriculture*, WORLD WILDLIFE FUND (Jan. 19, 2023, 11:26 AM), <https://www.worldwildlife.org/industries/sustainable-agriculture> [<https://perma.cc/4BHH-QSZM>] (explaining how unsustainable practices can have serious impacts on the environment and that sustainable practices are necessary).

53. Méliissa Godin, ‘The Taste of Bordeaux is Going to Change.’ *Under Threat from Climate Change and Coronavirus, French Winemakers Try Experimenting*, TIME (May 22, 2020, 6:36 AM), <https://time.com/5777459/france-wine-climate-change/> [<https://perma.cc/TJ3W-5UZC>] (“But as climate change has threatened French wine production, the appellation authorities have permitted the addition of seven more grape varieties as of last July in an effort to find alternative wines that can thrive in a warmer France.”).

54. *Sustainable Agriculture*, *supra* note 52.

55. *Id.*

56. *Id.*

57. *Id.*

58. U.N. GAOR, 42d Sess., 96th plen. mtg. at 154, U.N. Doc. 42/187 (Dec. 11, 1987).

Some winegrowing nations may have a few solutions. France has been strictly regulating winegrowing and viticultural techniques since the 1930s.⁵⁹ They have also begun to allow for the experimentation of varieties not traditionally allowed in France.⁶⁰ The European Union has been implementing different sustainability goals in regard to the use of pesticides for its members for quite some time, with the most comprehensive regulations coming from a directive in 2009.⁶¹ Additionally, one of the youngest winegrowing regions, New Zealand, may have the most extensive set of sustainability regulations, though those regulations are optional (but highly encouraged by environmental groups, the industry, the government, the public, and consumers).⁶²

The American viticulture industry may also have a few answers: pressure from top players and sustainability guidance from third party regulators. Although there lacks a common definition of sustainable viticulture, the practice has been rising in popularity for both wine companies and consumers.⁶³ Currently, broad regulations are given by the federal government through the Environmental Protection Agency (EPA), USDA, and the United States Food and Drug Administration (FDA).⁶⁴ Some of the most influential practices have been education to implement Integrated Pest Management Systems (IPMs)⁶⁵ and the introduction and promotion of the ‘Certified Organic’ program from the USDA.⁶⁶ There are additional policy groups pushing for change on the state level that are more specific to

59. MACNEIL, *supra* note **Error! Bookmark not defined.**, at 137.

60. Eleanor Beardsley, *Climate Change is Disrupting Centuries-Old Methods of Wine-making in France*, NPR (Nov. 5, 2019, 7:00 AM), <https://www.npr.org/sections/the-salt/2019/11/05/773097167/climate-change-is-disrupting-centuries-old-methods-of-winemaking-in-france> [<https://perma.cc/A8W3-443J>].

61. *See generally* Council Directive 2009/128, 2009 O.J. (L 309/71) 1 (EC).

62. *See generally* *Sustainable Winegrowing New Zealand Standards*, N.Z. WINE (Jan. 19, 2023, 1:08 PM), <https://www.nzwine.com/media/6650/sustainable-winegrowing-new-zealand-standards.pdf> [<https://perma.cc/TZ7S-GE4B>].

63. Antonietta Baiano, *An Overview on Sustainability in the Wine Production Chain*, BEVERAGES, Mar. 17, 2021, at 1.

64. *Federal Pesticide Regulation*, NAT’L PESTICIDE INFO. CTR. (Sept. 22, 2020), <http://npic.orst.edu/reg/regfed.html> [<https://perma.cc/HYJ9-XZSV>]; *see generally* 27 C.F.R. §§ 24.1–24.332 (2021) (The Alcohol and Tobacco Tax Trade Bureau also present controlling regulations for the wine industry, but those regulations are primarily for winemaking, labeling, and selling regulations, not the farming and growing of wine grapes.).

