ROOTING FOR CHANGE: RETHINKING STANDING IN CLIMATE LITIGATION RELATED TO AGRICULTURE

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ABSTRACT

The battle against climate change is raging, but the legal system is still stuck using outdated weapons. The standing doctrine—meant to ensure only those with a direct stake in the action can bring lawsuits—has become an insurmountable barrier in climate litigation, especially when it comes to agriculture. Farmers are

watching their fields wither, storms are battering crops, and groundwater is turning salty, yet courts continue to dismiss cases, claiming the harm isn't "particularized" enough. This Article dives into the problem, exposing how traditional standing rules fail to address the sprawling, slow-burn devastation of climate change. It explores bold new legal strategies, from granting legal personhood to rivers and forests to leveraging state authority under parens patriae. Drawing inspiration from global success stories—like India's Green Bench and the Philippines' Writ of Kalikasan—it makes the case for a fresh, tailored environmental standing doctrine. If we want to take climate change to court and win, we need a new rulebook—one that acknowledges the real and immediate threats climate change poses to agriculture, communities, and the planet itself.

I. INTRODUCTION

For a person or entity to bring a case before a court, they must have legal standing.[1] Standing ensures that only litigants with a direct and substantial interest in the lawsuit can access the judicial system, therefore keeping the courts from becoming "roving commissions assigned to pass judgment on the validity of the [n]ation's laws."[2] There are three requirements to establish standing: a concrete, particularized harm; proof that the harm is linked to actions of the defendant; and a demonstration that the alleged harm can be remedied by a favorable court decision.[3] While this idea is intended to uphold the integrity of the legal system, its applicability and limitations are now under closer examination, particularly in climate change lawsuits.[4] In such cases, the conventional standing criteria frequently fall short of addressing the widespread and complex nature of the harm at stake.[5]

Plaintiffs in climate change lawsuits—often environmental activists, state governments, individual citizens, or environmental interest groups—typically have trouble proving they have suffered the necessary concrete and particularized harm.[6] This is because the harm caused by climate change happens gradually, and

1. *Standing*, LEGAL INFO. INST., CORNELL L. SCH. (Jan. 11, 2025, 4:12 PM), https://www.law.cornell.edu/wex/standing [https://perma.cc/2AX4-NCN7].

2. Broadrick v. Oklahoma, 413 U.S. 601, 611 (1973).

3. Lujan v. Defs. of Wildlife, 504 U.S. 555, 560–61 (1992).

4. Marisa Martin, *Standing: Who Can Sue to Protect the Environment?*, INSIGHTS ON L. & SOC'Y, Fall 2018, at 4.1, 4.3–4.4.

5. *Id.*

6. *Id.* at 4.2.

individualized harm is hard to prove in cases of global environmental impact.[7] Unfortunately, crucial aspects of agriculture are being harmed by climate change in ways that are difficult to redress. These issues are becoming increasingly more severe.[8] Harms that are not redressable in the traditional legal sense include things like heat index change, groundwater salination, weather changes, physical damage from storms, growing zone change, and many other large and encompassing issues.[9] Additionally, courts quickly dismiss climate change litigation because the requested relief would be insufficient to solve global climate change.[10]

This Article examines how the standing doctrine is used to preclude climate change litigation and explores alternatives to the doctrine in such cases. Part II of this Article begins with a summary of the standing doctrine and introduces the concept of a new standing analysis for climate change litigation. Part III discusses different claims surrounding climate change litigation and the associated standing questions. Part IV explores the possibility of granting personhood status to environmental entities, therefore avoiding the standing hurdles that most climate change lawsuits face. Part V considers state standing in climate change litigation under the concept of *parens patriae*. Part VI advocates for a new environmental standing doctrine. Finally, Part VII delves into the relationship between the agriculture industry and climate change.

II. THE EVOLVING LANDSCAPE OF LEGAL STANDING IN CLIMATE CHANGE CASES

A. The Traditional Three-Part Test for Standing

Standing is a fundamental legal test, used to maintain the integrity of the legal system by ensuring that only parties with a legitimate interest in a case can bring it before a court.[11] The test consists of three elements: injury-in-fact, causation, and redressability.[12] The injury-in-fact prong of the test requires that, to bring a case, plaintiffs must have suffered a concrete and particularized harm.[13] The harm cannot be merely hypothetical, it must be actual and imminent.[14]

7. *Id.* at 4.2–4.3.

8. *The Effects of Climate Change*, NAT'L AERONAUTICS & SPACE ADMIN. (Jan. 11, 2025, 4:12 PM), https://science.nasa.gov/climate-change/effects [https://perma.cc/NEG7-WBWH].

9. *See id.*; Martin, *supra* note 4, at 4.3.

10. Martin, *supra* note 4, at 4.3.

11. *See* Lujan v. Defs. of Wildlife, 504 U.S. 555, 559–61 (1992).

12. *Id.* at 560–61.

13. *Id.* at 560.

14. *Id.*

Causation then requires the plaintiff's injury to be traceable to the defendant's actions.[15] There must be a link between the defendant's conduct and the plaintiff's harm.[16] The final element, redressability, requires that a favorable court decision is capable of redressing the plaintiff's injury.[17]

B. Challenges in Meeting the Traditional Standing Requirements in Climate Change Cases

Climate change poses a worldwide threat that impacts communities, ecosystems, and future generations. Unlike many traditional standing cases where a plaintiff can point to a specific and immediate harm, climate change harm is often diffuse and occurs over extended periods.[18] This makes it difficult for individual plaintiffs to establish a concrete and particularized injury, as required to prove injury-in-fact.[19] For example, a person living on a coast faces flooding risks due to rising sea levels, but attributing a single weather event or a defendant's actions directly to property damage can be challenging.[20]

Climate change results from the cumulative effect of numerous greenhouse gas emissions from various sources over decades.[21] Establishing a direct causation link between a specific defendant's activities and a particular harm is a daunting task.[22] Climate change cases often involve complex chains of causation, as numerous actors contribute to greenhouse gas emissions and their consequences.[23] However, drawing a direct link between a specific defendant's actions and the broader climate impact is often a challenge for plaintiffs, and raises questions about whether a single entity can be held solely responsible for the consequences of climate change.[24]

15. *Id.*
16. *Id.*
17. *Id.* at 561.
18. Martin, *supra* note 4, at 4.2–4.3.
19. *Id.* at 4.2.
20. *See, e.g.*, Massachusetts v. Env't Prot. Agency, 549 U.S. 497, 526 (2007); *see also Tort Law and Climate Change*, CTR. FOR CLIMATE ENGAGEMENT, UNIV. OF CAMBRIDGE (July 2024), https://lawclimateatlas.org/resources/tort-law-and-climate-change/ [https://perma.cc/PZ5L-325P].
21. *Climate Change Indicators: Greenhouse Gases*, U.S. ENV'T PROT. AGENCY (Feb. 13, 2025), https://www.epa.gov/climate-indicators/greenhouse-gases [https://perma.cc/5ZM6-REFG].
22. Note, *Causation in Environmental Law*, 128 HARV. L. REV. 2256, 2265 (2015).
23. *Id.*
24. *Id.*

Finally, the redressability requirement raises questions about the effectiveness of court orders at mitigating the global issue of climate change.[25] A court may find in favor of a plaintiff, but lack the ability to remedy climate change-related harm, given the global and systemic nature of the problem.[26] For example, reducing carbon emissions requires international cooperation and policy changes that extend far beyond the capacity of any single court.[27]

C. Countries with Relaxed Standing Criteria for Climate Change Cases

While climate change litigation often fails to meet standing requirements in United States jurisdictions, some countries have adopted more relaxed criteria when it comes to allowing plaintiffs to bring climate change cases. Countries such as India and the Philippines have taken progressive steps to allow climate-related lawsuits, recognizing the unique nature of the issue.[28] These countries serve as important examples of legal systems that have adapted to the evolving landscape of climate change litigation.

India established the Green Bench in 1996 and the National Green Tribunal in 2010 to serve as specialized judicial bodies dedicated to environmental matters and public interest litigation.[29] The benches address issues concerning environmental protection, sustainability, and conservation of natural resources.[30] Concerned citizens, environmental activists, nonprofits, and other entities can use public interest litigation to file cases on behalf of the environment and the public.[31] The Green Tribunal has the authority to enforce its decisions through fines and penalties, ensuring that environmental laws and regulations are upheld.[32] Using these innovative legal mechanisms, India has strengthened its commitment to

25. Mina Juhn, Note, *Taking a Stand: Climate Change Litigants and the Viability of Constitutional Claims*, 89 FORDHAM L. REV. 2731, 2748 (2021).

26. *Id.* at 2749–50.

27. *Id.*

28. Ian R. Curry, Note, *Establishing Climate Change Standing: A New Approach*, 36 PACE ENV'T L. REV. 297, 321 (2019).

29. Praveen Bhargav, *Everything You Need to Know About the National Green Tribunal (NGT)*, CONSERVATION INDIA (May 2, 2011), https://www.conservationindia.org/resources/ngt [https://perma.cc/A8WS-B2N9]; *'Green Benches'*, INDIA ENV'T PORTAL (May 5, 1997), http://www.indiaenvironmentportal.org.in/content/18739/green-benches [https://perma.cc/YA3U-4LFD].

