GROWING CARBON CREDITS: STRENGTHENING THE AGRICULTURAL SECTOR'S PARTICIPATION IN VOLUNTARY CARBON MARKETS THROUGH LAW AND POLICY

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ABSTRACT

In the face of a global climate crisis, the United States is not relying upon a command-and-control environmental regulatory system to prevent cataclysmic consequences. Instead, the United States is accepting voluntary greenhouse gas (GHG) emissions reduction pledges from the private sector that have little hope of being achieved without substantial emissions reductions, significant infrastructure improvements, and the purchase of carbon offset credits from voluntary carbon markets (VCMs). However, VCMs, a form of private environmental governance (PEG), are only a viable solution to the climate crisis if there are high-quality credits that function as valid representations of GHG emissions reductions. The agricultural sector is expected to play an important role in generating carbon credits through the adoption of carbon sequestering production methods, but farmers are not committing to sow the seeds of carbon credit generation.

At this critical juncture, farmers' concerns about carbon credit generation need to be understood and addressed in a way that maintains market flexibility while ensuring the integrity of the credits. In the last year, there have been multiple legislative proposals offering varying forms of public governance support for the private carbon marketplace. This government intervention is reflective of a new public-private hybrid form of environmental governance for VCMs.

This Article seeks to contribute to the theoretical and empirical literature of PEG by evaluating the proposed forms of government support for VCMs and analyzing how a hybrid public-private environmental governance structure will facilitate the performance of VCMs. To explain how hybrid public-private environmental governance for VCMs will encourage the participation of the agricultural sector, this Article is structured around three propositions. The first is the agricultural sector's central role in addressing climate change. The second is that VCMs are the preferred mechanism in the United States to facilitate emissions reductions pledges. The third proposition is that competing VCM standards and low carbon credit prices have created barriers to market entry for the agricultural

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sector. The recent passage of the Inflation Reduction Act and the revised Growing Climate Solutions Act have the potential to support the private carbon marketplace through funding for regenerative agricultural practices and by establishing a trusted source of credit generation information. To be effective, however, this public-private environmental governance will need to create a cohesive and transparent marketplace by unifying credit standards among markets, reducing transaction costs, and improving the economic incentives for the agricultural generation of carbon credits.

INTRODUCTION

In January 2020, Microsoft announced that it will become carbon negative in the next decade, and that by 2050, it "will remove from the environment all the carbon the company has emitted either

directly or by electrical consumption since it was founded in 1975."[1] To achieve its ambitious carbon reduction pledge, Microsoft will need to purchase a large amount of carbon offset credits from voluntary carbon markets (VCMs).[2]

Carbon credits represent a verified removal or reduction of carbon emissions.[3] Farmers generate carbon credits—a credit represents one metric ton of carbon dioxide—by adopting management practices that either decrease greenhouse gas (GHG) emissions or increase the amount of carbon sequestered in soils rather than released into the atmosphere.[4] Although there are carbon registries that have created credit generation standards to lend credits credibility,[5] VCMs are largely unregulated[6] and are not bound to any specific set of carbon credit generation metrics.[7] Once the credits are generated and verified, a carbon certificate representing those credits is sold through VCMs in order to achieve carbon emissions reductions goals.[8]

In 2021, Microsoft did just that and bought nearly two hundred thousand carbon credits generated from agricultural sources.[9] The purchase was among the largest-ever purchases of agricultural

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[1] Brad Smith, *Microsoft Will Be Carbon Negative by 2030*, MICROSOFT: OFFICIAL MICROSOFT BLOG (Jan. 16, 2020), https://blogs.microsoft.com/blog/2020/01/16/microsoft-will-be-carbon-negative-by-2030.

[2] *See* Karl Plume, *Farmers Struggle to Break into Booming Carbon-Credit Market*, REUTERS (Apr. 28, 2021, 7:00 AM), https://www.reuters.com/business/energy/farmers-struggle-break-into-booming-carbon-credit-market-2021-04-28/.

[3] *See* MEGAN STUBBS ET AL., CONG. RSCH. SERV., R46956, AGRICULTURE AND FORESTRY OFFSETS IN CARBON MARKETS: BACKGROUND AND SELECTED ISSUES I (2021), https://crsreports.congress.gov/product/pdf/R/R46956.

[4] *See* Sarah Sellars et al., *What Questions Should Farmers Ask About Selling Carbon Credits?*, *FARMDOC DAILY* (Apr. 13, 2021), https://farmdocdaily.illinois.edu/2021/04/what-questions-should-farmers-ask-about-selling-carbon-credits.html.

[5] *See* STUBBS ET AL., *supra* note 3, at 8.

[6] *See* Alex Fredman & Todd Phillips, *The CFTC Should Raise Standards and Mitigate Fraud in the Carbon Offsets Market*, CTR. FOR AM. PROGRESS (Oct. 7, 2022), https://www.americanprogress.org/article/the-cftc-should-raise-standards-and-mitigate-fraud-in-the-carbon-offsets-market.

[7] *See* STUBBS ET AL., *supra* note 3, at 8, 13.

[8] *See* Jordan Shockley & Will Snell, *Carbon Markets 101*, 21 ECON. & POL'Y UPDATE 1 (2021), https://agecon.ca.uky.edu/files/carbon_markets_101.pdf.

[9] *See* Plume, *supra* note 2.

carbon credits.[10] At first blush, this could be seen as indicative of a well-functioning carbon credit marketplace. However, Microsoft also rejected more than five million credits generated by agriculture projects.[11] Microsoft explained it rejected millions of credits "because of systemic problems with measuring their climate benefit."[12] According to Lucas Joppa, Microsoft's Chief Environmental Officer, "the company received proposals from agriculture projects that made carbon-removal claims without scientific validation."[13] He went on to provide, "the company might need to buy 6 million carbon credits annually by 2030. 'And that is going to require a lot greater transparency' on the part of agricultural credit producers."[14] Microsoft is not alone in its need for verified and credible carbon credits. Following former President Donald Trump's decision to withdraw from the Paris Agreement, announced in 2017,[15] numerous businesses, leaders in higher education, mayors, American Indian tribes, and state governors made ambitious GHG emissions reduction pledges.[16] Today, thousands of U.S. companies have promised to reduce their net emissions to zero by 2050.[17]

"Carbon credits, purchased voluntarily, enable organizations to compensate or neutralize emissions not yet eliminated by financing the avoidance or reduction of emissions from other sources, or the removal of greenhouse gases from the atmosphere and thus

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[10] *See id*.

[11] *See id*.

[12] *Id*.

[13] *Id*.

[14] *Id*.

[15] *See* Brady Dennis, *Trump Makes It Official: U.S. Will Withdraw from the Paris Climate Accord*, WASH. POST (Nov. 4, 2019), https://www.washingtonpost.com/climate-environment/2019/11/04/trump-makes-it-official-us-will-withdraw-paris-climate-accord.

[16] *See* Maria Banda, *The Bottom-Up Alternative: The Mitigation Potential of Private Climate Governance After the Paris Agreement*, 42 HARV. ENV'T L. REV. 325, 369–70 (2018); *see also* Louis G. Leonard III, *Under the Radar: A Coherent System of Climate Governance, Driven by Business*, 50 ENV'T L. REP. 10,546, 10,559 (2020).

[17] *See* Virginia Gewin, *As Carbon Markets Reward New Efforts, Will Regenerative Farming Pioneers Be Left in the Dirt?*, CIV. EATS (July 27, 2021), https://civileats.com/2021/07/27/as-carbon-markets-reward-new-efforts-will-regenerative-farming-pioneers-be-left-in-the-dirt.

meaningfully contribute in the transition to global net-zero."[18] Carbon offset[19] credits can be generated from numerous types of practices, such as forestry and agriculture.[20] However, in the United States, agriculture is predicted to be "essential to heading off the worst effects of climate change."[21] Although estimates vary, regenerative agricultural practices in the United States have the potential to annually sequester two hundred fifty million tons of carbon dioxide.[22] Despite the potential for agricultural carbon sequestration and the pool of willing buyers, only two percent of the carbon offsets sold in the United States are generated from agriculture.[23]

One of the reasons cited for farmers not generating more carbon credits is the challenge of comparing the competing carbon market offerings.[24] While there are undeniably many carbon market options with differing programmatic standards, farming commonly involves the assessment of multiple variables, including input costs, commodity prices, crop varietals, pesticide effectiveness, uncertain weather, and resistant plant diseases.[25] This Article argues the reasons that farmers are not participating in VCMs are reflective of

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[18] TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., FINAL REPORT 1 (2021), https://www.iif.com/Portals/1/Files/TSVCM_Report.pdf.

[19] A carbon offset "describe[s] the act of financing other climate change mitigation actions to compensate or neutralize for one's own footprint." *Id*. at 1 n.2.

[20] *See* U.S. DEP'T OF AGRIC., CLIMATE-SMART AGRICULTURE AND FORESTRY STRATEGY: 90-DAY PROGRESS REPORT 10 (2021), https://www.usda.gov/sites/default/files/documents/climate-smart-ag-forestry-strategy-90-day-progress-report.pdf.

[21] *See* Elizabeth Dunn, *The Latest Farm Product: Carbon Credits*, N.Y. TIMES: DEALBOOK (Nov. 23, 2021), https://www.nytimes.com/2021/11/23/business/dealbook/farm-carbon-credits.html.

[22] *See* NAT'L ACADS. OF SCI., ENG'G, & MED., NEGATIVE EMISSIONS TECHNOLOGIES AND RELIABLE SEQUESTRATION: A RESEARCH AGENDA 108 tbl.3.7 (2019), https://www.nap.edu/catalog/25259/negative-emissions-technologies-and-reliable-sequestration-a-research-agenda. This source provides alternate estimates of 305 and 240 tons.

[23] *See* U.S. DEP'T OF AGRIC., *supra* note 20, at 10.

[24] *See* ALEJANDRO PLASTINA & ORANUCH WONGPIYABOVORN, HOW TO GROW AND SELL CARBON CREDITS IN US AGRICULTURE 1 (2021), https://www.extension.iastate.edu/agdm/crops/pdf/a1-76.pdf.

[25] *See generally* Sharon K. Bard & Peter J. Barry, *Assessing Farmers' Attitudes Toward Risk Using the "Closing-in" Method*, 26 J. AGRIC. & RES. ECON. 248 (2001).

something bigger than an inability to choose the right market; namely, frailties in the carbon market private environmental governance (PEG) structure.[26]

According to Michael Vandenbergh and Jonathan Gilligan—leaders in the field of PEG—in their book on the subject, *Beyond Politics: The Private Governance Response to Climate Change*, PEG has the potential to play an important role in addressing climate change.[27] However, the most effective way to structure private climate governance is still taking shape. A review of existing ecosystem markets is instructive. According to Vandenbergh, markets that "only exist if government creates the entitlement and the requirement not to emit in the absence of the entitlement" are better thought of as a form of public governance.[28] VCMs, unlike other forms of ecosystem markets, currently operate with limited governmental oversight.[29]

A unified set of standards for VCMs is needed to resolve differing market standards and create carbon credits of equal quality.[30] The proposals to unify the voluntary carbon marketplace present varying levels of government involvement which straddle the line of private and public environmental governance. A central

[26] *See* Julie Creswell, *Companies' Climate Promises Face a Wildcard: Farmers*, N.Y. TIMES (July 9, 2022), https://www.nytimes.com/2022/07/09/business/farmers-climate-change.html.

[27] *See* MICHAEL P. VANDENBERGH & JONATHAN M. GILLIGAN, BEYOND POLITICS: THE PRIVATE GOVERNANCE RESPONSE TO CLIMATE CHANGE, at ix (2017).

[28] *See* Michael Vandenbergh, *The Emergence of Private Environmental Governance*, 44 ENV'T L. REP. 10,125, 10,127 (2014).

[29] *See* Robert O. Mendelsohn et al., *A Framework to Ensure that Voluntary Carbon Markets Will Truly Help Combat Climate Change*, BROOKINGS (Sept. 16, 2021), https://www.brookings.edu/research/a-framework-to-ensure-that-voluntary-carbon-markets-will-truly-help-combat-climate-change.