65. *See generally* *Integrated Pest Management*, U.S. DEPT. OF AGRIC. (Jan. 19, 2023, 11:36 AM), <https://www.usda.gov/oce/pest/integrated-pest-management> [<https://perma.cc/B8FS-XP5D>].

66. *See generally* 7 C.F.R. §§ 205.1–205.699 (2021).

certain areas, namely in California.⁶⁷ Some of these regulations are not even being enforced by the government, but instead by independent boards, like the LODI RULES.⁶⁸ But, there has to be something more viticulturists can do to help sustain wine growing for future generations.

A. Sustainable Viticulture Regulations Around the World

1. French Viticulture and Wine Regulations

As discussed in the previous sections, the French have had a heavily regulated wine industry for many decades.⁶⁹ This has made experimentation for French winegrowers incredibly difficult. However, with climate change forcing agriculture to adapt faster than ever before, more experimentation has become necessary for the viticultural community.⁷⁰

In Bordeaux specifically, the INAO allows for only six varietals to be grown in the region and make up a bottle of red Bordeaux.⁷¹ Many experts have predicted that these varietals will not be able to thrive or survive in Bordeaux as the region continues to experience more extreme weather patterns.⁷² Some winegrowers in the region have resorted to changing their own practices within the vineyard to be able to continue to have a harvest.⁷³ But, even with changing growing and harvesting procedures, more guidance has to be implemented on a national level in order for the industry to survive the changes it faces.⁷⁴ Some wine growers have tried to apply for allowances to irrigate, but were turned down.⁷⁵ This led to historical vines dying off due to drought.⁷⁶ Although irrigation would have saved the vines, many experts have noted that irrigation is not a sustainable practice and would not be a successful, long-term solution to the climate change issues the French

67. See *Certified California Sustainable Winegrowing*, WINE INST. (Feb. 1, 2023, 3:52 PM), <https://wineinstitute.org/our-work/responsibility/sustainability/certified/> [<https://perma.cc/9W92-TMA3>].

68. See *About LODI RULES*, LODI RULES (Feb. 1, 2023, 3:53 PM), <https://www.lodirules.org/About> [<https://perma.cc/K755-BTBB>].

69. MACNEIL, *supra* note **Error! Bookmark not defined.**, at 137.

70. Beardsley, *supra* note 60.

71. MACNEIL, *supra* note **Error! Bookmark not defined.**, at 146.

72. Beardsley, *supra* note 60.

73. *Id.*

74. *Id.*

75. *Id.* (In the United States, irrigation is primarily acceptable, but in France and other EU nations, irrigation lacks the necessary “authenticity” that is required in grape growing.).

76. *Id.*

winegrowing community faces.⁷⁷ Viticulturists have pushed the government for guidance on these issues, but have continually been dismissed due to the deep traditions within the industry.⁷⁸

2. New Zealand's Sustainable Viticulture Program

Currently, New Zealand has a program to improve and adhere to international sustainability practices.⁷⁹ This program was originally introduced, and continues, as an election-only program.⁸⁰ The program was so popular after its introduction to grape growers that a secondary program was offered for wineries as well.⁸¹ There are several areas with which vineyards have to comply: soil, water, pest and disease, waste, people, and climate change.⁸² All of these compliance areas have been re-engineered to adhere to the United Nations Sustainable Development Goals, that were developed in 2015, at the forefront of the continually thriving wine scene in New Zealand.⁸³ The focus area of climate change has been one of the most recent adoptions.⁸⁴ This adoption was primarily made to meet the national standards of reducing industrial greenhouse gas emissions set forth in The Climate Change Response Act 2002.⁸⁵ This Act was amended in 2019 to further New Zealand's goals for net zero greenhouse gas emissions and to ratify the country's goal under the Paris Agreement.⁸⁶

When a vineyard adopts these practices, there are two categories in which

77. *Id.* (Grape vines around the Mediterranean have been noted to adapt to their surroundings quickly, and the nature of grapevines allow them to be non-dependent on water, but due to rapid climate changes, the vines have not been able to naturally adapt and keep up with the changes.).