30. Bhargav, *supra* note 29.

31. GEORGE (ROCK) PRING & CATHERINE (KITTY) PRING, UNITED NATIONS ENV'T PROGRAMME, ENVIRONMENTAL COURTS & TRIBUNALS: A GUIDE FOR POLICY MAKERS 51 (2016), https://wedocs.unep.org/handle/20.500.11822/10001 [https://perma.cc/U88F-9Z2Y].

32. *Id.* at 34; Bhargav, *supra* note 29.

addressing environmental concerns promptly and effectively.[33] This innovative approach to environmental jurisprudence has made the Green Tribunal a noteworthy institution for resolving environmental disputes and safeguarding the nation's natural heritage.[34]

Much like India, in 2010 the Philippines enacted The Writ of Kalikasan, a legal remedy unique to the Philippines, designed to protect and preserve the country's environment and natural resources.[35] This serves as a legal tool for concerned citizens, environmental activists, nonprofits, and even government agencies to litigate environmental violations and seek remedies for ecological damage.[36] This innovative mechanism empowers citizens and groups to file petitions in cases of environmental harm, such as deforestation, pollution, and any activities that threaten the nation's ecology.[37] The Writ of Kalikasan is notable for its focus on safeguarding the collective environmental rights of present and future generations, making it a significant step toward environmental conservation and the promotion of sustainable practices in the Philippines.[38] Through this legal instrument, the Philippines is preserving its natural heritage, addressing environmental issues, and ensuring a balanced and healthy ecosystem for its citizens.[39]

Most climate change damage is seen on a local scale.[40] Climate change planning on a local scale in the agriculture industry can be more art than science when faced with specific issues. Estimates of regional climate change in the United

33. *See* PRING & PRING, *supra* note 31, at 35.

34. *See id.*

35. Purple Romero, *Hits and Misses for a Legal Tool to Protect the Environment in Philippines*, MONGABAY (Apr. 28, 2021), https://news.mongabay.com/2021/04/hits-and-misses-for-a-legal-tool-to-protect-the-environment-in-philippines/ [https://perma.cc/8FM5-TEYT].

36. PRING & PRING, *supra* note 31, at 29–30; RULES OF PROCEDURE FOR ENVIRONMENTAL CASES, Rule 2, § 4 (Phil.).

37. *See* PRING & PRING, *supra* note 31, at 30.

38. Hannah Alcoseba Fernandez, *Explaining the Philippines' 'Writ of Kalikasan': What Does the Special Legal Remedy Mean for Nature Protection?*, ECO-BUS. (Aug. 26, 2023), https://www.eco-business.com/news/explaining-the-philippines-writ-of-kalikasan-what-does-the-special-legal-remedy-mean-for-nature-protection.

39. *See* PRING & PRING, *supra* note 31, at 29–30.

40. *Climate Change Impacts on Agriculture and Food Supply*, U.S. ENV'T PROT. AGENCY (Feb. 6, 2025), https://www.epa.gov/climateimpacts/climate-change-impacts-agriculture-and-food-supply [https://perma.cc/V6XT-SD58].

States project that there will be unpredictable challenges, along with those science can predict.[41]

For example, on a local scale in Maryland, physical damage from storms and salinization of groundwater are major threats to the future of agriculture in the region.[42] Globally, climate change planning uses small areas that are closer to the equator, which are at the forefront of climate change.[43] Places like Punjab, Pakistan are used as unfortunate examples in this case study.[44] Climate modeling in the United States will rely on similar tactics as used in Pakistan, by observing climate sensitive areas.[45] Countries that use different regional localities in climate modeling and litigation processes have seen success in regional changes.[46] Considering environmental litigation and climate change planning from other nations can help the United States achieve environmental resilience and redressability.

D. The Need for a Specialized Test for Standing

Given the complex nature of climate change cases and the difficulties in satisfying the traditional standing requirements, there are growing calls to develop a specialized test for climate change standing.[47] By tailoring standing criteria to climate change litigation, the legal system can better accommodate plaintiffs by reducing their burden and promoting the use of legal action to address this pressing global issue.[48] Such an approach represents a crucial shift in how the legal system addresses climate-related challenges, recognizing that traditional standing

41. *See, e.g.*, Nicky Phillips, *Legal Threat Exposes Gaps in Climate-Change Planning*, 548 NATURE 508, 508–09 (2017).

42. *Study Finds Sea-Level Rise Is Swallowing Farms in Maryland, Delaware and Virginia*, MD. TODAY, UNIV. OF MD. (Aug. 2, 2023), https://today.umd.edu/study-finds-sea-level-rise-is-swallowing-farms-in-maryland-delaware-and-virginia [https://perma.cc/3G3K-8LUQ].

43. *See Tropics Feel the Heat from Afar*, NATURE PORTFOLIO (Jan. 23, 2025, 12:57 PM), https://www.nature.com/articles/d42473-021-00407-w [https://perma.cc/9GN2-5FRQ].

44. Abdus Samie et al., *Examining the Impacts of Future Land Use/Land Cover Changes on Climate in Punjab Province, Pakistan: Implications for Environmental Sustainability and Economic Growth*, 27 ENV'T SCI. & POLLUTION RSCH. 25415, 25430 (2020).

45. *See id*.

46. *See id.* at 25430–31.

47. *See, e.g.*, Curry, *supra* note 28, at 326–27; *Causation in Environmental Law*, *supra* note 22, at 2272; Douglas A. Kysar, What Climate Change Can Do About Tort Law 3–4 (March 10, 2011) (Yale Law School, Faculty Scholarship Series).

48. *Id.*

requirements often fall short of effectively addressing the harm caused by climate change.[49]

III. CLAIMS IN CLIMATE CHANGE LITIGATION

A. Diverse Legal Avenues for Climate Change Claims

Climate change litigation can arise under a broad spectrum of legal claims, ranging from statutory and common law tort to constitutional arguments.[50] Statutory claims often involve the interpretation and enforcement of environmental laws.[51] This may include challenges to government decisions or actions that allegedly violate environmental statutes aimed at curbing greenhouse gas emissions, protecting biodiversity, or regulating industrial practices.[52] Plaintiffs in common law tort actions seek remedies for harm(s) caused by specific actors.[53] In climate change cases, plaintiffs may allege negligence, nuisance, or trespass by arguing that the defendant's actions directly contributed to climate-related damages, such as sea-level rise, extreme weather events, or habitat destruction.[54] Finally, constitutional claims assert that government action or inaction violates fundamental rights.[55]

In climate change cases arising under constitutional law claims, plaintiffs argue that constitutionally protected rights, such as the right to a clean and healthy environment or, as seen in *Juliana v. United States*, broader constitutional guarantees like the right to life, liberty, and property, are being infringed upon due to climate change.[56] The right to a clean and healthy environment is particularly important to farmers, whose livelihoods directly depend on a clean and healthy environment. Aspects of the environment, like weather, are especially important and difficult to litigate.[57]

B. Challenges in Applying Traditional Tort Law to Climate Change Cases

Many plaintiffs struggle to apply traditional tort law to climate change litigation, largely due to the unique characteristics of the environmental harm and

49. *Id.*
50. Juhn, *supra* note 25, at 2736.
51. *Id.* at 2737–38.
52. *See id.*
53. *Id.* at 2739.
54. *Id.* at 2739–40.
55. *Id.* at 2742.
56. 947 F.3d 1159, 1165 (9th Cir. 2020); Juhn, *supra* note 25, at 2735, 2742 n.95.
57. Juhn, *supra* note 25, at 2758.

the complexities associated with establishing causation and liability.[58] In conventional tort cases, a direct and proximate link between the defendant's actions and the resulting harm is usually apparent.[59] Alternatively, climate change is a worldwide problem, resulting from a cumulation of greenhouse gas emissions, therefore attributing specific impacts to the actions of individual defendants is very difficult.[60]

Because climate change harm takes time to become evident, it is difficult to apply traditional legal framework. Climate change harm unfolds over decades, and sometimes centuries, making it nearly impossible to link a specific injury to a particular defendant or action.[61] Additionally, climate change does not necessarily affect the location where emissions occur, instead the effects of climate change are felt around the world.[62] This is especially true in terms of water use, as runoff from a specific source becomes a nonpoint source pollutant when it enters the water table.[63] Any sort of identifiable pollution from an entity can dissolve and cause damage to the surrounding water system, including groundwater.[64] Groundwater contamination attributable to a specific business made lawsuits against Dow Chemical and DuPont some of the most formative to the framework of contemporary environmental policy.[65]

This recurring issue has brought much damage to the waterways of the United States.[66] Yet, groundwater contamination is a difficult issue for courts to redress. How can you prove that one company was responsible for a specific damage when there are multiple entities polluting the same waterway? Changes in how we establish causation are being proposed so that courts can more effectively

58. Kysar, *supra* note 47, at 3–4.

59. *Id.* at 13.