[30] *See* Angelyca A. Jackson Hammond et al., *Implementing the Soil Enrichment Protocol at Scale: Opportunities for an Agricultural Carbon Market*, FRONTIERS IN CLIMATE, 21 June 2021, at 1 https://doi.org/10.3389/fclim.2021.686440. "Carbon markets are unusual in that they create financial value for something that is hard to verify (reduced or avoided emissions) and which can be non-permanent (enhanced carbon sinks). Therefore, the rules of the game are important to maintaining trust." TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 35.

governance body for VCMs could improve the integrity of VCMs by establishing standards for validation and verification.[31]

Although it was speculated that the Biden administration, upon taking office, would form a government-backed carbon bank,[32] that did not occur. The United States Supreme Court's decision in *West Virginia v. Environmental Protection Agency*[33] (*West Virginia v. EPA*) has further reduced the likelihood that the Biden administration will be able to address climate change and has heightened the importance of private climate governance. In 2021, Congress, through the Growing Climate Solutions Act (GCSA), appeared ready to legislatively authorize the United States Department of Agriculture (USDA) to have an oversight role for the production of carbon credits.[34] The GCSA included the publication by the USDA of credit generation standards and a system to certify credit verifiers. However, despite overwhelming bipartisan support in the Senate, the GCSA failed to proceed to a vote in the House.[35] Just when all hope seemed lost that the GCSA would pass, the Act was revised and passed as part of the Consolidated Appropriations Act, 2023.[36]

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[31] *See* TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 19.

[32] *See* Mike Dorning, *Biden's USDA Chief Is Exploring Making Carbon Bank for Farmers*, BLOOMBERG (Mar. 21, 2021), https://www.bloomberg.com/news/articles/2021-03-05/biden-s-usda-chief-is-exploring-making-a-carbon-bank-for-farmers#xj4y7vzkg.

[33] *See* West Virginia v. EPA, 142 S. Ct. 2587 (2022) (holding that the Environmental Protection Agency (EPA) did not have the power to regulate carbon emissions from power plants under Section 111(d) of the Clean Air Act without congressional authority).

[34] *See* Chris Clayton, *Groups Support Ag Carbon Credit Bill*, PROGRESSIVE FARMER (Apr. 21, 2021, 3:03 PM), https://www.dtnpf.com/agriculture/web/ag/news/world-policy/article/2021/04/21/growing-climate-solutions-act-bi; *see also* H.R. 2820, 117th Cong. (2021); Quill Robinson, *Senate Plants a Seed for Bipartisan Climate Solutions*, THE HILL (June 25, 2021, 3:30 PM), https://thehill.com/opinion/energy-environment/560221-senate-plants-a-seed-for-bipartisan-climate-solutions.

[35] *See* Brook Detterman et al., *Growing Climate Solutions Act Introduced with Broad Bipartisan Support*, BEVERIDGE & DIAMOND PC (June 8, 2020), https://www.bdlaw.com/publications/growing-climate-solutions-act-introduced-with-broad-bipartisan-support; H.R. 2820, 117th Cong. (2021).

[36] *See* Consolidated Appropriations Act, 2023, Pub. L. No. 117-328, div. HH, tit. I, sec. 201; H.R. 2617 at 1513, 117th Cong. (2021).

Currently, the Biden administration is also supporting significant funding initiatives related to climate-smart agricultural practices.[37] The Inflation Reduction Act of 2022 (Inflation Reduction Act), originally a textual amendment to the Build Back Better Act,[38] was signed into law by President Biden on August 16, 2022.[39] The Inflation Reduction Act, as described more fully in Part IV, authorizes significant funding to support existing agricultural conservation programs and associated USDA conservation program technical assistance.[40] Another federal funding initiative to support VCMs, described more fully below, is the Partnerships for Climate Smart Commodities program which funds innovative pilot research projects related to measuring and verifying carbon sequestration.[41]

The current Farm Bill, set to expire on September 30, 2023,[42] also has the potential to provide additional research and financial support for climate-smart agricultural practices.[43] Although

[37] *See Fact Sheet: How the Inflation Reduction Act Helps Rural Communities,* THE WHITE HOUSE (Aug. 17, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/17/fact-sheet-how-the-inflation-reduction-act-helps-rural-communities; *see also* Press Release, U.S. Dep't of Agric., Biden-Harris Administration Announces Historic Investment in Partnerships for 70 Climate-Smart Commodities and Rural Projects, (Sept. 14, 2022), https://www.usda.gov/media/press-releases/2022/09/14/biden-harris-administration-announces-historic-investment.

[38] *See* Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818 (2022).

[39] *See id.*

[40] *See* Chris Clayton, *Senate Deal Boosts Climate-Smart Ag*, PROGRESSIVE FARMER (July 28, 2022, 3:49 PM), https://www.dtnpf.com/agriculture/web/ag/news/business-inputs/article/2022/07/28/climate-smart-ag-funding-expansion.

[41] *See* Press Release, U.S. Dep't of Agric., USDA to Invest $1 Billion in Climate Smart Commodities, Expanding Markets, Strengthening Rural America (Feb. 7, 2022), https://www.usda.gov/media/press-releases/2022/02/07/usda-invest-1-billion-climate-smart-commodities-expanding-markets.

[42] *See* Agriculture Improvement Act of 2018, Pub. L. No. 115-334, 132 Stat. 4490 (2018).

[43] *See* Garrett Downs, *Climate Advocates See a Path Forward in the Farm Bill: Lining Farmers' Pockets*, POLITICO (Nov. 24, 2022, 7:00 AM), https://www.politico.com/news/2022/11/24/climate-advocates-farm-bill-00070567; Press Release, Congresswoman Chellie Pingree, SEEC Climate and Agriculture Task Force Releases Recommendations for a Climate-Friendly Farm Bill (Nov. 17, 2022), https://pingree.house.gov/news/documentsingle.aspx?DocumentID=4380.

increased federal funding for climate smart farming practices may increase the number of farmers implementing practices that sequester carbon, the funding will have limited impact on many of the existing issues described in this Article that dissuade farmers from participating in VCMs. However, an influx in funding for conservation practices in combination with the recent passage of the GCSA has the potential, through a public-private form of environmental governance, to unify VCMs and increase interest from the agricultural sector.

To explain how hybrid public-private environmental governance for VCMs will entice the agricultural sector to generate credits, this Article is structured around three propositions. The first is that the agricultural sector plays a central role in addressing climate change. Part I demonstrates that although farming in the United States contributes to GHG emissions, farms also have tremendous potential, through the adoption of climate-friendly farming practices, to create carbon credits. The second proposition is that VCMs are the preferred mechanism to facilitate emissions reductions pledges. Part II describes ecosystem markets and how VCMs emerged as the most viable PEG solution to the climate crisis. The third proposition is that the agricultural sector is not actively generating carbon credits and governmental support is needed to spur credit generation. Part III examines how VCM standards have created barriers to market entry for the agricultural sector. Part IV details the proposed legal solutions to resolve the barriers to entry, and how these proposals will impact the functionality of VCMs.

I. CLIMATE CHANGE AND THE AGRICULTURAL SECTOR

To understand the need for a robust voluntary carbon marketplace, it is first necessary to examine the threat of climate change and agriculture's role as both a cause of and solution to GHG emissions.[44] The Earth's average surface temperature is projected to

[44] "According to a 2019 report by the National Academy of Sciences, agricultural practices to enhance soil carbon storage can sequester 250 million tons of carbon dioxide annually in the U.S., equivalent to around 4% of the country's emissions." PLASTINA & WONGPIYABOVORN, *supra* note 24, at 1; *see* NAT'L ACADS. OF SCI., ENG'G, & MED., *supra* note 22, at 108 tbl.3.7; ALEJANDRO PLASTINA, HOW DO DATA AND PAYMENTS FLOW THROUGH AG CARBON PROGRAMS? 1 (2021), https://www.extension.iastate.edu/agdm/crops/pdf/a1-77.pdf.

continue to increase by an additional 3.2°F to 7.2°F over the twenty-first century.[45] These seemingly slight changes in temperature could have profound implications, including extreme weather events and rapid sea-level rise.[46] The cause of rising temperatures is attributed to an increase in carbon dioxide and other GHGs from the use of "fossil fuels, deforestation, agriculture and other industrial activities."[47] GHGs "trap[] the heat of the sun before it can be released back into space . . . resulting in a global warming effect."[48]

In 2020, the agricultural sector generated approximately 11 percent of U.S. GHG emissions.[49] Agricultural soil management is the largest source of the agricultural sector's GHG emissions and specifically nitrous oxide emissions.[50] The types of agricultural activities that lead to nitrous oxide emissions include the application of synthetic fertilizers, livestock manure and "other organic materials such as biosolids," the "retention of crop residue" in fields, and drainage of organic soils.[51] Another significant source of the GHG emissions from agriculture is enteric fermentation, which produces methane from the digestive processes of livestock.[52] Manure management and storage also contribute to the production of GHG emissions.[53] Less significant sources of agricultural emissions include

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[45] *See* EPA, THE EFFECT OF CLIMATE CHANGE ON WATER RESOURCES AND PROGRAMS, https://cfpub.epa.gov/watertrain/moduleFrame.cfm?parent_object_id=2431 (last visited Mar. 20, 2023).

[46] *See* INTERNATIONAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY, SIXTH ASSESSMENT REPORT, TECHNICAL SUMMARY 58–62 (2021).

[47] JEFF SCHAHCZENSKI & HOLLY HILL, NAT'L CTR. FOR APPROPRIATE TECH., AGRICULTURE, CLIMATE CHANGE AND CARBON SEQUESTRATION 2 (2009), https://www.canr.msu.edu/foodsystems/uploads/files/ag-climate-change.pdf.

[48] *Id.*

[49] *See Sources of Greenhouse Gas Emissions*, EPA (Aug. 5, 2020), https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#agriculture; *see also* RENÉE JOHNSON, CONG. RSCH. SERV., IF10979, GREENHOUSE GAS EMISSIONS AND SINKS IN U.S. AGRICULTURE (2018), https://sgp.fas.org/crs/misc/IF10979.pdf.

[50] *See* EPA, EPA 430-R-22-003, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2020, at 5-1 (2022).

[51] *Id.* at 5-27 to 5-28.

[52] *See Sources of Greenhouse Gas Emissions*, *supra* note 49.

[53] *See id.*

"CO_2 from liming and urea application, CH_4 from rice cultivation, and burning crop residues, which produces CH_4 and N_2O."[54]

In 2015, after decades of negotiations, 196 parties, including the United States, adopted the Paris Agreement, pledging to reduce their GHG emissions.[55] Although the Trump administration withdrew from the Paris Agreement in 2017, President Biden rejoined the Agreement on his first day in office.[56] Signatories to the Paris Agreement are tasked with setting pledges to reduce emissions and increase reductions goals every five years.[57] After making its emissions reductions pledge, the Biden administration asked the USDA[58] to "develop a strategy for climate-smart agriculture and forestry [(CSAF)] as part of a whole-of-government effort to address the climate crisis."[59] Arguably, the most important role the agricultural sector can play in the climate crisis is as a vital source of carbon

[54] *Id.*

[55] *See* Renee Cho, *The U.S. Is Back in the Paris Agreement. Now What?*, COLUM. CLIMATE SCH.: STATE OF THE PLANET (Feb. 4, 2021), https://news.climate.columbia.edu/2021/02/04/u-s-rejoins-paris-agreement.

[56] *See id*.

[57] *See id*. The new target for the U.S. is to achieve a fifty to fifty-two percent reduction from 2005 levels in economy-wide net GHG pollution in 2030. *See Fact Sheet: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies*, THE WHITE HOUSE (Apr. 22, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies. According to a report from the United Nations Climate Change, the emission reduction goals set by the signatories to the Paris Agreement will be insufficient to fulfill the terms of the Agreement. "*Climate Commitments Not On Track to Meet Paris Agreement Goals" as NDC Synthesis Report Is Published*, U.N. CLIMATE CHANGE NEWS (Feb. 26, 2021), https://unfccc.int/news/ climate-commitments-not-on-track-to-meet-paris-agreement-goals-as-ndc-synthesis-report-is-published.