78. *Id.*

79. *See Sustainable Winegrowing New Zealand Standards*, *supra* note 62, at 1.

80. *Id.*

81. *Id.*

82. *Id.*

83. N.Z. WINE, *NEW ZEALAND WINE: A COMPREHENSIVE GUIDE TO THE REGIONS AND VARIETIES* 8 (2020), <https://www.nzwine.com/media/19321/nzwgeneric-text-book2021web.pdf> [<https://perma.cc/2FZY-39LU>] (“The UN SDGs are the blueprint to achieve a better and more sustainable future for all, as they seek to mobilize global efforts around a common set of targets.”).

84. *See Sustainable Winegrowing New Zealand Standards*, *supra* note 62, at 1–2.

85. *See* N.Z. WINE, *supra* note 83; *see generally* Climate Change Response Act, 2002 (N.Z.).

86. *Climate Change Response (Zero Carbon) Amendment Act 2019*, MINISTRY FOR THE ENV'T (Apr. 5, 2021), <https://environment.govt.nz/acts-and-regulations/acts/climate-change-response-amendment-act-2019/#what-the-amendment-act-does> [<https://perma.cc/W8EP-8YM6>].

the vineyard is graded on: compulsory and voluntary.⁸⁷ A compulsory category measures the bare minimum of what is required to keep the sustainable vineyard designation.⁸⁸ A voluntary measure is something vineyards can voluntarily sign up for; this would allow for additional data being provided and more informed decisions being made on behalf of the vineyard.⁸⁹ Both self-reporting and on-site visits take place under the program.⁹⁰ Vineyards are required to keep a record of the amount and types of pesticides used and file it along with a self-report each year.⁹¹ Compliance with this step is one of the most important parts of the program, as this is what allows the certifying company to know that the vineyard is still in compliance.⁹² This program began in 1995 and was one of the first to be recognized on an international level as a sustainable option for viticulture.⁹³ Today, 96% of the vineyards in New Zealand operate under these sustainability standards.⁹⁴

B. Sustainable Viticulture Regulations in the United States

As mentioned above, viticulture in the United States takes a slightly different approach. There is rarely an agreed upon answer as to what makes a vineyard “sustainable” in the United States. The possibility of adding a “Certified Sustainable” certificate, similar to that of the “Certified Organic” certificate, may prove to be useful for vinticulturists and the continuing push by consumers to have sustainable options.

For decades, wine culture in California has been an integral part of the state’s economy and culture.⁹⁵ For example, California produces 90% of the wine supply in the United States.⁹⁶ Nearly twenty million tourists flock to the state each year to participate in some form of viticulture or wine tourism.⁹⁷ The economic impact of just the California wine industry each year is \$88.12 billion.⁹⁸ Grapes in California are cultivated on lands that are incredibly sensitive and are often adjacent to areas

87. *Sustainable Winegrowing New Zealand Standards*, *supra* note 62, at 1.

88. *Id.*

89. *Id.*

90. *Id.* at 2.

91. *Id.*

92. *Id.*

93. *Id.*

94. *Id.*

95. See Karen Ross & Deborah Golino, *Wine Grapes Go Green: The Sustainable Viticulture Story*, 62(4) CAL. AGRIC. 125, 125 (2008).

96. *Id.*

97. *Id.*

98. *Wine Industry Economic Impact Reports*, *supra* note 49.

with diverse wildlife.⁹⁹ Additionally, setting up vineyards is a huge investment on the part of the producers.¹⁰⁰ Overall, a farmer wanting to set up a small vineyard would need a capital investment of \$1.5 million for just the first five years; further, this is only for a conventional style vineyard, not a vineyard focused on sustainable farming techniques.¹⁰¹