60. *Id.* at 18.

61. *Id.* at 40–41.

62. Curry, *supra* note 28, at 327.

63. *See Basic Information About Nonpoint Source (NPS) Pollution*, U.S. ENV'T PROT. AGENCY (Nov. 22, 2024), www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution [https://perma.cc/BHB5-FRZW].

64. *Id.*

65. *See generally Dow Chemical Company Settlement*, U.S. ENV'T PROT. AGENCY (Jan. 6, 2025), www.epa.gov/enforcement/dow-chemical-company-settlement [https://perma.cc/3CPT-DD2S]; Clark Mindock, Carey Gillam & Shannon Kelleher, *Top US Chemical Firms to Pay $1.2bn to Settle Water Contamination Lawsuits*, THE GUARDIAN (June 2, 2023, 4:00 PM), https://www.theguardian.com/environment/2023/jun/02/dupont-pfas-settlement-water-chemical-contamination [https://perma.cc/F5DT-5Z9R].

66. *Basic Information About Nonpoint Source (NPS) Pollution*, *supra* note 63.

hold polluters accountable.[67] These proposals raise questions and concerns about jurisdiction and how traditional legal rules should apply to such widespread problems.[68]

Furthermore, climate change results from the combined actions of numerous entities, including individuals, corporations, and entire countries.[69] Traditional tort law was designed for conflicts between two parties, and thus faces difficulties when dealing with the shared responsibility of global environmental issues.[70] Determining who is responsible and creating solutions that match the scale of the problem presents significant legal and practical hurdles.[71] To overcome these challenges, it is necessary to reconsider traditional legal principles and adopt new approaches that fit the distinct characteristics of climate change. As courts tackle these complexities, the development of legal doctrines and precedents is essential to effectively handling the unique challenges presented by climate change lawsuits.[72]

C. Juliana v. United States: *A Rights-Based Approach*

Juliana v. United States is a landmark case exemplifying a rights-based approach to climate change litigation in which the plaintiffs asserted constitutional claims grounded in the violation of fundamental rights.[73] The case involved a group of young activists who argued that the federal government's actions and policies contributed to climate change, infringing upon their constitutional rights to life, liberty, and property.[74] This rights-based strategy seeks to establish that the government has a duty to protect the environment for the well-being of current and future generations.[75] By framing climate change as a violation of constitutional rights, *Juliana* represents a distinct legal avenue that challenges traditional tort frameworks and emphasizes the broader societal implications of environmental harm.[76]

67. *See, e.g.*, *Causation in Environmental Law*, *supra* note 22, at 2272–74.

68. *Id.* at 2274–75.

69. *See* Jocelyn Timperley, *Who Is Really to Blame for Climate Change?*, BBC (June 18, 2020), https://www.bbc.com/future/article/20200618-climate-change-who-is-to-blame-and-why-does-it-matter [https://perma.cc/GX8P-DYC5].

70. Juhn, *supra* note 25, at 2739.

71. *Id.*

72. Curry, *supra* note 28, at 326.

73. Recent Case, Juliana v. United States, *947 F.3d 1159 (9th Cir. 2020)*, 134 HARV. L. REV. 1929, 1930 (2021) [hereinafter Recent Case, Juliana].

74. *Id.* at 1929–30.

75. Juliana v. United States, 947 F.3d 1159, 1165 (9th Cir. 2020).

76. *See* Recent Case, Juliana, *supra* note 73, at 1930–31.

The case underscores the evolving nature of climate change litigation, moving beyond conventional legal doctrines to address the complex and interconnected issues associated with global environmental challenges.[77] However, the Ninth Circuit ultimately held that the plaintiffs lacked standing, concluding that the issues raised were outside the judiciary's power to address as they involved "complex policy decisions" without an ascertainable legal standard.[78]

IV. PERSONHOOD STATUS FOR NATURAL ENTITIES

A. Introduction to Granting Legal Standing to Natural Entities in the United States

Currently, only individual persons, as well as corporate and government entities, have legal rights and standing.[79] However, due to growing environmental challenges, some believe that the United States should extend legal personhood to natural entities.[80] For proponents of this argument, natural entities, such as lakes, forests, mountains, and ecosystems, are inherently valuable and deserve protection under the law.[81] This new legal concept challenges traditional views and emphasizes an inclusive approach to environmental justice.[82] Granting personhood to natural entities would not only create new legal protections and responsibilities, but also foster a deeper connection between the legal system and the natural world.[83]

B. International Examples of Granting Personhood Status to Natural Entities

Several countries have made significant advancements in granting natural entities legal personhood, rejecting the traditional view of regarding nature as

77. *Id.* at 1931.

78. *Id.* at 1931, 1933–34.

79. *Legal Personhood: The Growing Movement to Give Bodies of Water Their Day in Court*, CHICAGO-KENT J. ENV'T & ENERGY L. (Apr. 5, 2021), https://studentorgs.kentlaw.iit.edu/ckjeel/2021/04/05/legal-personhood-the-growing-movement-to-give-bodies-of-water-their-day-in-court/#_ednref9 [https://perma.cc/QL28-869A].

80. *See, e.g.*, *id.*; Tiffany Challe, *The Rights of Nature—Can an Ecosystem Bear Legal Rights?*, COLUM. CLIMATE SCH. (Apr. 22, 2021), https://news.climate.columbia.edu/2021/04/22/rights-of-nature-lawsuits/ [https://perma.cc/M8AK-9FRC].

81. Challe, *supra* note 80.

82. *Id.*

83. *Id.*

property.[84] For example, the Whanganui River in New Zealand was granted legal personhood in 2017.[85] The indigenous Māori people have long considered the river to be a living entity.[86] Now, the New Zealand government has recognized the river as an entity of intrinsic value that deserves legal rights and protections.[87] This decision reflects the government's commitment to respecting and incorporating Māori values into the country's legal framework.[88] By granting legal personhood to the Whanganui River, New Zealand not only emphasized the cultural, spiritual, and ecological value of natural entities, but also established that they are more than mere resources.[89]

Two years later, Bangladesh followed New Zealand's lead and granted legal personhood to all of its rivers.[90] The Supreme Court declared the National River Conservation Commission is to protect the rights of the waterways and take strict action against encroachers and polluters.[91] By granting legal personhood to the rivers, Bangladesh showed its commitment to recognizing the intrinsic value of natural entities.[92] This revolutionary decision solidifies the country's dedication to environmental ethics, emphasizing the interconnection of rivers with human well-being, and advocating for the preservation of these water bodies for present and future generations.[93] With this ruling, Bangladesh signified a commitment to viewing rivers as entities possessing inherent worth, contributing to a more sustainable and harmonious relationship between society and the natural environment.[94]

84. *See* Scott Bordow, *What if Nature Had Legal Rights?*, ARIZ. STATE UNIV. NEWS (Aug. 25, 2022), https://news.asu.edu/20220825-global-engagement-what-if-nature-had-legal-rights [https://perma.cc/J7WL-TBBD].

85. Nick Perry, *New Zealand River's Personhood Status Offers Hope to Māori*, THE ASSOCIATED PRESS (Aug. 14, 2022, 11:01 PM), https://apnews.com/article/religion-sacred-rivers-new-zealand-86d34a78f5fc662ccd554dd7f578d217# [https://perma.cc/LJ3G-6MGY].

86. *Id.*

87. *Id.*

88. *See id.*

89. *See id.*

90. Mari Margil, *Bangladesh Supreme Court Upholds Rights of Rivers*, MEDIUM (Aug. 24, 2020), https://mari-margil.medium.com/bangladesh-supreme-court-upholds-rights-of-rivers-ede78568d8aa [https://perma.cc/J2AR-87L7].

91. *Id.*

92. *Id.*

93. *See id.*

94. *Id.*

Spain also embraced the notion of giving legal rights to bodies of water when it granted legal personhood to Europe's biggest saltwater lagoon in 2022.[95] The new law was passed following a citizens' push to provide better protection for the threatened ecosystem of the Mar Menor lagoon.[96] This provides yet another example of a government rejecting the traditional view of natural entities as resources.[97] With this law, Spain signified a broader shift towards attributing agency to these entities, acknowledging their intrinsic role in sustaining ecological balance.[98] These three countries provide global examples of granting legal personhood to natural entities and provide valuable insight into the outcomes that follow.

C. Granting Personhood Status to Natural Entities Could Simplify the Standing Analysis in Climate Change Cases

Granting legal personhood to natural entities is a promising new approach to addressing the standing issues many climate change lawsuits face. In the traditional standing framework, the plaintiff must demonstrate direct harm, which is difficult to do as the impacts of climate change are diffuse and occur over extended periods.[99] Granting natural entities personhood would provide an alternative route around the standing issue by shifting the focus from harm suffered by individual persons to the harm done unto a natural entity's inherent rights.[100] It mirrors the international approach of acknowledging that ecosystems and their natural entities have intrinsic value and a right to exist, flourish, and evolve.[101] Granting personhood provides a more direct avenue to address environmental concerns, allowing for more comprehensive consideration of the impacts of human activities on the natural world.[102] Natural personhood would revolutionize legal standing by creating a more inclusive approach to overcoming the challenges climate change litigation often faces.