[58] On January 27, 2021, President Joe Biden signed Exec. Order No. 14,008, Tackling the Climate Crisis at Home and Abroad, 86 Fed. Reg. 7619 (Jan. 27, 2021). "This Executive Order directs federal agencies to coordinate a Government-wide approach to combat the climate crisis. Recognizing the important role that agriculture and forestry will play in climate change mitigation and resilience, the Executive Order tasked the U.S. Secretary of Agriculture to deliver a report with recommendations for a climate-smart agriculture and forestry strategy." U.S. DEP'T OF AGRIC., *supra* note 20, at 2.

[59] U.S. DEP'T OF AGRIC., *supra* note 20, at 1.

offset credits through soil sequestration and reduced or avoided GHG emissions.[60]

The generation of agricultural carbon credits via carbon sequestration "operates under the philosophy that plants have the potential to increase soil organic matter by trapping larger levels of CO_2 using photosynthesis."[61] Plants are able to sequester carbon by drawing it down from the air into the soil through root systems and during decomposition by depositing the carbon underground.[62] There are numerous regenerative farming practices that sequester carbon such as those that minimize soil disturbance, incorporate additional organic material into the soil, and encourage crop diversity.[63]

U.S. farmers can minimize soil disturbance by reducing tillage through conservation tillage or no-till farming, incorporating crop residue into the soil, and using synthetic herbicides to kill unwanted weeds instead of using tillage.[64] Reducing tillage has well-known soil health benefits such as increased water retention and reduced soil erosion.[65] U.S. farmers can reduce tillage because of the availability of herbicide-tolerant crops.[66]

Planting cover crops, most commonly winter cover crops, is an effective way for farmers to incorporate additional organic material

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[60] *See Climate Change*, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV. (June 10, 2022), https://www.ers.usda.gov/topics/natural-resources-environment/climate-change; Peter Lehner & Nathan A. Rosenberg, *Legal Pathways to Carbon-Neutral Agriculture*, 47 ENV'T L. REP. 10,845, 10,846–47 (2017).

[61] Alexia Brunet Marks, *(Carbon) Farming Our Way Out of Climate Change*, 97 DENV. L. REV. 497, 506 (2020).

[62] *See id*. at 503.

[63] *See id*. at 506–07 (citing REGENERATIVE AGRIC. INITIATIVE & CARBON UNDERGROUND, WHAT IS REGENERATIVE AGRICULTURE? (2017), https://regenerationinternational.org/2017/02/24/what-is-regenerative-agriculture).

[64] ROGER CLAASSEN ET AL., U.S. DEP'T OF AGRIC. ECON. RSCH. SERV., TILLAGE INTENSITY AND CONSERVATION CROPPING IN THE UNITED STATES 1 (2018), https://www.ers.usda.gov/webdocs/publications/90201/eib-197.pdf?v=1787.1.

[65] *See id.* at iii. Conservation tillage was used on seventy percent of soybean (2012), sixty-five percent of corn (2016), and sixty-seven percent of wheat (2017) acres.

[66] *See id*. at 1.

into the soil and thereby sequester carbon.[67] The presence of a cover crop on fields that would typically lay fallow feeds soil microbes and increases the carbon in the soil.[68] The amount of carbon stored in soil is reduced if farmers use tillage to remove a cover crop; therefore, to maximize carbon sequestration, it is recommended that farmers combine reduced tillage and cover crops.[69] Crop rotation encourages crop diversity and also sequesters carbon in the soil.[70] Crop rotations also improve overall soil health, reduce weed and pest cycles, and minimize soil erosion.[71]

Carbon credits can also be generated by reducing or avoiding GHG emissions.[72] Row crop farmers are able to reduce or avoid GHG emissions by improving nitrogen efficiency for their crops through controlled applications of fertilizers.[73] Farmers who raise livestock can reduce carbon emissions by changing livestock feed or installing digesters to capture methane produced during manure storage. The captured methane can then be used to generate electricity and offset emissions that would have come from fossil fuel-based electricity.[74] Livestock producers can also reduce GHG

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67 *See* Marks, *supra* note 61, at 508.

68 *See* ANDY CLARK, SUSTAINABLE AGRIC. RSCH. & EDUC., COVER CROPS AND CARBON SEQUESTRATION, 1, 4 (2015), https://www.sare.org/wp-content/uploads/Cover-Crops-for-Sustainable-Crop-Rotations.pdf.

69 *See* DEB O'DELL & NEAL EASH, UNIV. OF TENN. INST. OF AGRIC., PUTTING CARBON INTO SOIL 7 (2020), https://www.agronomy.org/files/science-policy/caucus/briefings/2020-05-soil-health-climate-change.pdf; Noah Wicks, *Saving the Planet by Saving the Soil: Can Cover Crops Fulfill Their Promise?*, AGRI-PULSE (Nov. 29, 2021, 1:00 PM), https://www.agri-pulse.com/articles/16867-saving-the-planet-by-saving-the-soil-can-cover-crops-fulfill-their-promise.

70 *See Soil Tillage and Crop Rotation*, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV. (Apr. 28, 2022), https://www.ers.usda.gov/topics/farm-practices-management/crop-livestock-practices/soil-tillage-and-crop-rotation; Magnus Land et al., *How Do Selected Crop Rotations Affect Soil Organic Carbon in Boreo-Temperate Systems? A Systematic Review Protocol*, ENV'T EVIDENCE, Apr. 17, 2017, at 2, https://doi.org/10.1186/s13750-017-0086-y.

71 *See* CLAASSEN ET AL., *supra* note 64, at 1, 4.

72 *See* STUBBS ET AL., *supra* note 3, at 12.

73 *See id*.

74 *See id*.; *see also* SCHAHCZENSKI & HILL, *supra* note 47, at 7, 12.

emissions through modified pasturing methods like silvopasture—grazing animals in forested land rather than fields.[75]

In addition to the soil health benefits from the farming practices that sequester carbon,[76] there are also financial incentives available for farmers to defray the costs associated with adopting sustainable agricultural practices.[77] Federal conservation programs, such as the Conservation Reserve Program (CRP), provide funding to farmers to take highly erodible or environmentally sensitive farmland out of production for ten to fifteen years.[78] Converting farmland to land planted in grass or trees has a myriad of conservation benefits and sequesters carbon.[79] The CRP is a very popular program with over twenty million acres enrolled in 2021.[80] Beginning in 2021, the USDA, through the Climate Smart Practice Incentive, also began offering additional CRP financial incentives to specifically encourage the use of CRP to sequester carbon.[81]

The Environmental Quality Incentives Program (EQIP) is another federal conservation program that provides financial incentives for the adoption of production methods, such as conservation

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[75] *See* Marks, *supra* note 61, at 510 (citing REGENERATIVE AGRIC. INITIATIVE & CARBON UNDERGROUND, *supra* note 63).

[76] *See Soil Health*, U.S. DEP'T OF AGRIC. NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health (last visited Mar. 18, 2023).

[77] *See* MEGAN STUBBS, CONG. RSCH. SERV., RL34042, AGRICULTURE CONSERVATION IN THE 2018 FARM BILL 1 (2019), https://crsreports.congress.gov/product/pdf/R/R45698.

[78] *See* FARM SERVICE AGENCY, U.S. DEP'T OF AGRIC., CONSERVATION RESERVE PROGRAM 1 (2022), https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2019/conservation-reserve_program-fact_sheet.pdf.

[79] *See id.*

[80] *See* Chris Clayton, *USDA Opens CRP Enrollment, Looking to Hit 25.5 Million Total Acres in Program*, AG POLICY BLOG (Jan. 26, 2022, 3:28 PM), https://www.dtnpf.com/agriculture/web/ag/news/article/2022/01/28/dtn-ag-policy-blog-usda-opens-crp-25.

[81] *See* News Release, U.S. Dep't of Agric. Farm Serv. Agency, USDA Accepts 2 Million Acres in Offers Through Conservation Reserve Program General Signup (May 3, 2022), https://www.fsa.usda.gov/news-room/news-releases/2022/usda-accepts-2-million-acres-in-offers-through-conservation-reserve-program-general-signup.

tillage and cover crops, that sequester carbon.[82] As described more fully in Part IV, some of the recent legislative attempts to support VCMs include significant increased funding for federal conservation programs.

Despite the potential benefits and existing incentives, adopting new farming practices involves additional operational costs and, in some cases, negative impacts on crop yields.[83] The financial and logistical challenges to utilizing regenerative farming practices have led to only a small percentage of U.S. farmers adopting them.[84] Generating carbon credits has the potential to benefit the agricultural sector by increasing the adoption of regenerative farming practices "while maximizing carbon sequestration and co-beneficial outcomes to soil and crops."[85] However, to convince farmers to adopt regenerative practices based on the promise of carbon credit generation and sale, farmers need greater assurance than is currently being offered by VCMs that the risks they take will be rewarded.[86]

II. PRIVATE CLIMATE GOVERNANCE, THE MECHANICS OF ECOSYSTEM MARKETS, AND THE ROLE OF CARBON MARKETS

A. Private Climate Governance

According to Vandenbergh and Gilligan, "private climate governance is not a sideshow but is one of the few ways to bypass government gridlock and achieve major emissions reductions over the next decade."[87] To understand private climate governance, it is

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[82] *See* JOHN HOROWITZ & JESSICA GOTTLIEB, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV., ECON. BRIEF NO. 15, THE ROLE OF AGRICULTURE IN REDUCING GREENHOUSE GAS EMISSIONS 7–8 (2010), https://www.ers.usda.gov/webdocs/publications/42842/8494_eb15_1_.pdf?v=211.

[83] *See* Plume, *supra* note 2.

[84] For example, according to the most recent Census of Agriculture, cover crops were planted on 3.9% of U.S. farmland. *See* Carl Zulauf & Ben Brown, *Cover Crops, 2017 US Census of Agriculture*, FARMDOC DAILY (July 24, 2019), https://farmdocdaily.illinois.edu/2019/07/cover-crops-2017-us-census-of-agriculture.html.

[85] Jackson Hammond et al., *supra* note 30, at 2.

[86] *See* Interview with Trey Hill, Farmer (Feb. 19, 2022) (on file with author) ("Who would increase complexity in their business if it isn't for more profit?").

[87] Michael P. Vandenbergh & Jonathan A. Gilligan, *Beyond Gridlock*, 40 COLUM. J. ENV'T L. 217, 225–26 (2015).

useful to examine how it came to be the most viable option for the United States to address climate change. The Clean Water Act (CWA), the Clean Air Act (CAA), and other command-and-control environmental laws passed from 1970 through 1990 have "led to significant reductions in emissions of targeted pollutants and improvements in environmental quality in the United States."[88] Following the passage of amendments to the CAA in 1990, the United States has only been able to pass one major command-and-control environmental protection law: revisions to the Toxic Substance Control Act in 2016.[89] The United States has been unable to pass a federal law regulating GHG emissions such as the institution of a carbon tax[90] or a cap-and-trade[91] program.[92]

According to Vandenbergh and Gilligan in *Beyond Gridlock*, the reasons federal climate legislation has not passed include the nature of the climate change problem and the design of the federal government.[93] Climate change is a difficult issue to address through legislation because "individuals and organizations can externalize the harms of carbon-emitting behaviors."[94] In other words, the harm caused by the actions is widely dispersed.[95] Further, many of the benefits to addressing climate change will not be enjoyed in the present, but by future generations.[96] The design of our legislative system is another constraint on the passage of climate change

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88 Michael Vandenbergh, *The Social Meaning of Environmental Command and Control*, 20 VA. ENV'T L.J. 191, 194 (2001).

89 *See* Joshua Galperin, *Environmental Governance at the Edge of Democracy*, 39 VA. ENV'T L.J. 70, 79–80 (2021) (citing *Assessing and Managing Chemicals Under TSCA: The Frank R. Lautenberg Chemical Safety for the 21st Century Act*, EPA, https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/frank-r-lautenberg-chemical-safety-21st-century-act (Mar. 22, 2022)).

90 *See* David E. Rosenbaum, *Clinton Backs Off Plan for New Tax on Heat in Fuels*, N.Y. TIMES (June 9, 1993), https://www.nytimes.com/1993/06/09/us/clinton-backs-off-plan-for-new-tax-on-heat-in-fuels.html.