Due to wine being an integral part of California culture, viticulturists have long felt the need to keep the industry going for generations to come.¹⁰² For example, in the early 1990s viticulturists began banding together to adopt environmentally friendly farming techniques.¹⁰³ The industry in California saw the need to continue the story of California wine.¹⁰⁴ These viticulturists wanted to not only implement a plan for sustaining their livelihood, but a plan that would sustain “California[’s] water, soil, wildlife, conditions for workers, and community-farmer relationships.”¹⁰⁵

1. Pressure from Top Players

Some of the biggest funders of these changes came from top wine houses, like E. & J. Gallo.¹⁰⁶ However, the E. & J. Gallo sustainability program really dates back to the 1930s when the founders of the company began the “50/50 Give Back” plan.¹⁰⁷ Ernest and Julio Gallo saw the beauty in California’s land and wanted to

99. Ross & Golino, *supra* note 95.

100. Caroline Goldstein, *How to Start a Winery: 5 Steps to Starting a Wine Business*, NERDWALLET (Oct. 22, 2020), <https://www.nerdwallet.com/article/small-business/how-to-start-a-wine-business> [<https://perma.cc/MX7U-AZTP>].

101. *Id.* (For an acre of land in Northern California, it costs approximately \$11,000-\$30,000. Installing a vineyard can cost anywhere from \$35,000-\$45,000. The annual upkeep for the first three years can cost anywhere from \$15,000-\$20,000. It is a large investment to begin even a small vineyard, so there should be incentives for farmers that want to invest in sustainable practices.).

102. *See generally* Ross & Golino, *supra* note 95.

103. *Id.*

104. *See id.*

105. *Id.*

106. *See Corporate Social Responsibility Brochure*, E. & J. GALLO WINERY 2 (2020), https://www.gallo.com/files/Corporate_Social_Responsibility_Brochure_2020.pdf [<https://perma.cc/2CTU-9WUK>] (“Our commitment to sustainability began with my grandfather Ernest and great-uncle Julio and continues today. At Gallo, we make long term business decisions considering the social, environmental, and economic impacts, reflecting a deep commitment to the land, to our employees, and to the communities where we do business. To us, sustainability is about continuous improvement and being stewards for future generations.”).

107. *Responsibility*, E. & J. GALLO WINERY (Jan. 19, 2023, 11:38 AM), <https://www.gallo.com/responsibility> [<https://perma.cc/Q66T-Q22U>].

keep it that way.¹⁰⁸ Because of this, every acre of vines that was planted by the company would in turn equal an acre being set aside for wildlife habitat in the North Coast.¹⁰⁹ Ever since, the big vineyards of California and bigger vineyards across the country have been chasing one another to show that they are “environmentally conscious.”¹¹⁰ But this has shut out the option for smaller vineyards to comply with environmentally conscious options due to the amount of capital that is necessary to adopt these practices.¹¹¹ Additionally, many of these large wine houses have the capital to participate in mass production of their wines, which include the industrial processes of utilizing chemicals and machinery.¹¹²

2. Regenerative Agriculture

Some mid-tier farmers have fought for change on their own, not necessarily caring about their bottom line. In Oregon, the process of winemaking is similar to that in France; Oregon winemakers and viticulturists love the character *terroir* can bring to a wine.¹¹³ Many of these viticulturists have embraced the idea of regenerative agriculture.¹¹⁴ Regenerative agriculture is “a way of farming that emphasizes rebuilding, restoring, and supporting the organic matter that composes healthy soils.”¹¹⁵ This type of grape growing also allows viticulturists to take a hard look at climate change and try to do something about it.¹¹⁶

Regenerative agriculture isn’t just happening in Oregon either; it has been working its way down the coast to different wine growing areas in California, like Sonoma County.¹¹⁷ The farmers that have embraced this way of viticulture have found the end product wine to be much more expressive.¹¹⁸ The main goal for these viticulturists is to prevent desertification¹¹⁹ and to create healthy soils for

108. *See id.*

109. *Id.*

110. Eric Asimov, *In Oregon Wine Country, One Farmer’s Battle to Save the Soil*, THE N.Y. TIMES (Oct. 17, 2019), <https://www.nytimes.com/2019/10/17/dining/drinks/climate-change-regenerative-agriculture-wine.html> [<https://perma.cc/CR5N-3PUL>].