95. Angela Symons, *Spain Makes History by Giving Personhood Status to Salt-Water Lagoon, Thanks to 600,000 Citizens*, EURONEWS (Sept. 27, 2022, 3:23 PM), https://www.euronews.com/green/2022/09/22/spain-gives-personhood-status-to-mar-menor-salt-water-lagoon-in-european-first [https://perma.cc/4N43-XUUK].

96. *Id.*

97. *Id.*

98. *Id.*

99. Juhn, *supra* note 25, at 2747.

100. Challe, *supra* note 80.

101. *Id.*

102. *See id*.

D. Natural Entity Personhood vs. Corporate Personhood

The United States already has a precedent for granting personhood to nonhuman entities.[103] Analyzing the effects of recognizing corporate personhood in the legal system provides context for understanding the potential implications of granting personhood status to natural entities. The decision to recognize corporations as "persons" with rights and protections has sparked debate over the years.[104] There is no doubt a similar debate will occur over granting personhood status to natural entities.[105] This comparison prompts consideration of how legal recognition of non-human entities aligns with, or diverges from, existing legal constructs.[106] Examining the successes and challenges of corporate personhood offers insight into potential benefits and drawbacks of extending legal personhood to natural entities. This comparison lays the groundwork for evaluating the broader societal and legal consequences of recognizing personhood for natural entities in the context of climate change litigation.

V. STATE STANDING IN CLIMATE CHANGE LITIGATION

A. State and Local Governments' Role in Advancing Climate Policies Through Litigation

State and local governments have long been involved in climate change research and play a crucial role in advancing climate policies through legal processes today.[107] Many local governments have become laboratories for innovative legal strategies, finding new ways to address climate change issues within their jurisdiction. One notable example of this is the 2007 case, *Massachusetts v. Environmental Protection Agency*, where Massachusetts and other states brought suit against the EPA, challenging their reluctance to regulate greenhouse gas emissions.[108] The states were successful and this case marked a turning point, affirming the authority of states to take legal action to address climate change concerns.[109] The historical engagement of state and local

103. *See* Ciara Carolyn Torres-Spelliscy, *Does "We the People" Include Corporations?*, AM. BAR ASS'N (Jan. 7, 2019), https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/we-the-people/we-the-people-corporations.

104. *Id.*

105. Bordow, *supra* note 84.

106. *See id.*

107. BARRY G. RABE, PEW CTR. ON GLOBAL CLIMATE CHANGE, GREENHOUSE & STATEHOUSE 6 (2002), https://www.c2es.org/wp-content/uploads/2002/11/states_greenhouse.pdf [https://perma.cc/XZF8-7N8A].

108. 549 U.S. 497, 514 (2007).

109. *See id.* at 534–35.

governments underscores their proactive stance in using litigation as a tool to shape climate policies and advocate for environmental protections.[110]

B. Uncertainties and Standards for State Standing in Climate Change Cases

The uncertainties surrounding state standing in climate change cases stem from the complicated nature of the environmental challenge and the legal criteria for states to bring litigation. Traditionally, standing demands that states exhibit a distinct and tangible injury, separate from that suffered by individuals, and demonstrate that court intervention can effectively address the situation.[111] Issues arise when attempting to establish a direct correlation between a state's injury and the actions of specific defendants, particularly given the widespread and global effects of climate change.[112] Standing criteria is designed for more localized harms, as opposed to the widespread harm climate change causes.[113] This prompts ongoing debates and legal developments as courts navigate the evolving landscape of climate change litigation.

C. Introducing the Concept of Parens Patriae Standing and Its Origins

In climate change litigation, *parens patriae* standing can play a crucial role in offering states a unique avenue for legal representation. The *parens patriae* doctrine dates back to English common law, where the Crown acted as the ultimate guardian of its subjects and their collective interests.[114] The term *parens patriae* translates to "parent of his or her country" and grants the state the authority to act as a guardian for the well-being of its citizens and the environment.[115] This form of standing allows states to bring lawsuits on behalf of their residents and to address injuries to quasi-sovereign interests, such as natural entities within their borders.[116] As states increasingly leverage *parens patriae* standing in climate

110. Sara Zdeb, Note, *From* Georgia v. Tennessee Copper *to* Massachusetts v. EPA: *Parens Patriae Standing for State Global Warming Plaintiffs*, 96 GEO. L.J. 1059, 1062 (2008) (noting the role of states as plaintiffs in climate change suits).

111. *Id.* at 1070; Pennsylvania v. New Jersey, 426 U.S. 660, 663, 665 (1976) (explaining that "a State has standing to sue only when its sovereign or quasi-sovereign interests are implicated and it is not merely litigating as a volunteer the personal claims of its citizens").

112. Juhn, *supra* note 25, at 2747–48.

113. *Id.* at 2763.

114. Zdeb, *supra* note 110, at 1068.

115. *States and Parens Patriae*, LEGAL INFO. INST., CORNELL L. SCH. (Jan. 11, 2025, 4:12 PM), https://www.law.cornell.edu/constitution-conan/article-3/section-2/clause-1/states-and-parens-patriae [https://perma.cc/LH9C-UFS5].

116. *Id.*; *see* Massachusetts v. Env'l Prot. Agency, 549 U.S. 497, 518–20 (2007).

change cases, its historical roots and adaptive application will underscore its significance in addressing complex environmental challenges.

D. Reformulating State Standing: Embracing the Parens Patriae Doctrine for Climate Change Litigation

When proposing a reformulation that firmly places state standing within the *parens patriae* doctrine in climate change litigation, it is essential to align the legal framework with the unique characteristics of environmental issues. The evolving nature of climate change requires a flexible and adaptive approach to legal standing. Additionally, the reformulation would need to clarify and expand the scope of *parens patriae* standing to expressly include climate-related harms.[117] States, acting as the ultimate protectors of their citizens and natural resources, would be explicitly empowered to sue on behalf of their residents in cases where climate change poses a threat to the well-being of their communities.[118] By anchoring state standing within the *parens patriae* doctrine, the legal system can better accommodate the collective impacts of climate change, providing a more effective avenue for states to address environmental challenges on behalf of their constituents.[119]

This reformulation within the *parens patriae* doctrine would also require a comprehensive examination of the state's role as a guardian of its citizens' welfare and the natural resources within its jurisdiction.[120] *Parens patriae* traditionally allows states to sue on behalf of individuals who are unable to bring lawsuits on their own, typically involving cases related to public health, consumer protection, or environmental concerns.[121] In the context of climate change, this would entail recognizing that the state, as the sovereign entity, has a compelling interest in safeguarding the environmental well-being of its residents against the broad and systemic impacts of climate-related harms.[122] By expanding *parens patriae* standing to explicitly cover climate change, states would be equipped with a robust legal mechanism to address the widespread consequences of climate-related actions, fostering a more proactive and responsive role for state governments in climate change litigation.[123]

117. *See* Lexi Zerrillo, Note, *Who's Your Sovereign?: The Standing Doctrine of Parens Patriae & State Lawsuits Defending Sanctuary Policies*, 27 WM & MARY BILL RTS. J. 573, 581–82 (2018).

118. Zdeb, *supra* note 110, at 1070–71.

119. *See id.*

120. *See id.* at 1068.

121. *Id.*; Zerrillo, *supra* note 117, at 592.

122. Zdeb, *supra* note 110, at 1071–73.

123. *Id.*

E. Assessing the Pros and Cons: Relying on States in Climate Change Litigation

The involvement of states in climate change litigation brings with it a set of intricate dynamics. On the positive side, states, being political entities, can act as advocates for climate policies and litigation. They have the capacity to pool substantial resources and tap into legal expertise within their jurisdictions, which is pivotal for mounting effective legal challenges.[124] Furthermore, states can bring diverse perspectives to the table, representing the interests of various constituents, ecosystems, and industries affected by climate change.[125]

Smaller countries and local jurisdictions within them that use different areas of climate modeling and litigation processes have seen success in regional changes.[126] Countries like the Philippines are creating their environmental processes to become more encompassing of environmental issues experienced by the public.[127] This has led to a focus on grassroots-based regional initiatives against environmental hazards.[128] Local individuals are the ideal candidates to bring action forward, as they have firsthand knowledge and details on how climate issues impact their communities.

However, this regional focus can also be a source of challenges. The complex relationship of economic, social, and political factors within a state may lead to differing priorities in addressing climate-related issues.[129] Economic considerations, in particular, can shape the state's stance, potentially affecting the alignment of climate policies with ecological conservation.[130] The inherently political nature of state governance introduces an element of unpredictability, as changes in administrations may influence the commitment to and prioritization of climate litigation.[131] Furthermore, the decentralized nature of state governments

124. Zerrillo, *supra* note 117, at 592–93.

125. *See id.*

126. *See* Michael Burger et al., *The Law and Science of Climate Change Attribution*, 45 COLUM. J. ENV'T L. 57, 108, 219 (2020).