91 *See* John M. Broder, *'Cap and Trade' Loses Its Standing as Energy Policy of Choice*, N.Y. TIMES (Mar. 25, 2010), https://www.nytimes.com/2010/03/26/science/earth/26climate.html.

92 *See* Vandenbergh & Gilligan, *supra* note 87, at 236.

93 *See id.*

94 *Id.*

95 *See id.*

96 *See id.*

legislation because of the need for support from the President, the House, and at least sixty members of "the Senate to avoid a filibuster."[97] According to Matto Mildenberger, the numerous veto points in the U.S. political system are a problem for climate legislation because fossil fuel interests are bipartisan.[98] Democrats typically represent labor unions and industrial workers and Republicans typically protect corporations and business interests.[99] Because both political parties represent special interest groups that could be harmed by the federal regulation of GHG emissions, both parties have reasons to be unsupportive of legislation aimed at addressing climate change.[100] Another bipartisan barrier to climate mitigation efforts are personally held beliefs about the role of government. According to Vandenbergh and Gilligan, research suggests climate mitigation often triggers big government concerns across political parties and reduces the likelihood of successful government climate mitigation policies in the United States.[101] In the absence of federal command-and-control legislation, PEG has "turned out to be most prominent in the area of climate change."[102] As is more fully described in Part IV, the prediction of the vital role PEG will play in the fight against climate change has been underscored by the recent chilling effect of the Supreme Court's decision in *West Virginia v. EPA*.[103]

B. Private Environmental Governance

PEG occurs when the private sector takes on roles traditionally held by the government such as "reducing negative externalities, providing public goods, [and] managing common pool

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97 *Id.*; *see also* Shannon Osaka, *Is the US Uniquely Bad at Tackling Climate Change?*, GRIST (Jan. 6, 2022), https://grist.org/politics/is-american-democracy-uniquely-bad-at-tackling-climate-change.

98 *See* MATTO MILDENBERGER, CARBON CAPTURED: HOW BUSINESS AND LABOR CONTROL CLIMATE POLITICS 99, 100 (2020).

99 *See* Amy Scott & Richard Cunningham, *Why It's so Hard to Pass Climate Crisis Legislation in the U.S.*, MARKETPLACE (Jan. 27, 2022), https://www.marketplace.org/2022/01/27/why-its-hard-pass-climate-crisis-legislation-u-s.

100 *See id.*

101 *See* Vandenbergh & Gilligan, *supra* note 87, at 237.

102 Dan Farber, *Continuity and Transformation in Environmental Regulation*, 10 ARIZ. J. ENV'T L. & POL'Y 1, 12 (2019).

103 *See* West Virginia v. EPA, 142 S. Ct. 2587 (2022).

resources."[104] The advantage of PEG is that it is not subject to the roadblocks that confront public governance, such as "political barriers, lack of capacity, or jurisdictional limits."[105] The focus of PEG is viability.[106] PEG has an advantage over public governance, which must "consider not just the ideal functionality of … solutions, but their political odds."[107] The ability of PEG to address climate change without the need for federal climate legislation is one of the reasons it has emerged as a viable form of governance to address climate change in the United States.[108] However, according to Vandenbergh and Gilligan, "the central question for private climate governance is how private initiatives can induce emissions reductions in the absence of government intervention."[109]

The deregulatory approach of the Trump administration and the withdrawal from the Paris Agreement caused responsive GHG emission reduction pledges from many private organizations and state and local governments.[110] Vandenbergh and Gilligan explain that the reasons large corporations undertook private climate initiatives following the withdrawal from the Paris Agreement include investor pressure,[111] supply chain pressure,[112] consumer willingness to pay a premium for sustainable products,[113] and the desire to maintain a positive corporate brand.[114] Private climate governance initiatives play a quasi-governmental role by creating entitlements in emissions reductions and have the potential to reduce transaction costs.[115] The private actors in private climate governance initiatives

104 *See* Michael P. Vandenbergh & Bruce M. Johnson, *The Role of Private Environmental Governance in Climate Adaption*, FRONTIERS IN CLIMATE, 10 Sept. 2021, at 2, https://www.frontiersin.org/articles/10.3389/fclim.2021.715368/full.

105 Vandenbergh, *supra* note 28, at 10,131; *see also* Galperin, *supra* note 89, at 90.

106 *See* Galperin, *supra* note 89, at 91.

107 *Id.*

108 *See* Vandenbergh & Gilligan, *supra* note 87, at 225.

109 *Id*. at 242.

110 Farber, *supra* note 102, at 13.

111 *See* VANDENBERGH & GILLIGAN, *supra* note 27, at 10–11.

112 *See id.* at 145.

113 *See id.* at 142.

114 *See id.* at 143.

115 *See* Vandenbergh & Gilligan, *supra* note 87, at 252.

can reduce transaction costs by providing credible information about emissions and emissions reductions.[116]

While private climate governance initiatives can serve an important role, according to Maria Banda in *The Bottom-Up Alternative: The Mitigation Potential of Private Climate Governance After the Paris Agreement*, these initiatives may unevenly distribute climate commitments across companies and sectors, create accountability and integrity concerns, and set cosmetic targets that companies fail to reach.[117] A recent study of twenty-five companies with net-zero emission pledges completed by the New Climate Institute reflects accountability and integrity concerns.[118] According to the study, many of the companies examined "are misleading consumers by using accounting practices that make their environmental goals relatively meaningless or are excluding key parts of their businesses in their calculations."[119] These findings emphasize the need for a strong governance framework to credibly carry out private climate initiatives.[120]

C. Multilateral Standard Setting

Multilateral standard setting is a type of PEG involving a certification system meant to provide consistency across an industry.[121] In these systems, standards are created and entities who agree to follow the standards and are certified may then display the certification.[122] An often cited example of multilateral standard setting is Marine Stewardship Council (MSC) certified seafood.[123] The MSC

116 *See id*.

117 *See* Banda, *supra* note 16, at 370–71.

118 *See* Associated Press, *Corporate Climate Pledges Are Weaker Than They Seem, a New Study Reports*, NPR (Feb. 7, 2022), https://www.npr.org/2022/02/07/1079009751/corporate-climate-pledges-are-weaker-than-they-seem-a-new-study-reports.

119 *Id*.; *see also* THOMAS DAY ET AL., NEW CLIMATE INST., CORPORATE CLIMATE RESPONSIBILITY MONITOR 2022, 17 (2022), https://newclimate.org/wp-content/uploads/2022/02/CorporateClimateResponsibilityMonitor2022.pdf.

120 *See* TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 19.

121 *See* Galperin, *supra* note 89, at 81–82.

122 *See id.* at 82.

123 *See, e.g.*, *id.* at 82.

certification was generated by Unilever, "an international consumer goods corporation, and the World Wildlife Fund, an environmental advocacy group…to create and administer fisheries standards" that ensure that "[o]nly seafood that meets the MSC requirements is eligible for the MSC label."[124] Bearing the MSC label is valuable for the seafood industry because some large retailers like Walmart only sell seafood that is MSC certified and because the label confers a better reputation.[125]

There are non-governmental groups, such as the Integrity Council for Voluntary Carbon Markets (Integrity Council), that are attempting to establish multilateral standards for VCMs.[126] The Integrity Council's carbon core principles and related assessment framework are meant to create a standardized benchmark to reduce confusion and allow buyers to identify high quality carbon credits more easily.[127] The Taskforce for Scaling Voluntary Carbon Markets is another private-sector-led initiative advocating for the adoption of core carbon principles.[128] The carbon principles "set out threshold quality criteria to which a carbon credit and the supporting standards and methodologies should adhere…[and represent] a foundational step that would enable other recommended actions to work toward high-integrity market scaling and achieving Paris Agreement emissions goals."[129]

The suggestion in this Article for the need for VCMs to come together to adopt multi-lateral standards is supported by the background principles of PEG analyzed by Joshua Galperin in his article, *Environmental Governance at the Edge of Democracy*.[130] Galperin

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124 *Id.*

125 *See id.*; *see also Buy Sustainable Seafood,* MARINE STEWARDSHIP COUNCIL, https://www.msc.org/what-you-can-do/buy-sustainable-seafood (last visited Nov. 20, 2022).

126 *See* J. Paul Forrester & Nadav C. Klugman, *More Standard Setting for Standard-Setters: This Time for Voluntary Carbon Markets*, MAYER BROWN: PERSPECTIVES & EVENTS (Aug. 3, 2022), https://www.mayerbrown.com/en/perspectives-events/publications/2022/08/more-standard-setting-for-standardsetters-this-time-for-voluntary-carbon-markets.

127 *See id.*

128 *See* TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 3.

129 *See id*. at 11.

130 *See* Galperin, *supra* note 89.

explores whether PEG "lacks critical features of public governance."[131] Galperin's interpretation of the PEG literature is that for PEG to work most effectively it must work in concert with public governance and neither governance structure should replace the other.[132] This Article agrees with Galperin that PEG has distinct advantages to addressing climate change, however, it is important to "consider whether it lacks critical features of public governance."[133] This Article asserts that the adoption of unifying standards is a facet of public governance that could improve the credibility and functionality of VCMs. Those unifying standards could come from government regulation—a form of public governance—the adoption of multilateral standards by multiple VCMs—a form of PEG—or through a hybrid public-private form of environmental governance.

D. Ecosystem Markets

To discern the best way forward for VCMs, it is important to understand the history of ecosystem markets and how VCMs compare to other similar ecosystem markets. Although it may be tempting to put VCMs in the same category as all other ecosystem markets, the PEG structure of VCMs is an important distinction. The term ecosystem markets[134] typically refers to markets that involve the trade of credits related to ecosystem services.[135] Ecosystem services, the tradeable goods in ecosystem markets, are the benefits society obtains from nature, such as water filtration, wildlife habitat, carbon sequestration, recreation, etc.[136] Typically, services provided

131 *Id*. at 72.

132 *See id.* at 72.

133 *Id.*

134 Ecosystem markets, sometimes referred to payments for ecosystem services, are synonymous terms used to describe the suite of economic tools such as direct payments, tax incentives, cap-and-trade markets, voluntary markets, and certification programs. *See* Tom Lindley, *Ecosystem Markets: A Very Short Introduction*, AM. BAR ASS'N 2–3 n.2 (Oct. 2018), https://www.americanbar.org/content/dam/aba/administrative/environment_energy_resources/2018/fall/course_materials/15-lindley.pdf.

135 *See id*. at 2.

136 *See* RENEE JOHNSON, CONG. RSCH. SERV., RL34042, PROVISIONS SUPPORTING ECOSYSTEM SERVICES MARKETS IN U.S. FARM BILL LEGISLATION 1 (2009), https://nationalaglawcenter.org/wp-content/uploads/assets/crs/ RL34042.pdf.

by nature are not valued in a marketplace; however, entities with an interest in improving the availability of an ecosystem service may be willing to pay for the service via an ecosystem market.[137] These markets offer land owners the opportunity of financial compensation "for specific voluntary restoration activities that improve ecosystem services."[138]

Ecosystem markets are often driven by regulations, such as the CWA, which spur buyers to acquire environmental services credits to mitigate the climate harms of their activities and remain in regulatory compliance.[139] In other words, in ecosystem markets the government "creates the entitlement and the requirement not to emit in the absence of the entitlement."[140] The role of the government in the creation and implementation of these programs creates an important distinction. According to Vandenbergh and Gilligan, ecosystem markets "are better thought of as a form of public governance that creates and harnesses private market behavior, not as a form of direct private environmental governance."[141]

E. Water Quality Trading Markets

Although a form of public governance, water quality trading (WQT) markets are comparable to VCMs because of their similar reliance on the agricultural sector for credit generation.[142] WQT markets have faced many of the same challenges facing VCMs[143] and a comparison sheds lights on the best governance structure of VCMs. WQT allows a polluter, required to limit the amount of nutrients it releases into an impaired water body, to avoid costly upgrades to infrastructure to reduce pollution by purchasing water quality credits from a typically unregulated source, such as a farmer,

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137 *See* Nicole Balloffet et al., *Ecosystem Services*, CLIMATE CHANGE RES. CTR. (Feb. 4, 2012), www.fs.usda.gov/ccrc/topics/ecosystem-services.