111. *See id.*

112. *See id.*

113. *See* MACNEIL, *supra* note 2, at 137.

114. Asimov, *supra* note 110.

115. *Id.*

116. *Id.*

117. *See* Amy Tara Koch, *In Sonoma County, ‘Regenerative Agriculture’ Is the Next Big Thing*, THE N.Y. TIMES (Oct. 19, 2021), <https://www.nytimes.com/2021/10/19/travel/sonoma-county-regenerative-agriculture.html> [<https://perma.cc/HK37-2BZ3>].

118. Asimov, *supra* note 110.

119. *See generally* U.N. Convention to Combat Desertification in those Countries

generations to come.¹²⁰

However, some seem to be hesitant to make these changes, primarily due to giving up habits and work that many viticulturists have always known.¹²¹ But given the pressing manner of climate change, and the possibility of not having a wine growing industry to pass down, there should be something in between industrial farming and regenerative agriculture that would allow viticulturists to begin working toward sustainability.

3. Current USDA Programs

In 1990, the USDA recognized that many consumers were caring more often about what was going into their bodies, which helped to begin the USDA Certified Organic program.¹²² To be Certified Organic, a vineyard must go through a rigorous process to gain the certification through the USDA.¹²³ Viticulturists that utilize this program have implemented an organic production system¹²⁴ which allows them to focus on growing grapes through an organic process.¹²⁵ By complying with these processes, the viticulturists are also able to tell organic winemakers that the end product will be organic and can market it as such.¹²⁶ In addition to complying with the USDA program, winegrowers and makers must also comply with the Alcohol and Tobacco Trade and Tax Bureau for a number of regulations that are specific to organic alcohols.¹²⁷ Further, wines that contain only organically grown

Experiencing Serious Drought and/or Desertification, Particularly in Africa art. 1(a), Oct. 14, 1994, 1954 U.N.T.S. 3 (Desertification has been defined by the United Nations as “land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climactic variations and human activity.” Desertification has long been a concern of the global community.).

120. Asimov, *supra* note 110.

121. *Id.*

122. See CATHERINE GREENE & AMY KREMEN., U.S. DEP’T AGRIC. ECON. RSCH. SERV., U.S. ORGANIC FARMING IN 2000-2001, at 1 (2003), https://www.ers.usda.gov/webdocs/publications/42476/17413_aib780_1_.pdf?v=5700 [<https://perma.cc/XSH9-T2Z5>] (showing that Organic production regulation began with the passing of the Organic Foods Production Act in 1990).

123. See generally 7 C.F.R. § 205 (2015).

124. § 205.2 (“A production system that is managed in accordance with the Act and regulations in this part to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity.”).

125. See *id.*

126. § 205.

127. *Organic Wine: Oversight, Labeling + Trade*, U.S. DEP’T AGRIC., AGRIC. MKTG. SERV. 1 (Dec. 2012), <https://www.ams.usda.gov/sites/default/files/media/Organic%20Wine%20-%20Oversight-Labeling-Trade.pdf> [<https://perma.cc/Z5LQ-E6SY>].

grapes can use the label “Made with Organic Grapes.”¹²⁸ A wine bearing such a statement includes organic grapes made into wine in a process that does not follow the National Organic Program but can still be labeled as such.¹²⁹

However, becoming USDA Certified Organic is a time-consuming and expensive process.¹³⁰ Many certifications take three years to acquire if a farm is transitioning from conventional farming practices to organic farming practices and require yearly inspections to maintain them.¹³¹ Additionally, the USDA projects the cost for certification to be “a few hundred to several thousand dollars.”¹³² This constant oversight coupled with an uncertain cost, on top of an already steep entry level investment to begin a vineyard, has caused some viticulturists to be reluctant to become certified.¹³³ Additionally, many wine growers are reluctant to give up the use of pesticides due to poor soil conditions, unpredictable climate, and pest patterns.¹³⁴ But due to the demand of organic products, and the request for the process to become more streamlined, some states have begun their own Certified Organic Programs, including California.¹³⁵ These programs work in the same way as the USDA organic program, but the viticulturists are not able to use any labeling to identify themselves as organic.¹³⁶