127. PRING & PRING, *supra* note 31, at 29–30; *Green Is in: The Rise of Environmental Sustainability in the Philippines*, PRIORITY CONSULTANTS (May 28, 2021), https://priority consultants.com/green-is-in-the-rise-of-environmental-sustainability-in-the-philippines/ [https://perma.cc/Z2A5-7TVR].

128. *Green Is in: The Rise of Environmental Sustainability in the Philippines*, *supra* note 127.

129. *See* Zerrillo, *supra* note 117, at 593.

130. *Id.*; MORGAN HIGMAN ET AL., CTR. FOR STRATEGIC & INT'L STUD., CLEAN RESILIENT STATES: THE ROLE OF U.S. STATES IN ADDRESSING CLIMATE ACTION 2, 4 (2021), https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/210209_Higman_Clean_ Resilient.pdf [https://perma.cc/SZP6-8W3J].

131. *See id.* at 1; Zerrillo, *supra* note 117, at 593.

can result in inconsistencies in climate policies and litigation strategies, especially when different states pursue divergent paths.[132] While these inconsistencies can sometimes be caused by differing environmental policy, they are typically a result of lacking action from state governments.[133] This state fragmentation may impede a unified and coordinated approach to tackling the overarching global challenge of climate change.[134] Striking a balance between leveraging the advantages of state involvement and addressing the potential pitfalls is pivotal for devising effective and resilient strategies in the realm of climate change litigation.

Grassroots environmental movements sometimes address these sorts of issues the same way the Philippines has seen in recent years.[135] While these are incredibly difficult to get started, they sometimes benefit the environment by mobilizing local communities to push for stronger climate policies and helping to mitigate state fragmentation.[136] The United States would be a fantastic candidate for more grassroots-based lawsuits, even as difficult as they are to achieve. From superfund sites to institutional discrimination, marginalized people face a disproportionate amount of negative environmental effects.[137] Low-income and otherwise marginalized groups experience the dual burden of poverty and environmental issues.[138] Unfortunately, these individuals often lack the resources to maintain a grassroots environmental movement.[139]

While most climate change damage is witnessed on a local scale, small-scale responses are only effective if they sweep across several regions.[140] Gaps in climate

132. HIGMAN et. al., *supra* note 130, at 6–7.

133. *See id.* at 3.

134. *Id.* at 7–8.

135. Nikolay L. Mihaylov & Douglas D. Perkins, *Local Environmental Grassroots Activism: Contributions from Environmental Psychology, Sociology and Politics*, 5 BEHAV. SCI. 121, 122 (2015); *Green Is in: The Rise of Environmental Sustainability in the Philippines*, *supra* note 127.

136. *See* Mihaylov & Perkins, *supra* note 135, at 126–27.

137. Carmen Ross, *People of Color Live Disproportionately Close to Superfund Sites*, UNIV. OF ALA. AT BIRMINGHAM INST. FOR HUM. RTS. Blog (Jan. 15, 2021), https://sites.uab.edu/humanrights/2021/01/15/people-of-color-live-disproportionately-close-to-superfund-sites/ [https://perma.cc/738A-LVSE].

138. *Id.*

139. *Id.*

140. Alexa K. Jay et al., *Overview: Understanding Risks, Impacts, and Responses*, *in* U.S. GLOB. CHANGE RSCH. PROGRAM, FIFTH NATIONAL CLIMATE ASSESSMENT 1-12, 1-23, 1-32 (Allison R. Crimmins et al. eds., 2023), https://nca2023.globalchange.gov/downloads/NCA5_Ch1_Overview.pdf [https://perma.cc/Y532-3CY6].

change planning will cloud the perceptions of climate change on a sub-national level.[141]

VI. THE NEED FOR AN ENVIRONMENTAL STANDING DOCTRINE

A. Limitations of the Current Standing Doctrine in Climate Change Litigation

The traditional standing doctrine was created with a focus on individualized harm and direct causation.[142] However, when applied to the vast issue of climate change, there are significant gaps and inadequacies in this framework.[143] The widespread impacts of climate change often make establishing direct causation a challenge in litigation, as it is nearly impossible to attribute specific environmental degradations to individual actors or entities.[144] The stringent requirements of traditional standing inadvertently neglect crucial climate change cases, leaving affected parties without a legal avenue for recourse.[145] Additionally, the traditional emphasis on concrete and immediate injuries overshadows the long-term, cumulative effects of climate change, further complicating the establishment of standing in climate change litigation.[146] Thus, while the traditional standing doctrine serves as a cornerstone principle in many legal contexts, its application to climate change litigation underscores a pressing need for reform and adaptation to better reflect the unique challenges posed by this global phenomenon.

B. The Call for a Tailored Environmental Standing Doctrine

Because climate change litigation is so complex, it requires a more tailored approach to the issue of legal standing. Climate change is a global phenomenon with far-reaching implications, and the current standing doctrine often falls short in addressing the multifaceted challenges posed by climate change.[147] As such, there is a pressing need to develop an environmental standing doctrine specifically designed to address the unique nature of climate change cases.[148] The proposed doctrine would consider the combined effects of greenhouse gas emissions, the interaction among worldwide ecosystems, and the pressing need to tackle the

141. *See id.* at 1-32.
142. Curry, *supra* note 28, at 299.
143. *Id.* at 301.
144. *Id.*
145. *Id.* at 330.
146. *See* Kysar, *supra* note 47, at 59.
147. Juhn, *supra* note 25, at 2732–33.
148. *See, e.g.*, Curry, *supra* note 28, at 326; Kysar, *supra* note 47, at 44; *Causation in Environmental Law*, *supra* note 22, at 2272.

consequences of climate change. By crafting a doctrine that aligns with the intricacies of climate change litigation, the legal system can better facilitate the adjudication of cases and ensure that important environmental concerns receive the attention and resolution they warrant.

C. Elements of the Proposed Doctrine

The proposed environmental standing doctrine emphasizes several pivotal components essential for effective climate change litigation. First, "environmental injury" would require a reevaluation of what constitutes harm in the context of climate change.[149] Rather than focusing solely on immediate and direct damages to individuals or property, this concept would broaden to encompass the widespread ecological and environmental harms of climate change.[150] For instance, loss of biodiversity, ecosystem disruption, and degradation of natural resources would all be recognized as significant injuries deserving of legal redress.[151]

Second, "climate change causation" would emphasize the link between human activities, particularly the emission of greenhouse gases, and the resulting climatic shifts and environmental impacts.[152] This element would require a robust evidentiary framework to establish a direct connection between specific human actions and the broader climatic consequences.[153] Such clarity in causation would provide a more concrete basis for attributing responsibility and accountability.

Lastly, a focus on injunctive emission reduction remedies would underscore the proactive and preventive nature of climate change litigation.[154] Rather than merely seeking compensation for past harms, an emphasis should be placed on implementing measures to curtail future emissions and mitigate ongoing environmental degradation. This forward-looking approach aligns with the overarching goal of sustainable environmental stewardship and emphasizes the importance of preventive action in addressing the challenges of climate change.

149. Curry, *supra* note 28, at 326.

150. *Id.*; *see* Thomas Burman, *A New Causal Pathway for Recovery in Climate Change Litigation?*, 52 ENV'T. L. REP. 10038, 10044 (2022).

151. *See* Jay et al., *supra* note 140, at 1-31.

152. *See* Curry, *supra* note 28, at 326; Burman, *supra* note 150, at 1044.

153. *See* Burman, *supra* note 150, at 1044–45.

154. Curry, *supra* note 28, at 329.

D. Reframing Causation and Redressability Through Emission Reduction

The concepts of causation and redressability have traditionally focused on addressing past harms through compensatory measures or restorative actions.[155] However, the proposed standing doctrine seeks to redefine these foundational principles by placing a renewed emphasis on the proactive mitigation of greenhouse gas emissions.[156] By reframing these elements through the lens of emission reduction, the proposed doctrine aligns climate change litigation more closely with the overarching imperative of combating the climate crisis.

Discussing causation within the context of climate change is not just about pinpointing specific activities or actors responsible for emitting greenhouse gases, but rather, it's about understanding the interconnected web of human activities that collectively contribute to global emissions.[157] This includes industrial processes, deforestation, transportation, and various other human activities.[158] The proposed doctrine would encourage a more holistic view, recognizing that the cumulative effect of these diverse sources is what drives climate change.[159] By broadening the scope of causation, the legal system can better capture the multifaceted nature of the climate crisis and assign responsibility where it's due.