138 *See id*.

139 *See id*.

140 Vandenbergh, *supra* note 28, at 10,127.

141 *Id.*

142 *See* JOHNSON, *supra* note 136, at 2.

143 *See* Marc Ribaudo, *Agriculture and Water Quality Trading: Exploring the Possibilities*, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV. (Mar. 1, 2009), https://www.ers.usda.gov/amber-waves/2009/march/agriculture-and-water-quality-trading-exploring-the-possibilities.

who can take steps to reduce nutrient loading in the same watershed.[144]

WQT programs are typically established as a result of limitations on nutrient loading established for water bodies regulated by the CWA.[145] Through policy, the Environmental Protection Agency (EPA) has encouraged WQT as a way to comply with the CWA and established limitations for trading.[146] Numerous states have also adopted "statewide regulatory authority for trading through statute, regulation, policy, or guidance."[147] Federal and state agencies also provide technical and financial assistance for WQT through "grant programs, cost-share programs, WQT guidance, and landowner outreach and education efforts."[148]

Despite the proliferation of WQT programs,[149] the participation in trading remains low.[150] The reasons why WQT has not become a mainstream practice are multi-faceted and relevant to VCMs.[151] One of the issues WQT markets wrestle with for trading between point sources and agricultural nonpoint sources is quantifying agricultural nutrient reductions.[152] Quantification of tradeable credits results in increased transaction costs related to the difficulty of measuring

144 *See Water Quality Trading*, MINN. POLLUTION CONTROL AGENCY, https://www.pca.state.mn.us/water/water-quality-trading (last visited Mar. 18, 2023).

145 *See* Victor B. Flatt, *C(r)ap and Trade: The Brave New World of Non-point Source Nutrient Trading and Using Lessons from Greenhouse Gas Markets to Make it Work*, 52 HOUS. L. REV. 301, 308 (2014); *see also* WORLD RES. INST., CURRENT AND POTENTIAL ROLES FOR GOVERNMENT IN FACILITATING WATER QUALITY MARKETS 1, https://www.usda.gov/sites/default/files/documents/WRI_Government_Roles_WQTMarkets.pdf.

146 *See* WORLD RES. INST., *supra* note 145, at 2.

147 *Id.*

148 *Id*.

149 "Trading programs are spread throughout thirty states and almost as many watersheds." Flatt, *supra* note 145, at 307.

150 Chris Lewis, *Building Demand in US Water Quality Trading Markets*, CONSERVATION FIN. NETWORK (Sept. 25, 2019), https://www.conservationfinancenetwork.org/2019/09/25/building-demand-in-us-water-quality-trading-markets.

151 *See* Flatt, *supra* note 145, at 335–36.

152 *See id*. at 335.

environmental services.[153] Farmers also face transaction costs related to assessing whether on-farm pollution reductions match "the type, amount, and timing of pollutant reductions . . . needed by regulated dischargers."[154]

WQT programs are also often considered complex in both design and application and the complexity creates "a steep learning curve" for participants.[155] Another impediment to the wide-scale adoption of WQT is the concern that allowing a non-point source to compensate for a point source will facilitate harmful environmental impacts in the vicinity of the point source.[156] WQT has the potential to negatively impact the environment by concentrating pollution on an impaired waterbody or otherwise altering habitats due to physical land intervention.[157] The voluntary carbon marketplace suffers from many of the same pitfalls as WQT, namely, high transaction costs related to the quantification of tradeable credits, an undue burden on farmer-generators to create and measure credits, and environmental justice concerns.[158] To prevent history from repeating itself, the proposed policy solutions to strengthen the PEG structure of VCMs described more fully below, should also address the frailties of similar ecosystem markets such as WQT markets.

F. Carbon Markets

The lack of viable options to address GHG emission reductions has created the need for VCMs.[159] When GHG emissions are

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153 *See* Marc Ribaudo et al., *The Use of Markets to Increase Private Investment in Environmental Stewardship*, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV. (Sept. 2008), https://www.ers.usda.gov/publications/pub-details/?pubid=46077.

154 *Id.*

155 WILLAMETTE P'SHIP & ECOSYSTEM MARKETPLACE, BREAKING DOWN BARRIERS: PRIORITY ACTIONS FOR ADVANCING WATER QUALITY TRADING 10 (2018), http://willamettepartnership.org/wp-content/uploads/2018/10/Breaking-Down-Barriers_Priority-Actions-for-Advancing-WQT.pdf.

156 *See* Flatt, *supra* note 145, at 336.

157 *See id*.

158 *See id.* at 335–42.

159 *See* Oliver Miltenberger et al., *The Good Is Never Perfect: Why the Current Flaws of Voluntary Carbon Markets Are Services, Not Barriers to Successful Climate Change Action*, FRONTIERS IN CLIMATE, Oct. 14, 2021, at 2, https://www.frontiersin.org/articles/10.3389/fclim.2021.686516/full; "Companies turn to voluntary carbon markets to compensate or neutralize emissions not yet eliminated

reduced or atmospheric carbon is sequestered, it "generates a credit which can then be bought or sold on within [sic] the voluntary market."[160] A carbon credit typically represents one metric ton of carbon dioxide (CO_2) or the equivalent amount of GHG—methane, nitrous oxide, etc.[161] VCMs "support a wide range of activities that increase sequestration or avoid GHG emissions."[162] Carbon markets can be either compliance or voluntary markets.[163] In compliance markets, referred to as cap-and-trade, the government sets pollution limits and allows polluters who cannot meet the required limit to purchase allocations representing pollution reductions.[164] Although the United States does not have a national carbon cap-and-trade system, these types of compliance systems can be adopted on the state and regional level, as has been done in California and in the Regional Greenhouse Gas Initiative.[165]

VCMs have developed without a central oversight authority present in other ecosystem markets.[166] In 2003, the Chicago Climate Exchange (CCX) became the first centralized VCM.[167] The prices on the CCX "tended to be less than $5 per ton of carbon dioxide and

because it is either not possible or prohibitively expensive to directly reduce emissions from all activities across their value chains, such as from business travel, shipping, or cement production for construction." TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 9.

160 Brigit Rollins, *Senate Advances Carbon Market Bill*, NAT'L AGRIC. L. CTR. (Apr. 22, 2021), https://nationalaglawcenter.org/senate-advances-carbon-market-bill.

161 *See What Questions Should Farmers Ask About Selling Carbon Credits?*, WIS. STATE FARMER (Apr. 18, 2021, 6:43 PM), https://www.wisfarmer.com/story/news/2021/04/18/what-farmers-should-know-selling-carbon-credits/7280044002.

162 David Cooley & Lydia Olander, *Stacking Ecosystem Services Payments: Risks and Solutions*, 42 ENV'T L. REP. 10,150, 10,153 (2012).

163 *See* WIS. STATE FARMER, *supra* note 161.

164 *See id.*

165 *See Cap-and-Trade Program*, CAL. AIR RES. BD., https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program (last visited Aug. 10, 2022); *Welcome,* REG'L GREENHOUSE GAS INITIATIVE, https://www.rggi.org/ (last visited Sept. 14, 2022).

166 *See* STUBBS ET AL., *supra* note 3, at 8, 30.

167 *See* Mendelsohn et al., *supra* note 29; TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 38.

eventually collapsed to zero in 2010."[168] The closure of the CCX is attributed to the failure to pass federal legislation that would have created a regulatory driver for the market.[169]

The adoption of the Paris Agreement in 2015 reinvigorated the voluntary carbon marketplace, and in 2021 VCMs generated over $1 billion globally in transactions.[170] In the United States, VCMs can take many different forms and vary widely in the types of credits they will verify and sell.[171]

A lack of "recognized central authority and no universally accepted standards or guidelines for generating offsets" is the reason for variability among VCMs.[172] Carbon offsets represent a "measurable reduction, avoidance, or sequestration of GHG emissions" and they are used to "compensate for emissions elsewhere."[173] To measure the reduction value of a carbon offset project, the market calculates "a baseline determination of what the emissions would have been without the project."[174] An accurate baseline determination allows a market to calculate the amount of GHG emissions reduced or avoided by the project and is vital to establishing the quality and credibility of carbon credits.[175]

Largely free from regulation and oversight, VCMs can adopt standards established by carbon registries or create independent standards to facilitate the transactions such as standards for the generation, registration, and transaction of credits.[176] Carbon registries,

168 Mendelsohn et al., *supra* note 29.

169 *See* Simione Talanoa, *US Carbon Markets Still Alive Despite Exchange Closure*, CLIMATE ACTION (Nov. 22, 2010), https://www.climateaction.org/news/us_carbon_markets_still_alive_despite_exchange_closure.

170 EM Insights Team, *Voluntary Carbon Markets Top $1 Billion in 2021 with Newly Reported Trades*, ECOSYSTEM MARKETPLACE (Nov. 10, 2021), https://www.ecosystemmarketplace.com/articles/voluntary-carbon-markets-top-1-billion-in-2021-with-newly-reported-trades-special-ecosystem-marketplace-cop26-bulletin.

171 *See* STUBBS ET AL., *supra* note 3, at 15–17, tbl.2.

172 *Id.* at 8.

173 *Id*. at 3.

174 Thomas P. Healy, *Clearing the Air: Pursuing a Course to Define the Federal Government's Role in the Voluntary Carbon Offset Market*, 61 ADMIN. L. REV. 871, 876 (2009).

175 *See id.*

176 *See* Rollins, *supra* note 160.

including the American Carbon Registry, Climate Action Reserve, and Verra, serve as clearinghouses that track the ownership of generating projects, accredit third-party verifiers, and issue offset credits for verified practices.[177] Carbon registries avoid double-counting offset credits by assigning the credits a unique serial number and retiring credits after they are sold.[178] Although carbon offset registries provide much-needed verification[179] and accounting for credits, there can be a multi-year "lag time between when the emission reduction occurred and the credits are [verified,] issued, and available for purchase" via the registries.[180] The delay between credit generation and sale may be unappealing to buyers who consider the credits too old to purchase and may prevent credit generators from being able to finance the cost of generation with credit income.[181] Some VCMs use carbon registries to perform roles such as accrediting and overseeing third-party verification of offset projects.[182] An evaluation of a VCM involves understanding the particular VCM's programmatic requirements and, if applicable, the protocols of the carbon registry the VCM utilizes.[183] Carbon registries develop individual protocols for agricultural practices; however, "[p]rojects sequestering carbon in (agricultural) soil are an emerging project category, and methodologies are still evolving to answer similar quality concerns of measurability, permanence, and additionality."[184] An alternative for markets that choose not to use a carbon registry is to establish internal procedures for measurement, reporting, and verification (MRV); however, "the perceived quality of

177 *See* STUBBS ET AL., *supra* note 3, at 2; TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 44 ("[M]ore than 90 percent of credits adhere to the most common standards for verification: Verra's VCS Program, the Gold Standard, American Carbon Registry, and the Climate Action Reserve.").

178 *See* STUBBS ET AL., *supra* note 3, at 8.

179 *See* TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 41 ("Verification of credits is overseen by standards to ensure an adequate supply of verifiable, high-quality carbon credits.").

180 Gewin, *supra* note 17.

181 *See id*.

182 *See* STUBBS ET AL., *supra* note 3, at 8–9.

183 *See generally id.* at 12–13.

184 TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 44.

carbon credits is expected to be higher when verification and issuance are external to the carbon project."[185]

Buyers of carbon credits are a diverse group comprised of the energy sector, corporate entities seeking to fulfill carbon neutral pledges or gain a market advantage, the finance and insurance industries,[186] and even individual consumers who pay additional fees to reduce the carbon footprint of a transaction.[187] In the absence of regulatory parameters for the generation and sale of credits, buyers must independently assess the quality of credits based on the limited available information about the market's protocols and MRV standards.[188]

Critics of VCMs claim that carbon markets allow emitters to cheaply buy their way out of reducing emissions.[189] Another environmental criticism of VCMs, referred to as "greenwashing," occurs when emitters, through the use of carbon markets, are able to hold themselves out as more climate-friendly than they actually are.[190] The failure to assess the amount of net GHG emissions reductions of a credit generator, such as whether a farming practice resulted in increased nitrous oxide and methane, is another critical knowledge gap.[191] Although many markets have protocols for calculating net

185 PLASTINA, *supra* note 44, at 1.

186 *See* Sarah McFarlane, *Carbon Offsets Are Used by Companies Seeking 'Net Zero,' but Concerns Persist*, WALL ST. J. (Oct. 24, 2021, 8:44 AM), https://www.wsj.com/articles/carbon-offsets-are-used-by-companies-seeking-net-zero-but-concerns-persist-11635079489.