The USDA has also been providing for more education on IPMs.¹³⁷ IPMs can be defined as a “sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks.”¹³⁸ As a result of the passing of the Food Quality Protection Act of 1996, federal agencies are now required to research and promote

128. *Organic Wine Definitions – Behind the Label*, ORGANIC VINEYARD ALL. (Jan. 19, 2023, 11:19 AM), <http://organicvineyardalliance.com/organic-wine-definitions-behind-the-label/> [<https://perma.cc/P2ZF-GF49>].

129. *Id.*

130. See generally Jennifer Chait, *How Much Does Organic Certification Cost?*, THE BALANCE SMALL BUS. (Mar. 20, 2019), <https://www.thebalancesmb.com/how-much-does-organic-certification-cost-2538018> [<https://perma.cc/2J6F-UKDC>].

131. *5 Reasons Getting USDA Organic Certification is Really Difficult*, MODERN FARMER (May 24, 2018), <https://modernfarmer.com/2018/05/5-reasons-getting-usda-organic-certification-is-really-difficult/> [<https://perma.cc/6BBP-W44B>].

132. Chait, *supra* note 130.

133. See *id.*; Goldstein, *supra* note 100.

134. See generally *How Much is too Much?*, MEININGER’S WINE BUS. INT’L (Sept. 8, 2014), <https://www.wine-business-international.com/wine/general/how-much-too-much> [<https://perma.cc/DU9G-M2BV>].

135. *Organic Wine Definitions – Behind the Label*, *supra* note 128.

136. *Id.*

137. See generally *Integrated Pest Management*, *supra* note 65.

138. 7 U.S.C. § 136r-1.

the use of IPMs¹³⁹ Additionally, the Secretary of Agriculture is now required to provide information about the uses and benefits of IPMs to any farmer that uses pesticides to try to further widespread use of practice.¹⁴⁰

Typically, the information and education is disseminated from the Integrated Pest Management Center through a variety of documents.¹⁴¹ The most beneficial for viticulturists is the Pest Management Strategic Plans (PMSPs).¹⁴² These documents break down pest management strategies by state and commodity, which ultimately assists viticulturists in planning for alternative pest management practices.¹⁴³ In the 2014 PMSP for Washington State wine grapes, the document lays out the importance and differences of alternative pest management options that have worked since the previous PMSP had been released and what more could be done over the next decade.¹⁴⁴ The document recognizes the fact that Washington State has a relatively experimental wine industry, but that much of the guidance within the document can be broadly utilized across all *Vitis vinifera* varieties.¹⁴⁵

Wine growers understand the importance of consumer goodwill for the continuance of the industry.¹⁴⁶ Because of this, and due to consumers becoming more and more savvy, viticulturists are wanting to reduce pesticide inputs on vines and continue advancing economic and environmental sustainability within the industry.¹⁴⁷ But with all this said, and the continuing degradation of vineyards and farmlands in general, isn't there something more to be done to preserve viticulture for generations to come?

IV. SOLUTIONS

Many mid-tier and large scale vineyards are trying to implement a good-faith environmentally conscious system, whether to appease consumers or because these farmers genuinely believe they can make a lasting impact. More needs to be done due to the growing climate crisis and the uncertainty climate change issues may

139. *Id.*

140. *Id.*

141. *Integrated Pest Management Datasources*, IPM DATA (Jan. 19, 2023, 11:14 AM), <https://ipmdata.ipmcenters.org/#pmsps> [<https://perma.cc/PX28-HVA2>].