Similarly, the notion of redressability would also undergo a transformation. Rather than focusing solely on reactive measures like monetary compensation or environmental restoration, the doctrine would prioritize proactive strategies aimed at emissions reduction. This could encompass a range of actions, from enforcing stricter emission standards and promoting renewable energy adoption to implementing carbon pricing mechanisms and fostering sustainable land use practices.[160] The underlying premise is clear: to effectively address the climate crisis, legal remedies must not only rectify past wrongs, but also prevent future environmental degradation.

155. Yehuda Adar & Ronen Perry, *Negligence Without Harm*, 111 GEO L.J. 187, 225 (2022).

156. *See id.* at 331.

157. *See* Burman, *supra* note 150, at 10044.

158. *Id.* at 10044, 10056.

159. *See id.* at 10044.

160. Jay et al., *supra* note 140, at 1-8, 1-15; U.S. DEP'T OF AGRIC., REPORT TO CONGRESS: A GENERAL ASSESSMENT OF THE ROLE OF AGRICULTURE AND FORESTRY IN U.S. CARBON MARKETS 1–2 (2023), https://www.usda.gov/sites/default/files/documents/USDA-General-Assessment-of-the-Role-of-Agriculture-and-Forestry-in-US-Carbon-Markets.pdf [https://perma.cc/J33F-7G2P].

VII. CLIMATE CHANGE AND THE AGRICULTURE INDUSTRY

A. The Environmental Standing Doctrine's Relevance to Agriculture

The complex relationship between climate change and agriculture necessitates a focused examination of how the proposed environmental standing doctrine can serve the interests of the agriculture industry. Agriculture is both a contributor to and a victim of climate change, making its integration into the environmental standing framework particularly relevant.[161] By establishing a clear legal pathway, the doctrine can provide farmers, agricultural enterprises, and associated stakeholders with the means to advocate for sustainable practices and protect their interests against the adverse impacts of climate change.[162]

For instance, consider the challenges posed by changing weather patterns on crop yields, or the implications of water scarcity on livestock and irrigation-dependent agriculture.[163] These concerns, among others, underscore the need for a legal mechanism that acknowledges the unique vulnerabilities of the agriculture sector. In this context, the environmental standing doctrine can serve as a bridge between agricultural stakeholders and policymakers, ensuring that climate resilience becomes a cornerstone of agricultural policy and practice.[164] Furthermore, by linking the agricultural industry with broader environmental objectives, the new doctrine can spur creative solutions that emphasize both ecological sustainability and agricultural needs.[165]

B. Challenges and Vulnerabilities of Agriculture in Climate Change

The agriculture sector is closely tied to nature's cycles, making it particularly vulnerable to the challenges of climate change.[166] Unlike industries that can adapt or move in response to environmental shifts, the agriculture industry depends on the land and its seasons.[167] One of the most pressing concerns is the unpredictability in production.[168] Climate change introduces erratic weather

161. Carlos Parra-López et al., *Integrating Digital Technologies in Agriculture for Climate Change Adaptation and Mitigation: State of the Art and Future Perspectives*, COMPUTS. & ELECS. AGRIC., Nov. 2024, at 1, 3.

162. *See* Curry, *supra* note 28, at 330–31.

163. *See* Jay et al., *supra* note 140, at 1-23 to 1-24.

164. Curry, *supra* note 28, at 331.

165. *See id.*

166. *Climate Change Impacts on Agriculture and Food Supply*, *supra* note 40.

167. *See id.*

168. *See* Jay et al., *supra* note 140, at 1-23.

patterns, meaning traditional reliance on historical data is now insufficient for informed planting and harvesting decisions.[169]

1. Fundamental Changes in Farming Due to Climate Change

From nutrient density to the physical makeup of soil, climate change will change the very fundamentals of farming within the United States, permanently.[170] Our current actions to change this have not outweighed the damages that our changing climate will bring.[171] We are trying our best to mitigate an issue that has been too far gone for far too long. Changing weather patterns are causing dramatic events like polar vortexes,[172] rising heat indexes,[173] snowfall pattern disruptions,[174] and many others that will impact farmers, particularly crop producers.

Heat indexes will continue to rise due to the greenhouse effect.[175] The American Horticultural Society has developed a planned heat zone map to provide accurate information to farmers to aid with crop selection.[176] These heat index changes will directly and quickly begin to interfere with farming structures in

169. Shiv Bolan et al., *Impacts of Climate Change on the Fate of Contaminants Through Extreme Weather Events*, SCI. TOTAL ENV'T, Jan. 20, 2024, at 1, 13; Jay et al., *supra* note 140, at 1-12.

170. *See* Bolan et al., *supra* note 169, at 13.

171. Jay et al., *supra* note 140, at 1-10.

172. Rebecca Lindsey, *Understanding the Arctic Polar Vortex*, CLIMATE.GOV, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Mar. 5, 2021), http://www.climate.gov/news-features/understanding-climate/understanding-arctic-polar-vortex [https://perma.cc/B2NU-B9AZ].

173. *Climate Change Indicators: Heat Waves*, U.S. ENV'T PROT. AGENCY (Jan. 15, 2025), www.epa.gov/climate-indicators/climate-change-indicators-heat-waves [https://perma.cc/E6TR-9HXF].

174. Josep Bonsoms et al., *Impact of Climate Change on Snowpack Dynamics in Coastal Central-Western Greenland*, 913 SCI. TOTAL ENV'T, Feb. 25, 2024, at 1.

175. Rebecca Lindsey, *Climate Change: Annual Greenhouse Gas Index*, CLIMATE.GOV, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (June 17, 2022), www.climate.gov/news-features/understanding-climate/climate-change-annual-greenhouse-gas-index [https://perma.cc/85YA-BBEB].

176. *Heat Zone Map Developed*, AM. HORTICULTURAL SOC'Y (Jan. 11, 2025, 3:56 PM), ahsgardening.org/about-us/news-press/cool_timeline/heat-zone-map-developed [https://perma.cc/7XFM-3XJA].

place.[177] Heat indexes are massively important to crop selection and yield.[178] Changing heat indexes also put livestock at a greater risk of heat stress.[179]

2. Shifting Crop and Garden Growing Zones

Crop and garden growing zones are also expected to change, as seen in the latest data.[180] These growing regions are determined by the USDA and updated periodically.[181] This system helps determine which plants will grow and thrive in a given environment through all seasons in the United States.[182]

3. Economic Losses in Agriculture Due to Climate Change

Physical storm damage is going to become a larger problem with advanced climate change.[183] The past 50 years have seen many "once in a lifetime" weather events unfolding across the globe.[184] Climate change has brought unexpected changes in weather patterns across the country, including unseen severe weather event frequencies.[185] Changing weather patterns also raise interesting questions about the ability to predict such events.[186] While modern meteorological technology is largely able to keep up with the changes, it is concerning that our

177. *See* Jay et al., *supra* note 140, at 1-24.

178. *Climate Impacts on Agriculture and Food Supply*, CITY OF CHI., U.S. ENV'T PROT. AGENCY (Feb. 24, 2025, 2:36 PM), https://climatechange.chicago.gov/climate-impacts/climate-impacts-agriculture-and-food-supply [https://perma.cc/5B68-744B].

179. Jerry L. Hatfield et al., *Indicators of Climate Change in Agricultural Systems*, 163 CLIMATIC CHANGE 1719, 1722–23 (2020).

180. Matt Kasson, *Climate Change Is Shifting the Zones Where Plants Grow – Here's What That Could Mean for Your Garden*, THE CONVERSATION (Mar. 22, 2024, 8:34 AM), https://theconversation.com/climate-change-is-shifting-the-zones-where-plants-grow-heres-what-that-could-mean-for-your-garden-222108 [https://perma.cc/37MX-93DZ].

181. Braelei Hardt & Sydney Anderson, *Hardiness Zones and Ecoregions for Climate-Smart Gardening*, NAT'L WILDLIFE FED: GARDEN HABITATS (Mar. 13, 2024), https://blog.nwf.org/2024/02/hardiness-zones-and-ecoregions-for-climate-smart-gardening/ [https://perma.cc/79DD-D686].

182. *Id.*

183. *See* Sasha Hill, *Why Are Extreme "One-In-A-Lifetime" Weather Events Becoming More Frequent?*, ECONNECT (Aug. 30, 2022), eco-nnect.com/extreme-weather-events [https://perma.cc/4RAV-DAZP].

184. *Id.*

185. *How Can Climate Change Affect Natural Disasters?*, U.S. GEOLOGICAL SURVEY (Feb. 7, 2025), https://www.usgs.gov/faqs/how-can-climate-change-affect-natural-disasters [https://perma.cc/D2HZ-VUP3].