187 *See* Maria Savasta-Kennedy, *The Newest Hybrid: Notes Toward Standardization Certification of Carbon Offsets*, 34 N.C. J. INT'L L. 851, 853 (2009).

188 *See* Healy, *supra* note 174, at 877. "Fragmented and complex markets mean that the typical buyer's journey involves a number of difficulties: insufficient understanding of offsetting, negative publicity on associated projects, difficulty finding sufficiently large project sizes, lack of commonly agreed principles to ensure the quality of credits, regulatory uncertainty, lack of pricing transparency, and limited visibility into project life cycle." TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 46.

189 *See* Lindsay Campbell, *Critics Say Bipartisan Carbon Market Bill Won't Dent Climate Change*, MOD. FARMER (June 21, 2020), https://modernfarmer.com/2020/06/critics-say-bipartisan-carbon-market-bill-wont-dent-climate-change.

190 *See* Miltenberger et al., *supra* note 159.

191 *See* EMILY OLDFIELD ET AL., ENV'T DEF. FUND, AGRICULTURAL SOIL CARBON CREDITS: MAKING SENSE OF PROTOCOLS FOR CARBON SEQUESTRATION

GHG emissions, some such as Nori and Bayer Carbon, described more fully below, currently do not.[192]

Just as water quality trading has the potential to negatively impact the area in the vicinity of the point source, there is concern that carbon markets also have the potential to contribute to environmental justice abuses.[193] The concern stems from the ability of emitters to purchase carbon credits in lieu of reducing the release of harmful air pollutants into frontline communities.[194] Similar environmental justice repercussions have been associated with the Western Climate Initiative known as California's Cap-and-Trade Program.[195] In a cap-and-trade program, the amount of permissible emissions are limited or capped, and if polluters can't reduce their emissions to meet the requirement, they can buy allowances.[196] Allowances are similar to carbon credits in that they represent a reduction of GHG emissions elsewhere.[197] Although the California program has resulted in a decrease in the state's total GHG emissions, critics of the program allege it has allowed many of the state's polluters to increase their local emissions of injurious substances, often in low-income communities and communities of color.[198] To address these concerns, California requires at least 25 percent of the cap-and-trade revenue go to disadvantaged communities to be used for programs that reduce GHG emissions.[199] In 2021, Washington State passed the Climate Commitment Act, which is a cap-and-trade program to

AND NET GREENHOUSE GAS REMOVALS 14 (2021), https://www.edf.org/sites/default/files/content/agricultural-soil-carbon-credits-protocol-synthesis.pdf.

192 *See id*.

193 *See id*. at 28.

194 *See id*.

195 *See* Kristoffer Tigue, *Why Do Environmental Justice Advocates Oppose Carbon Markets? Look at California, They Say*, INSIDE CLIMATE NEWS (Feb. 25, 2022), https://insideclimatenews.org/news/25022022/why-do-environmental-justice-advocates-oppose-carbon-markets-look-at-california-they-say.

196 *See id.*

197 *See id.*

198 *See* Chrisha Bali, *Four Years In, What Can We Learn from California's Cap-and-Trade Program?*, FRONT & CENTERED (Oct. 12, 2016), https://frontandcentered.org/four-years-in-what-can-we-learn-from-californias-cap-and-trade-program.

199 *See California Climate Investments to Benefit Disadvantaged Communities*, CAL. EPA, https://calepa.ca.gov/envjustice/ghginvest (last visited Mar. 18, 2023).

be established in 2023[200] that is similar to the California program. The Climate Commitment Act is billed as a cap-and-invest program because it also requires 35 percent of the proceeds to be targeted to overburdened communities[201] impacted by GHG emissions, with ten percent allocated for tribal lands.[202]

VCMs could address environmental justice concerns by adopting similar investment strategies in frontline communities near carbon credit buyers. Addressing environmental justice through contributions to impacted communities would be streamlined if VCMs functioned within the same framework created through law or the adoption of multilateral environmental governance standards. Despite legislatively appropriated investments in the affected communities, some critics of trading programs maintain trading will never be able to create the emissions reductions needed to protect the citizens most impacted.[203]

VCMs have the potential to be a powerful form of PEG that bring together multiple market players and facilitate GHG emissions reductions that are not achievable by the public sector. However, Part III will examine how the proliferation of differing VCM standards and resulting low credit prices have contributed to the reluctance of the agricultural sector to generate credits.

III. THE AGRICULTURAL SECTOR AND VCMS

Although VCMs differ, carbon credits are generated based on metrics for realness and verification, additionality, and permanence and reversal.[204] While metrics in VCMs are necessary for validation, the costly implementation of these standards can create economically undesirable credits.[205] The adoption of multilateral standards would reduce transaction costs[206] and could serve a vital purpose for improving the functionality of VCMs.

200 *See* 2021 Wash. Sess. Laws 2606.

201 *See* WASH. REV. CODE § 70A.65.230(1)(a).

202 *See id.* at (1)(b).

203 *See* Tigue, *supra* note 195.

204 *See* STUBBS ET AL., *supra* note 3, at 4.

205 *See id*. at 18.

206 *See* U.S. DEP'T OF AGRIC., *supra* note 20, at 10.

A. Realness and Verification

The realness of a carbon credit is the quantifiable amount of carbon a practice can reduce or sequester.[207] The soil in agricultural fields, being heterogeneous, is difficult to measure for specific properties such as carbon content.[208] Quantifying the amount of carbon stored in soil is often done using random soil sampling, a combination of sampling with process-based modeling, or modeling and remote sensing.[209] Third-party verifiers review and validate the data before credits are generated and sold.[210] Verifying carbon capture claims is a very costly process.[211] Currently, in the voluntary carbon marketplace there are inconsistent MRV protocols among carbon credit markets.[212]

To facilitate MRV, farmers are often required to share multiple years of past, present, and future farm data—on aspects of their business such as planting, harvesting, tillage, and fertilizer—to "quantify demonstrable changes in net greenhouse gas emissions."[213] The requirement to share valuable farm data with carbon markets presents concerns for farmers.[214] This is especially true when carbon markets are run by large agribusiness companies who could use the data to the financial detriment of farmers.[215]

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207 *See* STUBBS ET AL., *supra* note 3, at 4.

208 *See* Jackson Hammond et al., *supra* note 30, at 5.

209 *See id.*

210 *See* Plume, *supra* note 2.

211 *See* Miltenberger et al., *supra* note 159.

212 *See id*.

213 Lauren Manning, *Carbon Harvest: Indigo Ag, Nori Announce First Corporate Carbon Credit Buyers*, AGFUNDER NEWS (Oct. 15, 2020), https://agfundernews.com/carbon-harvest-indigo-ag-nori-announce-first-corporate-carbon-credit-buyers.

214 *See* Rod Nickel & Karl Plume, *Dollars in the Dirt: Big Ag Pays Farmers for Control of their Soil-bound Carbon,* REUTERS (Oct. 25, 2021, 6:18 AM), https://www.reuters.com/business/cop/dollars-dirt-big-ag-pays-farmers-control-their-soil-bound-carbon-2021-10-25.

215 *See* Jason Davidson, *Agricultural Carbon Markets Are Not a Climate Solution*, FOODTANK (Feb. 2022), https://foodtank.com/news/2022/02/agricultural-carbon-markets-are-not-a-climate-solution (last visited Sep 28, 2022); Claire Kelloway, *The Tricky New Way That Big Ag Is Getting Farm Data*, WASH. MONTHLY (Oct. 5, 2021), https://washingtonmonthly.com/2021/10/05/the-tricky-new-way-that-big-ag-is-getting-farm-data.

Companies such as Cargill, Bayer, Nutrien, and Corteva have all launched VCMs, and to verify carbon sequestration, they are gathering production and planting data from farmers, farm equipment, and satellite technology.[216] Agribusiness companies need farm data to improve their products, such as digital programs that recommend products or techniques based on personal data.[217] As explained previously, two agricultural production methods that sequester carbon are reducing tillage and planting a cover crop.[218] Many farmers can reduce tillage because they apply glyphosate, the chemical found in RoundUp, that kills weeds but not genetically engineered crops.[219] It should be noted that "Bayer, the company that manufactures RoundUp, has a profit motive to recommend farmers in its carbon program use its product to facilitate reduced tillage."[220]

In September 2021, Indigo announced it had paid its first round of 267 farmers for the generation of carbon credits through on-farm practices.[221] Indigo claims to have a unique approach to carbon sequestration measurement by "aggregating farmers together into groups, leveraging new tech, and using a combination of direct soil carbon measurements and advanced biochemical process models."[222] Indigo "measur[es] and quantif[ies] farmers' carbon impact in accordance with standards set by the Climate Action Reserve, a nonprofit organization that manages leading GHG offset project

216 *See* Kelloway, *supra* note 215.

217 *See id.*

218 *See id.*

219 *See id.*; *see also* Jordan Wilkerson, *Why Roundup Ready Crops Have Lost Their Allure,* HARV. UNIV.: THE GRADUATE SCH. OF ARTS AND SCIS. BLOG (Aug. 10, 2015), https://sitn.hms.harvard.edu/flash/2015/roundup-ready-crops.

220 Kelloway, *supra* note 215.

221 *See* Press Release, Indigo Agriculture, Indigo Pays 267 Farmers in Milestone Progress for First Ever Scalable Ag Carbon Farming Program (Sept. 9, 2021), https://www.indigoag.com/pages/news/indigo-pays-267-farmers-first-ever-scalable-ag-carbon-farming-program.

222 Lauren Manning, *Carbon Harvest: Indigo Ag, Nori Announce First Corporate Carbon Credit Buyers*, AGFUNDER NEWS (Oct. 15, 2020), https://agfundernews.com/carbon-harvest-indigo-ag-nori-announce-first-corporate-carbon-credit-buyers.html.

registries."[223] Indigo requires farmer generators to provide three to five years of historical and current data.[224] To verify its credits, "Indigo hires an independent, accredited verification body who conducts limited site visits and in-depth reviews of all documentation, reporting, and quantification."[225] Indigo has sold its "verified carbon credits" to large corporations such as Barclays, JPMorgan Chase, Shopify, and IBM.[226]

By contrast, Nori, another VCM, in an effort to reduce the overhead costs associated with the verification of carbon credits,[227] uses the USDA's publicly available COMET-Farm tool[228] to calculate the amount of carbon sequestered by farmers.[229] COMET-Farm, using USDA soil and climate data, generates a farm-specific comparison of GHG emissions of a farm's current practices and how GHG emissions could be reduced and carbon sequestered through the implementation of various USDA conservation practices.[230] To qualify as a generator for Nori, farmers must pay for the costs of third-party verification and the verification must occur at least once every three years.[231] Nori requires farmer generators to enter into ten-year contracts and provide farm data at least every three years.[232]

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223 Press Release, Corteva Agriscience, Corteva Announces Expansion of Corteva Carbon Initiative for 2022 Crop Year (Aug. 26, 2021), https://www.corteva.us/press-releases/corteva-carbon-initiative-2022-crop-year.html.

224 *See* PLASTINA & WONGPIYABOVORN, *supra* note 24, at 6.

225 PLASTINA, *supra* note 44, at 5.

226 Manning, *supra* note 222.

227 *See* Monica Nickelsburg, *Climate Solution or Corporate Greenwashing? Tech Taps Farmers to Help Offset Carbon Footprint*, GEEKWIRE (May 22, 2021, 8:00 AM), https://www.geekwire.com/2021/climate-solution-corporate-greenwashing-tech-taps-farmers-help-offset-carbon-footprint/.