142. *See id.*

143. *Id.*

144. *See generally* Michelle Moyer & Sally O'Neal, *Pest Management Strategic Plan for Washington State Wine Grape Production*, W. IPM CTR. (Sept. 8, 2014), https://ipmdata.ipmcenters.org/documents/pmsps/WA_WineGrape_PMSP_2014.pdf [<https://perma.cc/C7HG-JZG4>].

145. *Id.* at 8.

146. *Id.* at 9.

147. *Id.*

bring. The push for creating an accessible and understandable sustainability program may be what is best for wine grape growers and agriculture in general. Regenerative farming may be too far for some viticulturists, while organic may not be accessible. Further yet, the standards set by large scale vineyards may not be fiscally attainable for small and mid-tier viticulturists.

For many consumers, “fine wine . . . is the most visible agricultural product they will consciously encounter” making viticulture an incredibly important piece in the discussion of agriculture and climate change.¹⁴⁸ What consumers learn from their obsession with fine wine can help further the discussion of what needs to be done overall in adapting to a more sustainable way of agriculture.¹⁴⁹ Because of this, there needs to be a comprehensive goal in mind when it comes to sustainable viticulture.

A. LODI Rules on a State or Federal Government Scale

1. The Current System

There are a multitude of ways for a vineyard to become a certified sustainable operation.¹⁵⁰ Many of these are organizations, though filled with well-meaning individuals that want to make a difference, are corporate entities or non-profits with no real regulating power.¹⁵¹ One of particular interest, that may transfer well to a state or federal level, is LODI RULES.

In 1991, local grape growers in the county of Lodi, California came together to form the Lodi Winegrape Commission; this group was tasked with representing the interests and ideals of the Lodi community and to push for effective promotion of the region.¹⁵² They wanted to “improve farming for everyone in the community.”¹⁵³ In 1992, this commission launched an educational campaign to reduce the amount of pesticides being used in vineyards and furthering research about the vineyard ecosystem as a whole.¹⁵⁴ By 2005, along with input from local farmers, viticulturists, and environmentalists, this campaign formed the framework and

148. Asimov, *supra* note 110.

149. *Id.*

150. See Shana Clarke, *Your Guide to Sustainable Wine Certifications*, WINE ENTHUSIAST (Dec. 11, 2018), <https://www.winemag.com/2018/12/11/sustainable-wine-certification-guide/> [<https://perma.cc/ZHM4-U53C>].

151. See generally *id.*

152. *Lodi Winegrape Commission*, LODI WINE CAL. (Jan. 19, 2023, 11:10 AM), <https://www.lodiwine.com/Lodi-Winegrape-Commission> [<https://perma.cc/7G28-25DV>].

153. *About LODI RULES*, *supra* note 68.

154. *Id.*

founding ideals for what is now known as the LODI RULES.¹⁵⁵

Today, in order to be accredited by LODI RULES, a vineyard must meet six sustainability standards: business management, human resources management, ecosystem management, soil management, water management, and pest management.¹⁵⁶ Additionally, LODI RULES provides a pesticide risk model that accounts for the environmental and human impact of the use of pesticides applied often in vineyards.¹⁵⁷ These standards were decided upon with the impression of creating a winegrowing certification that was sustainable and took into account the farming ecosystem, science, economic feasibility, and, most importantly, how to make a meaningful impact on the environment.¹⁵⁸ All of the standards have been verified by a third-party, Protected Harvest, which is a board of environmentalists and pesticide risk scientists.¹⁵⁹ This third-party also conducts all annual audits to ensure quality of the vineyards and to reduce the risk of a conflict of interest.¹⁶⁰

The total cost of first year certification begins at \$1,785, with a per acre fee of \$2 to \$6, which can end up being an expensive investment, especially for a viticulturist just beginning their vineyard.¹⁶¹ However, due to the reputation of the LODI RULES, many grape growers have seen huge dividends from becoming certified; many wineries look for some sort of certified sustainable grapes and vintners specifically looking for the LODI RULES seal are willing to pay a premium in order to get sustainably grown grapes.¹⁶²