186. Andrew Moseman, *Will Climate Change Make Weather Forecasting Less Accurate?*, CLIMATE PORTAL, MASS. INST. OF TECH. (Jan. 30, 2023), https://climate.mit.edu/ask-mit/will-climate-change-make-weather-forecasting-less-accurate [https://perma.cc/E75M-8FZS].

weather systems will change to such a degree that historical records cannot be used to comparison.[187]

Financial losses from climate change are becoming more visible with each passing year.[188] Every year farmers face significant losses from storm damage.[189] For example, in California, a Monterey County Farm Bureau member reported flood damage spanning 15,000 acres.[190] This totaled an estimated $330 million dollars in agricultural loss.[191] Things that crop insurance does cover, like heat damage and individual weather events, has cost the industry $27 billion in almost 30 years.[192] Since crop insurance is federally subsidized, that raises debates over the extent of these payments.[193] Such large payouts also spell trouble for private insurance companies who will either adapt, drop many clients, move areas, or otherwise develop a climate resilience plan.[194] If not, they too may collapse under the pressure of the global climate emergency.[195] Climate change and increasing insurance rates are issues our generation is seeing unfold in real time.[196] The unpredictability of severe weather events complicates calculating insurance premiums, and the insurance business as a whole.[197]

Beyond the fields, the consequences of climate change are felt throughout the agricultural network, including suppliers, distributors, and consumers.[198] Disruptions, whether in the form of reduced yields or market instability, have the

187. *Id.*

188. Emma Charlton, *This Is What the Climate Crisis Is Costing Economies Around the World*, WORLD ECON. F. (Nov. 29, 2023), https://www.weforum.org/stories/2023/11/climate-crisis-cost-global-economies/ [https://perma.cc/MCP3-UMYW].

189. *See California Storms Are Impacting the Local Grocery Stores*, CBS NEWS (Mar. 16, 2023, 6:03 AM), https://www.cbsnews.com/sacramento/news/california-storms-are-impacting-the-local-grocery-stores/ [https://perma.cc/X4UU-CX9C].

190. *Id.*

191. *Id.*

192. *Global Warming Increased U.S. Crop Insurance Losses by $27 Billion in 27 Years, Stanford Study Finds*, STAN. REP. (Aug. 4, 2021), news.stanford.edu/2021/08/04/climate-change-crop-insurance [https://perma.cc/5ESK-7DMW].

193. *Id.*

194. Stephen J. Collier et al., *Climate Change and Insurance*, 50 ECON. & SOC'Y 158, 159 (2021).

195. *See id.*

196. Michael Copley et al., *How Climate Change Could Cause a Home Insurance Meltdown*, NPR (July 22, 2023, 6:00 AM), www.npr.org/2023/07/22/1186540332/how-climate-change-could-cause-a-home-insurance-meltdown [https://perma.cc/W7R6-BY4Z].

197. *Id.*

198. *Climate Impacts on Agriculture and Food Supply*, *supra* note 178.

potential to trigger fluctuations in food price volatility, job losses, and economic turbulence in rural areas.[199]

4. Threats to Soil Health and Nutrient Depletion

While some farms are battling severe flooding, others are faced with water scarcity.[200] With rising temperatures and unpredictable rainfall, many farming regions find themselves working with dwindling water resources.[201] This challenge extends beyond mere crop hydration; it affects nearly every aspect of agriculture, from livestock maintenance to irrigation.[202] Moreover, extreme weather events pose a tangible threat to the very foundation of agriculture—the soil.[203] Floods and droughts contribute to soil erosion, strip it of its essential nutrients, and diminish its vitality.[204] This degradation not only compromises crop yields, but also threatens the long-term sustainability of farming practices.[205]

i. Nutrient Leaching and Fertilizer Challenges

Changes in precipitation patterns are a major issue that impacts farmers in the United States, particularly Maryland.[206] This will harm the snowfall pattern, ocean currents, and freshwater aquifers.[207] Precipitation patterns have already been upended from anthropogenic factors of climate change which are not likely to revert to their previous levels.[208] Precipitation patterns take decades to centuries to address and present generations are unlikely to see any solution within their lifetime.[209] Larger amounts of precipitation will erode nutrients from soil faster

199. *Id.*; Jay et al., *supra* note 140, at 1-34.

200. Jay et al., *supra* note 140, at 1-24.

201. *Id.*

202. *Id.*

203. Hatfield et al., *supra* note 179, at 1723.

204. *Id.*

205. *Id.* at 1726–29.

206. U.S. ENV'T PROT. AGENCY, WHAT CLIMATE CHANGE MEANS FOR MARYLAND (2016), 19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-md.pdf [https://perma.cc/4364-B5FM].

207. *Id*; *Climate Change Indicators: Heavy Precipitation*, U.S. ENV'T PROT. AGENCY (June 2024), https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation [https://perma.cc/99PR-Q8TR].

208. *See Climate Change Indicators: U.S. and Global Precipitation*, U.S. ENV'T PROT. AGENCY (June 2024), https://www.epa.gov/climate-indicators/climate-change-indicators-us-and-global-precipitation [https://perma.cc/FC6T-FG7R].

209. *See* Jay et al., *supra* note 140, at 1-37; *Is It Too Late to Prevent Climate Change?*, NAT'L AERONAUTICS & SPACE ADMIN. (Feb. 25, 2025, 12:10 PM),

than they can be replaced.[210] According to the Clausius-Clapeyron model, precipitation will increase 7% for every degree of global warming.[211] More evidence is emerging that this increase is among the lower end of estimates for global warming precipitation rates.[212] Massive amounts of rainfall will change the frequency and totality of nutrient leaching from soil.[213] Many of the nutrients that plants depend on are built over the course of decades, making loosing these nutrients of particular concern.[214]

ii. Declining Nutritional Value in Crops

Nutrient loss from soil will cause farmers to add more artificial nutrients to compensate for this issue.[215] This is concerning as heavy precipitation patterns continue to become more rampant.[216] The additional artificial fertilizer used can be washed into watersheds during rainfall events.[217] These excess nutrients cause things like algal blooms and fauna die-off events.[218] Unfortunately, other climate change consequences like sea level rise and warmer water temperatures may lead to increased algal blooms anyway.[219]

https://science.nasa.gov/climate-change/faq/is-it-too-late-to-prevent-climate-change/ [https://perma.cc/5J2R-HP8Q].

210. *See Climate Change Impacts on Agriculture and Food Supply*, *supra* note 40.

211. Luke J. Harrington & Friederike E. L Otto, *Attributable Damage Liability in a Non-Linear Climate*, 153 CLIMACTIC CHANGE 15, 16 (2019).

212. *Id.*

213. *See* Z. Yuan et al., *Relationships of Nitrogen Losses, Phosphorus Losses, and Sediment Under Simulated Rainfall Conditions*, 75 J. SOIL & WATER CONSERVATION 231, 233 (2020).

214. *Soil: The Foundation of Life on Earth*, JOHN INNES CENTRE (2020), https://www.jic.ac.uk/advances/soil-the-foundation-of-life-on-earth/ [https://perma.cc/K2NP-3DW3].

215. Richard Schiffman, *Why It's Time to Stop Punishing Our Soils with Fertilizers*, YALE ENV'T 360 (May 3, 2017), https://e360.yale.edu/features/why-its-time-to-stop-punishing-our-soils-with-fertilizers-and-chemicals [https://perma.cc/AM73-PYD4].

216. Jay et al., *supra* note 140, at 1-23.

217. Tatiana Schlossberg, *Fertilizers, a Boon to Agriculture, Pose Growing Threat to U.S. Waterways*, N.Y. TIMES (July 27, 2017), https://www.nytimes.com/2017/07/27/climate/nitrogen-fertilizers-climate-change-pollution-waterways-global-warming.html.

218. *Id.*

219. *Climate Change and Freshwater Harmful Algal Blooms*, U.S. ENV'T PROT. AGENCY (Feb. 11, 2025), https://www.epa.gov/habs/climate-change-and-freshwater-harmful-algal-blooms [https://perma.cc/DXG2-27Y9].

Crops themselves are also quickly losing nutritional value.[220] Changes in atmospheric levels of carbon dioxide (CO2) are reducing nutrient levels in C3 plants like wheat and oats.[221] Both of these are farmed in Maryland, and are hugely important in the United States.[222] There are a projected 225 different staple foods that will become less nutritious as a result of rising CO2 levels by 2050.[223] Rising CO2 levels will continue to harm plants, humans and livestock alike, and will bring a disruption to farm ecology that our current infrastructure cannot tolerate for long.[224]

Plants will not be able to function at temperatures above their threshold and thus, will no longer be able to produce functioning nutrients for the human body.[225] Farmers might choose to adapt by planting crop varieties more tolerant to climate change affects in their area.[226] The combination of nutrition loss and some crops becoming unfarmable may lead to interesting shifts in the diet of Americans. Regardless, changes in food production will need to be made to support the nutritional needs of our population.

220. Louis Gray & William Stiles, *Changing Crops in a Changing Climate: The Impact of Rising CO2 Levels on the Nutritional Quality of Crops*, BUS. WALES (Aug. 2, 2022), https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/changing-crops-changing-climate-impact-rising-co2-levels-nutritional-quality-crops [https://perma.cc/5ZWD-95GN].

221. *Id.*

222. Dale Hawks, *Maryland Agriculture Has It All*, U.S. DEP'T AGRIC.: BLOG (June 4, 2019, 2:26 PM), https://www.usda.gov/about-usda/news/blog/maryland-agriculture-has-it-all [https://perma.cc/Q33B-FR95].