228 *See Commonly Used NRCS Tools - COMET-Farm*, U.S. DEP'T OF AGRIC. NAT. RES. CONSERVATION SERV., https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=stelprdb1261363 (last visited Oct. 3, 2022); STUBBS ET AL., *supra* note 3, at 26.

229 *See* PLASTINA, *supra* note 44, at 6.

230 *See* COMET-FARM, http://comet-farm.com (last visited Mar. 18, 2023).

231 *See* Farm Journal Editors, *Clarity on Carbon's Potential: Compare Nine of the Leading Markets*, AGWEB FARM J. (Feb. 16, 2021), https://www.agweb.com/news/business/technology/clarity-carbons-potential-compare-nine-leading-markets.

232 *See* STUBBS ET AL., *supra* note 3, at 16.

There is debate within the scientific community about the amount of carbon that agricultural soils can sequester and for how long.[233] Although it is generally accepted that regenerative farming practices initially increase soil carbon, due to a lack of long-term studies, it is unclear how long the carbon remains sequestered.[234] Conflicting scientific information about the veracity of carbon sequestration is a barrier to market entry for farmers who don't want to sell a potentially fraudulent product.[235]

B. Additionality

To be marketable, agricultural carbon credits typically have to come from practices that the farmers would not have implemented but for the carbon credit generation, referred to as additionality.[236] Because additionality only credits the adoption of new regenerative practices, it is viewed as unfair to farmers that were early adopters of these practices.[237] To overcome this inequity, some carbon markets have adopted a limited "look back" time frame to allow farmers to generate credits for practices they have recently adopted.[238]

C. Permanence

In order to create and market carbon credits, farm generators need to implement a practice which will result in a long-term

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233 *See* Gabriel Popkin, *A Soil-Science Revolution Upends Plans to Fight Climate Change*, QUANTA MAG. (July 28, 2021), https://www.quantamagazine.org/a-soil-science-revolution-upends-plans-to-fight-climate-change-20210727.

234 *See* Kara Hoving, *Changing the Conversation Around Soil Carbon*, YALE ENV'T REV. (Jan. 4, 2021), https://environment-review.yale.edu/changing-conversation-around-soil-carbon ("In a 19-year trial of rotational cropping systems, the addition of winter cover crops increased carbon stocks in the top 30 cm of the soil. However, when measured to a depth of two meters, there was an overall loss of carbon across the entire soil profile.") (citing Nicole E. Tautges et al., *Deep Soil Inventories Reveal that Impact of Cover Crops and Compost on Soil Carbon Sequestration Differ in Surface and Subsurface Soils*, 25 GLOB. CHANGE BIOLOGY 3753 (2019)).

235 *See, e.g.*, Interview with Trey Hill, *supra* note 86 ("Are they going to say that I did the wrong thing as a farmer? . . . I mean it's not hard to verify greenness, which would be your cover crops, and it's not hard to verify no-till . . . but how would you verify the carbon and what happens when it's not there?").

236 *See* OLDFIELD ET AL., *supra* note 191.

237 *See* Gewin, *supra* note 17.

238 *Id.*

reduction of carbon, referred to as permanence.[239] Farmer generators must sign long-term contracts with carbon markets.[240] For example, Indigo and Nori require farmer generators to enter into contracts with a minimum term of five and ten years, respectively.[241] Although five to ten years may not seem like a substantial amount of time, farmers often need to vary production practices; therefore, committing to implementing a generating practice for a decade can raise questions of liability for breaching a contract and serve as a deterrent for farmers.[242] Additionally, the average age of the American farmer is almost 58, and committing to adopt new farming practices for a prolonged period can be more complex for aging farmers who are contemplating farm succession options.[243]

D. Carbon Reversal

If a farmer has to stop a credit-generating practice because of loss of control of farmland or because of one of the other numerous variables involved in farming, the carbon sequestered may be released, resulting in a carbon reversal.[244] Some VCMs, such as Indigo, plan for a certain amount of credit reversal by holding a percentage of credits in reserve.[245] To disincentivize carbon reversals, Nori retains a share of the profits from the sale of carbon credits and,

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239 *See* OLDFIELD ET AL., *supra* note 191, at 9.

240 *See* PLASTINA, *supra* note 44, at 5.

241 *See* PLASTINA & WONGPIYABOVORN, *supra* note 24, at 5.

242 *See* Interview with Trey Hill*, supra* note 86 ("[T]hey're gonna go check my field in [ten] years and what if the carbon's not there? Are they going to say that I did the wrong thing as a farmer? . . . Did we have a drought and all the carbon leaves the soil[?] . . . [W]e can't all be responsible for that—but I am responsible because I sold you carbon."); Dunn, *supra* note 21;
Nathanael M. Thompson et al., *Opportunities and Challenges Associated with "Carbon Farming" for U.S. Row-Crop Producers,* PURDUE UNIV. (June 28, 2021), https://ag.purdue.edu/commercialag/home/resource/2021/06/opportunities-and-challenges-associated-with-carbon-farming-for-u-s-row-crop-producers.

243 *See 2017 Census of Agriculture Highlights*, *Farm Producers*, U.S. DEP'T OF AGRIC. NAT'L AGRIC. STAT. SERV. (NASS) (Apr. 2019), https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Farm_Producers.pdf; Creswell, *supra* note 26.

244 *See* Dan Blaustein-Rejto, *Dishing the Dirt on Ag Carbon Credits*, AGFUNDERNEWS (July 13, 2021), https://agfundernews.com/carbon-credits-in-ag-dishing-the-dirt.

245 *See* Dunn, *supra* note 21.

if farmers are able to avoid carbon reversals for ten years following the sale, Nori refunds the escrowed funds.[246]

Although it may seem that some VCMs are crafting solutions to overcome barriers to market entry for the agricultural sector, VCMs that adopt less stringent requirements such as look-back periods to avoid the harshness of additionality run the risk of creating low-quality credits that are considered not truly effective at reducing GHG emissions.[247]

E. Economics of Carbon Credits

Farmers are currently receiving an average of fifteen dollars per carbon credit, representing one metric ton of carbon sequestered.[248] Carbon sequestration varies, depending on geographic "region, practices, and soil types."[249] Farmers considering the economics of generating carbon credits start by calculating the breakeven price, which "represents the carbon incentive level where adopting a carbon sequestration practice becomes economically viable for the farmer."[250] The breakeven price calculation involves consideration of "the average annual soil carbon sequestration, adoption cost, yield changes, and average crop prices, when applicable."[251] By calculating the breakeven price, farmers will know the price per metric ton that they will need to break even given the increased production costs and associated impacts on crop yield.[252] Depending on the

246 *See id.*

247 *See* STUBBS ET AL., *supra* note 3, at 18.

248 *See* Shockley & Snell, *supra* note 8; Ed Maixner & Philip Brasher, *Carbon Markets Lure Farmers, but Will the Benefits Be Enough to Hook Them?*, AGRI-PULSE (Nov. 23, 2020, 1:00 PM), https://www.agri-pulse.com/articles/14880-carbon-markets-lure-farmers-but-are-benefits-enough-to-hook-them. The farmers who sold credits to Microsoft received $20 per credit. *See* Press Release, Agric. Council of Ark., Land O'Lakes Truterra Makes Big Move into Carbon Market with Microsoft, https://www.agcouncil.net/news/land-olakes-truterra-makes-big-move-into-carbon-market-with-microsoft (last visited Feb. 5, 2023).

249 Tom Doran, *Selling Carbon Credits: Questions Farmers Should Ask*, AGRINEWS (Apr. 14, 2022), https://www.agrinews-pubs.com/news/science/2022/04/15/selling-carbon-credits-questions-farmers-should-ask.

250 *What Questions Should Farmers Ask About Selling Carbon Credits?*, *supra* note 161.

251 *Id.*

252 *See* Plume, *supra* note 2; Sellars et al., *supra* note 4.

practices used, the generation of agricultural carbon credits requires increased farm production expenses such as additional seed costs, increased labor, and new farming equipment.[253] To calculate the carbon credit price per acre, farmers multiply their credit price by the amount of carbon sequestered per acre.[254] If farmers are not able to sell carbon credits for a price that will cover their costs, impact on crop yields, and restrictions on production practices, there is no financial incentive to participate in carbon markets.[255]

As an alternative to offering prices based on credit sale, Bayer Carbon offers a payment per acre for implementing the regenerative practice.[256] Instead of incentivizing farmers to generate credits that have the potential to be sold in a marketplace, Bayer is compensating farmers directly per acre—at a rate of five to twelve dollars per acre—for the adoption of climate-friendly production practices such as reducing tillage and planting cover crops.[257] Regardless of the VCM structure, an important consideration for farmer generators is the extent to which they will need to share data to quantify sequestration and with whom the data will be shared.[258]

In sum, VCMs are "an unarticulated patch of coexisting programs with different rules, incentives, and penalties, rather than . . . a cohesive and transparent market where the same activity has the same implication across programs."[259] Part IV will evaluate

253 *See* Interview with Trey Hill, *supra* note 86 ("The markets suck . . . [P]eople are throwing out 15, 20 bucks an acre . . . I spend more than that on tires."). A 2022 study from Ohio State University and the University of Illinois estimated the cost of cover crop seed, equipment, and labor to be $37 an acre. *See also* Creswell, *supra* note 26.

254 *See* Doran, *supra* note 249.

255 *See* Interview with Trey Hill, *supra* note 86 ("Then you've got folks coming to you and saying 'I'll give you $15 an acre and if you change everything and risk everything – you aren't going to make as much money, but you've got this $15 an acre and you're going to feel better about yourself because you solved climate change. . . .'").

256 *See Bayer Carbon Program: A New Revenue Stream for Farmers*, BAYER GLOB. (Apr. 12, 2022), https://www.bayer.com/en/us/bayer-carbon-program-a-new-revenue-stream-for-farmers.

257 *See id.*; Chris Clayton, *Growth and Profit Potential in Carbon Sequestration*, PROGRESSIVE FARMER (Oct. 31, 2022), https://www.dtnpf.com/agriculture/web/ag/news/article/2022/11/01/carbon-markets.

258 *See* Clayton, *supra* note 257.

259 PLASTINA & WONGPIYABOVORN, *supra* note 24, at 2.

the proposals to support better VCM performance and how these proposals, representing varying levels of government intervention, will impact the nature of private climate governance.

IV. PROPOSALS FOR A VIABLE CARBON MARKETPLACE

There are several recommended legal and policy proposals to support the fragmented voluntary carbon marketplace,[260] and the need to support VCMs has taken on new relevance following the Supreme Court's decision in *West Virginia v. EPA*.[261]

By a 6-3 majority, the Supreme Court in *West Virginia v. EPA* held that EPA did not have authority under Section III of the CAA to compel coal power plants to use certain types of renewable energy in the absence of legal authority.[262] According to Justice Roberts, although transitioning away from the use of coal to generate electricity may be sensible, the CAA did not give EPA the authority to mandate it without Congressional authorization.[263] The impact of *West Virginia v. EPA* is the Biden administration's reduced ability to use EPA to carry out climate change policy without a clear legislative directive.[264] Given the inherent challenges in passing legislation to regulate GHG emissions, improving the performance of VCMs has gained significance, and the proposed legal and policy-based solutions, which raise aspects of public-private environmental governance, are worthy of careful evaluation.

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260 *See* Lauren Manning, *Biden's Climate Plan Includes 'Carbon Bank' for Farmers Who Adopt Regen Practices*, AGFUNDER NEWS (Feb. 17, 2021), https://agfundernews.com/carbon-bank-bidens-climate-plan-includes-aimed-at-farmers-who-adopt-regen-practices.

261 *See* West Virginia v. EPA, 142 S. Ct. 2587 (2022).

262 *See id.* at 2615–16.

263 *See id.*

264 *See* Nives Dolsak & Aseem Prakash, *Supreme Court and Carbon Regulation:* West Virginia v. EPA *Requires Rethinking Climate Activism*, FORBES (July 4, 2022), https://www.forbes.com/sites/prakashdolsak/2022/07/04/supreme-court-and-carbon-regulation-west-virginia-v-epa-requires-rethinking-climate-activism/?sh=464d579b69fc.