Although some may say the LODI RULES is a way to “greenwash” and turn a profit, it has proven to be much more than that.¹⁶³ The purpose of the organization is to promote the ethical and ecological growing of wine grapes so that the practice can be done for generations to come.¹⁶⁴

155. *Id.*

156. *LODI RULES for Researchers*, LODI WINEGRAPE COMM’N 3 (Jan. 19, 2023, 12:13 PM), <https://www.lodigrowers.com/wp-content/uploads/2021/05/2021-LODI-RULES-Communication-Kit-for-Researchers-online-CMYK-reduced.pdf> [<https://perma.cc/U7LH-7AJC>].

157. *Id.* at 6.

158. *Id.* at 7.

159. *Id.* at 8.

160. *Id.*

161. *Id.*

162. *Id.*

163. *See generally About LODI RULES*, *supra* note 68.

164. *See generally id.*

2. *What a Federal or State System Could Look Like*

Although not all of the areas addressed in the LODI RULES system can, or should, be regulated by the government, the areas involving ecosystem and environmental impacts should be government regulated, and promoted, to increase the number of grape growers taking part in sustainable farming. This can be done through tax benefits and legislation, similar to what is found in New Zealand's Climate Change Response Act of 2002.¹⁶⁵ By setting attainable goals with actionable items, it could be possible to make an impact on the climate change issue through changes in the viticulture and agriculture process.¹⁶⁶ By enacting legislation that follows similar procedures to the LODI RULES and giving viticulturists attainable goals to follow, much more could be done to stop the climate crisis.

B. Certified Organic, but for Sustainability

1. The Current Certified Organic System

The current certified organic program has been great to raise awareness and promote the use of organic farming practices throughout the country.¹⁶⁷ However, some of the practices within organic farming can still be harmful to the environment.¹⁶⁸ Although the required organic practices can reduce pollution, the amount of additional land that would need to be cleared to keep up with current production levels would completely flip the scale.¹⁶⁹ The amount of additional land required to comply with organic regulations is simply not fiscally feasible for most small and mid-tier wine grape growers.¹⁷⁰

2. The Addition of Certified Sustainable

By accounting for this discrepancy in the Certified Organic program, the USDA could introduce a similar Certified Sustainable opt-in program. The current educational system in place for IPMs shows the USDA has the capacity to

165. See generally Climate Change Response Act, 2002, § 3 (N.Z.).

166. *Climate Change Response (Zero Carbon) Amendment Act 2019*, *supra* note 86 (showing New Zealand's 30-year reduction goal in greenhouse gases and, specifically, biogenic methane).

167. See generally 7 C.F.R. § 205 (2015).

168. James Temple, *Sorry—Organic Farming is Actually Worse for Climate Change*, MIT TECH. REV. (Oct. 22, 2019), <https://www.technologyreview.com/2019/10/22/132497/sorry-organic-farming-is-actually-worse-for-climate-change/> [<https://perma.cc/NA79-FY6J>] (“... organic farming produces more climate pollution than conventional practices when the additional land required is taken into account.”).

169. *Id.*

170. See generally *id.*

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implement a program that would reach not only viticulture, but every facet of agriculture.¹⁷¹ By combining the capacity for these types of programs and statutorily defining sustainable agriculture, the push for more sustainable options may become a reality.

V. CONCLUSION

Viticulture is an important part of everyday life. It provides a revenue stream for states and countries, has the ability to drastically effect diverse areas of environment, and provides a close and intimate way for individuals to begin thinking about the greater impacts of agriculture. By providing a common definition for sustainable agriculture and providing regulations and guidelines for viticulturists to follow, sustainable viticulture can become an important tool in combatting global climate change and ensuring the culture of winemaking continues for many generations to come.

171. See *Integrated Pest Management Datasources*, *supra* note 141 (showing that the USDA, with the assistance of public universities, scientists, and environmentalists, have been able to come up with IPMs for multiple areas of agriculture).