223. Nicola Davis, *Climate Change Will Make Hundreds of Millions More People Nutrient Deficient*, THE GUARDIAN (Aug. 27, 2018, 11:00 AM), www.theguardian.com/science/2018/aug/27/climate-change-will-make-hundreds-of-millions-more-people-nutrient-deficient [https://perma.cc/T6VU-7M5T].

224. *See* Ellen Gray, *Global Climate Change Impact on Crops Expected Within 10 Years, NASA Study Finds*, NAT'L AERONAUTICS & SPACE ADMIN. (Nov. 2, 2021), https://climate.nasa.gov/news/3124/global-climate-change-impact-on-crops-expected-within-10-years-nasa-study-finds/ [https://perma.cc/2UCQ-MXYW].

225. Amber Dance, *A Warmer Planet, Less Nutritious Plants and . . . Fewer Grasshoppers?*, ARS TECHNICA (Apr. 22, 2023, 7:22 AM), https://arstechnica.com/science/2023/04/a-warmer-planet-less-nutritious-plants-and-fewer-grasshoppers/ [https://perma.cc/U9AN-5JGT].

226. BRUCE BURNETT, UNIV. OF MANITOBA, CLIMATE CHANGE IMPACTS ON CROP SELECTION AND ROTATION IN 2050 (2022), https://umanitoba.ca/national-centre-livestock-environment/sites/national-centre-livestock-environment/files/2022-03/ag2050_essay_burnett.pdf [https://perma.cc/4EZT-BS5B].

5. Declining Effectiveness of Fertilizer in Changing Climates

Studies also suggest that fertilizer will start to lose effectiveness as climate change moves forward.[227] With increased CO2 levels comes unique issues for plant tissue to metabolize different aspects of fertilizer.[228] The natural effectiveness of plant biology to process nutrients will be reduced as the microbiota of the soil becomes less healthy.[229] Using more man-made chemicals in the soil adds tremendously to the other problems outlined within the means of climate change.[230] Plants will not be able to properly thrive even with fertilizer when climate change hits a certain tipping point.[231] This will be observed first in regional agricultural zones reliant on fertilizer for land left deficient by decreasing organic matter.[232]

6. Aquaculture and Fisheries at Risk

The terrestrial farming industry will not be the only one harmed by climate change. Many aspects of aquaculture and fisheries are experiencing the encompassing damages of climate change such as water quality deterioration and poor growth of cold-water species.[233] On top of this, almost all fisheries are planning for when overharvesting decreases the population of desired fish.[234] Overfishing and climate change are harming almost every single marine industry in some way or another.[235]

The rise in CO2 will harm things like aquaculture and fisheries as the ocean acts as a massive carbon sink, often absorbing the first waves of carbon.[236] While plants can thrive in CO2 increases to a degree, the ocean and its inhabitants are

227. Dance, *supra* note 225.

228. *Id.*

229. Christy Clutter, *Unearthing the Soil Microbiome, Climate Change, Carbon Storage Nexus*, AM. SOC'Y FOR MICROBIOLOGY (May 13, 2021), asm.org/Articles/2021/May/Unearthing-the-Soil-Microbiome,-Climate-Change,-Ca [https://perma.cc/3ZFZ-EBLB].

230. Schlossberg, *supra* note 217.

231. *See* Dance, *supra* note 225.

232. *See* V. Girija Veni et al., *Soil Health and Climate Change*, *in* CLIMATE CHANGE AND SOIL INTERACTIONS 751, 753 (Majeti Narasimha Vara Prasad & Marcin Pietrzykowski eds. 2020).

233. Sahya Maulu et al., *Climate Change Effects on Aquaculture Production: Sustainability Implications, Mitigation, and Adaptations*, FRONTIERS SUSTAINABLE FOOD SYS., Mar. 2021, at 1, 5.

234. Hannah Ritchie & Max Roser, *Fish and Overfishing*, OUR WORLD IN DATA (Mar. 2024), ourworldindata.org/fish-and-overfishing [https://perma.cc/HF69-UD6Y].

235. *See* Maulu et al., *supra* note 233, at 4.

236. A. Gomez-Zavaglia et al., *Mitigation of Emerging Implications of Climate Change on Food Production Systems*, FOOD RSCH. INT'L, Apr. 2020, at 1, 2.

much less resilient to changes in carbon.[237] Shellfish such as oysters will begin to see weaker shells and decreased nutrient capacity because the CO2 harms them so deeply.[238] The removal of marine resources will increase employment loss for those working in the industry.[239] Marine food resources will thus also decline.[240] Given these intertwined challenges, addressing the agriculture sector's vulnerabilities to climate change becomes not just a necessity, but a pressing imperative for both legal and policy frameworks.

C. Empowering Agriculture Through Environmental Standing

The proposed environmental standing doctrine would leave a positive impact on the world of agriculture. This doctrine, emphasizing the crucial need to reduce greenhouse gas emissions, could offer a systematic legal structure for the agriculture industry to tackle and manage challenges arising from climate change. Central to this discussion is the doctrine's emphasis on actionable remedies.[241] It offers a platform for stakeholders within the agriculture sector to scrutinize and potentially reform practices that are substantial contributors to greenhouse gas emissions. For instance, certain agricultural methods, particularly in livestock farming, have been identified as significant sources of methane emissions.[242] The doctrine's provisions could encourage legal interventions aimed at fostering the adoption of more sustainable farming techniques, subsequently mitigating emissions and aligning agricultural practices with environmental priorities. More policies like the Agriculture Resilience Act of 2023 should be introduced to help foster this change.[243]

Furthermore, the doctrine's legal structure could create accountability mechanisms within the agriculture sector. Consider a scenario where expansive agriculture operations lead to deforestation or deplete local water resources, intensifying climate vulnerabilities for neighboring smaller-scale farmers.[244] In such instances, the doctrine could serve as a catalyst for legal proceedings,

237. *Id.* at 7; Dance, *supra* note 225.

238. *Helping Shellfish Farmers Tackle Climate Change*, THE FISH SITE (May 24, 2022, 6:55 AM), thefishsite.com/articles/helping-shellfish-farmers-tackle-climate-change [https://perma.cc/K3GD-UAFX].

239. Jay et al., *supra* note 140, at 1-32.

240. *See Helping Shellfish Farmers Tackle Climate Change*, *supra* note 238.

241. *See* discussion *supra* Section VI.C.

242. *Agriculture and Aquaculture: Food for Thought*, U.S. ENV'T PROT. AGENCY (Oct. 2020), https://www.epa.gov/snep/agriculture-and-aquaculture-food-thought [https://perma.cc/D7M7-DYF7].

243. Agriculture Resilience Act of 2023, S. 1016, 118th Cong. (2023).

244. *See* Burman, *supra* note 150, at 10056.

enabling affected parties to challenge and seek redress for unsustainable corporate practices that exacerbate climate vulnerabilities.[245]

Beyond individual complaints, the proposed doctrine's potential extends to systemic advocacy. It could provide a legal avenue for challenging policy inadequacies or gaps in support mechanisms that impede the agricultural sector's adaptation and resilience strategies. These strategies can include anything from using more sustainable farming practices on a regional scale to legislative change. By facilitating legal challenges to policy frameworks that are incompatible with sustainable agricultural practices, or insufficient in addressing climate resilience, the doctrine might catalyze essential policy reforms crucial for the sector's long-term sustainability.

VIII. CONCLUSION

The intricacies of legal standing in the context of climate change litigation underscore the evolving nature of environmental law. Traditional standing criteria, while robust in many contexts, presents significant hurdles when addressing the global impacts of climate change.[246] Activists, states, and a growing number of stakeholders have begun to leverage legal avenues, illuminating the inadequacies of existing frameworks.[247] Internationally, countries like India and the Philippines are pioneering more inclusive standing criteria, offering insight into potential reforms.[248]

The shift towards recognizing personhood for natural entities, mirroring corporate personhood, reflects a deeper understanding of the environment's intrinsic value.[249] Such recognition could streamline legal proceedings, emphasizing tangible remedies like emissions reduction. Similarly, the unique vulnerabilities of the agriculture sector in the face of climate change highlight the urgency for a tailored environmental standing doctrine. This doctrine, if implemented, promises not only to bridge the gap between legal theory and practical environmental challenges, but also to empower industries like agriculture to actively engage in mitigating climate-related harms. In summary, as the global community grapples with the profound implications of climate change, the legal realm stands as a critical battleground. Through innovative standing doctrines and

245. Curry, *supra* note 28, at 330–31.
246. *Causation in Environmental Law*, *supra* note 22, at 2265.
247. Zdeb, *supra* note 110, at 1062; Mihaylov & Perkins, *supra* note 135, at 122.
248. PRING & PRING, *supra* note 31, at 29, 34.
249. Bordow, *supra* note 84.

a reimagined legal landscape, there lies potential to foster a more resilient, equitable, and sustainable future.