A. A U.S. Carbon Bank

In November 2020, the Climate 21 Project[265] authored a transition memo to the USDA and recommended that the Biden administration establish a carbon bank operated by the USDA within its first one hundred days.[266] A carbon bank, run by the USDA, could function as a "reverse carbon credit auction" by buying sequestered and reduced carbon from farmers at a guaranteed rate of twenty dollars per ton "while guaranteeing the environmental integrity of carbon conservation practices."[267] However, twenty dollars per ton is not enough to cover farmers' costs of generating credits.[268]

The suggested funding source for the government carbon bank was the Commodity Credit Corporation (CCC).[269] The CCC "has broad authorization to support, stabilize and protect farm income and prices and to support conservation . . . ."[270] Since the release of the Climate 21 transition memo, there has been opposition to the use of the CCC funds for the establishment of a USDA-led carbon bank.[271] Republican lawmakers, including House Agriculture Committee Ranking Member Representative Glenn Thompson, have questioned whether the USDA has the authority to use CCC funds

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265 The Climate 21 Project drafters consulted "more than 150 experts with high-level government experience who volunteered their time to imagine what it would take for the White House and federal agencies to mobilize effectively as part of a whole-of-government climate response at the dawn of the next administration." CLIMATE 21 PROJECT, TRANSITION RECOMMENDATIONS FOR CLIMATE GOVERNANCE AND ACTION 1 (2020), https://climate21.org/documents/C21_Summary.pdf.

266 *See* ROBERT BONNIE ET AL., CLIMATE 21 PROJECT TRANSITION MEMO 1, 2, 8, 9, https://climate21.org/documents/C21_USDA.pdf.

267 *Id*. at 9 ("If the CCC allocated even $1 billion annually towards purchasing carbon credits, at $20/ton, this could produce 50 megatons in GHG reductions annually.").

268 *See* RIPE, RIPE100: HELPING AMERICAN FARMERS PROSPER AS THEY INVEST IN OUR CLIMATE & ENVIRONMENT 12 (2021).

269 *See* BONNIE ET AL., *supra* note 266, at 9. The CCC is a wholly-owned government corporation that funds "specific programs established by Congress." *Commodity Credit Corporation*, U.S. DEP'T OF AGRIC., https://www.usda.gov/ccc (last visited Aug. 10, 2022).

270 BONNIE ET AL., *supra* note 266, at 9.

271 *See* Todd Neeley, *Vilsack: USDA Focused on Climate Future*, PROGRESSIVE FARMER (Mar. 22, 2021), https://www.dtnpf.com/agriculture/web/ag/news/article/2021/03/22/commodity-credit-corp-may-play-role.

to fund a carbon bank and have raised concerns about the impacts of reallocating the funding to do so from other USDA programs.[272] Agricultural and environmental groups have also voiced opposition to a government carbon bank based on concerns about the efficacy of net emissions reductions and the inability of small- and mid-size farmers to reap the same benefits as larger producers.[273] A government-backed climate bank would be the clearest form of public environmental governance for carbon markets. However, to date, the Biden administration has yet to establish a carbon bank and doesn't seem likely to do so in the future.[274]

B. Pay for Practice

According to the Rural Investment to Protect Our Environment (RIPE),[275] another proposed solution to encourage the adoption of regenerative agricultural practices is to directly pay farmers a minimum of one hundred dollars per acre to establish USDA conservation practices.[276] According to RIPE, the proposed policy would be handled by local USDA Natural Resources Conservation Service (NRCS) technical service advisors.[277] The program would have no additionality hurdles as it would be open to farmers who had already adopted the practices, and being paid on a per-acre basis would make the program equitable to small and large farmers.[278] The first phase of the program could be funded by $4 billion from the CCC followed by a federally allocated budget of $40 billion annually.[279] Proponents of the RIPE policy argue that the funding needed for their proposal, when compared to the amount the Biden administration previously proposed for climate change initiatives, is a

272 *See id.*

273 *See* STUBBS ET AL., *supra* note 3, at 18–19.

274 *See* Daren Bakst & Joshua Sewell, *Congress Should Stop Abrogating Its Spending Power and Rein in the USDA Slush Fund*, HERITAGE FOUND. (Feb. 19, 2021), https://www.heritage.org/budget-and-spending/report/congress-should-stop-abrogating-its-spending-power-and-rein-the-usda.

275 RIPE is a non-profit group of farmers, ranchers, and agricultural commodity association representatives. *See* RIPE, *supra* note 268, at 5.

276 *See id.* at 13.

277 *See id.* at 9.

278 *See id.* at 33.

279 *See id.* at 15.

reasonable request to entice farmers to be part of the climate change solution.[280] Given the use of federal funding to pay participants in federal conservation programs, this proposal presents a form of public governance to address the climate crisis. Although this type of program has the potential to lead to greater adoption of climate-smart farming practices, it would be vulnerable to the everchanging political winds and could result in carbon reversals if the funding is withdrawn in the future.

C. Partnerships for Climate Smart Commodities

On March 22, 2021, Secretary of Agriculture Tom Vilsack admitted that the current carbon marketplace "is not designed and set up for farmers . . . There's a lot of paperwork involved there's a lot of complexity involved. The actual payments are not necessarily significant and not enough to overcome the hassle that's connected with the carbon market."[281]

In the ninety-day progress report on CSAF, the USDA highlighted the existing barriers to voluntary carbon markets: "the relatively small scale of agricultural and small forestry offset projects, high transaction costs associated with project development, monitoring, reporting, and verification, and confusion in the carbon marketplace where there is a lack of consistency among approaches to protocols for generating GHG offsets from agriculture."[282] In the same report, the USDA promised to adopt strategies to address the barriers which

> "include setting standards to reduce transaction costs; adopting science-based monitoring, reporting, and verification approaches for CSAF practices; bolstering market infrastructure; or serving as a source of demand for agricultural carbon credits by setting clear price signals through price supports, loan programs or other

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[280] *See* Forrest Laws, *RIPE100 Program Rollout Cost Would Be "Modest*,*"* AM. AGRICULTURIST (Oct. 22, 2021), https://www.farmprogress.com/sustainability/ripe100-program-rollout-cost-would-be-modest.

[281] Ashley Rice, *Vilsack Shares Thoughts on Carbon Banks, CCC Funding, CFAP Payments*, FARMWEEK (Mar. 22, 2021), https://www.farmweeknow.com/policy/national/vilsack-shares-thoughts-on-carbon-banks-ccc-funding-cfap-payments/article_5afa1248-8b4b-11eb-90dd-af7ede45d0c0.html (internal quotation marks omitted).

[282] U.S. DEP'T OF AGRIC., *supra* note 20, at 10.

> financial tools that can help producers implement CSAF technologies."[283]

On February 7, 2022, the USDA announced $1 billion in available funding for the Partnerships for Climate-Smart Commodities program.[284] Due to strong interest in the program, the USDA later increased the available funding to more than $3 billion.[285] The program will fund, through the CCC, pilot projects that create market opportunities for U.S. agricultural and forestry products that use climate-smart practices and include innovative, cost-effective ways to measure and verify GHG benefits.[286] The pilot program approach was recommended to the USDA by the Food and Agriculture Climate Alliance (FACA), a collection of more than eighty farm and environmental groups.[287] When describing the Partnerships for Climate-Smart Commodities program, Secretary Vilsack emphasized that it "is not a carbon market program."[288] Instead, it is meant to support farmers' adoption of climate-smart practices so that they can participate in private-sector markets.[289] This program is an example of how government can support VCMs through a hybrid public-private environmental governance solution.

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283 *Id*.

284 *See* Press Release, U.S. DEP'T OF AGRIC., USDA to Invest $1 Billion in Climate Smart Commodities, Expanding Markets, Strengthening Rural America (Feb. 7, 2022), https://www.usda.gov/media/press-releases/2022/02/07/usda-invest-1-billion-climate-smart-commodities-expanding-markets.

285 *See* Press Release, U.S. DEP'T OF AGRIC., Biden-Harris Administration Announces Historic Investment in Partnerships for Climate-Smart Commodities and Rural Projects (Sept. 14, 2022), https://www.usda.gov/media/press-releases/2022/09/14/biden-harris-administration-announces-historic-investment.

286 *See* Press Release, U.S. DEP'T OF AGRIC., *supra* note 284.

287 *See* News Release, Am. Farm Bureau Fed'n, FACA Applauds USDA Investment in Climate-Smart Pilot Projects (Feb. 7, 2022), https://www.fb.org/newsroom/faca-applauds-usda-investment-in-climate-smart-pilot-projects1.

288 DTN/Northern Ag Network, *Climate-Smart: A New Approach to Commodity Production*, KBHB RADIO (Feb. 10, 2022), https://kbhbradio.com/news/climate-smart-a-new-approach-to-commodity-production.

289 *See id.*

D. The Growing Climate Solutions Act and the Consolidated Appropriations Act of 2023

The GCSA was a legislative approach to encourage the agricultural sector to participate in VCMs that garnered overwhelming bipartisan support in the Senate in 2021, as well as support from more than seventy-five agricultural, food, forestry, and environmental groups.[290] On June 4, 2020, Senators Mike Braun and Debbie Stabenow introduced the GCSA of 2020 in the U.S. Senate. However, the Act failed to advance past an initial hearing by the Senate Committee on Agriculture, Nutrition, and Forestry.[291] On April 20, 2021, Senator Braun reintroduced the GCSA[292] and on June 24, 2021, the Act passed the Senate by a 92-8 vote.[293] The Act proposed to authorize the USDA to establish MRV standards, train GHG technical assistance providers, form an interdisciplinary advisory council to guide the USDA, and create a third-party verifier certification program, and by doing so, demonstrated the potential to address many of the barriers to entry identified in this Article.[294]

The passage of the GCSA, by establishing the USDA as a trusted source of information about how to develop carbon credits,[295] would have empowered the USDA to assume a role like the one it serves for the National Organic Program (NOP). The USDA's role in the NOP was born out of burgeoning market demand for organic products, conflicting marketing claims, and divergent state labelling laws.[296] To avoid competing state organic labelling laws, Congress passed the Organic Foods Production Act (OFPA).[297] The

290 *See* Craig Butler, *Ohio Farmers Must Be Part of Climate Change Solution*, NEWARK ADVOC. (Feb. 6, 2022), https://www.newarkadvocate.com/story/news/local/2022/02/06/butler-ohio-farmers-must-part-climate-change-solution/9239480002.

291 *See* S. 3894, 116th Cong. (2020).

292 *See* S. 1251, 117th Cong. (2021).

293 *See S. 1251 - Growing Climate Solutions Act of 2021*, CONGRESS.GOV, https://www.congress.gov/bill/117th-congress/senate-bill/1251/actions (last visited Mar. 20, 2023).

294 *See* H.R. 2820, 117th Cong. (2021).

295 *See* Ankur K. Tohan et al., *Carbon Policy: The 2023 Farm Bill and the Growing Climate Solutions Act*, 6 CARBON Q. 3 (2022).

296 *See* Savasta-Kennedy, *supra* note 187, at 871–73.

297 *See id*.

OFPA and associated regulations define the farming practices that qualify as organic and establish a third-party organic inspection and certification process to verify that organic farms and processors are following the organic standards.[298] The OFPA also established the National Organic Standards Board (NOSB), a non-governmental stakeholder board with statutory authority over what types of inputs can be used in organic production.[299] The USDA and the NOSB have successfully worked together to develop a uniform certification standard, enforced by certified third-party verifiers[300] and increasingly in demand by consumers.[301] The NOP, however, is far from a perfect program, with highly publicized cases of fraud involving U.S. farmers[302] and foreign food importers knowingly labelling food products organic that don't actually meet NOP standards.[303] Unlike other industries that eschew government oversight and regulation, however, the organic industry advocates for stricter government regulation in order to preserve the integrity of the organic seal.[304] Despite the flaws of the NOP, it is easy to see how VCMs could benefit from a similar structure with the USDA serving a role in which it, in consultation with an advisory council, creates MRV standards and certifies verifiers to enforce those standards.[305] It is unlikely this type of system could completely prevent fraud. However, VCM stakeholders would likely have the same desire as

298 *See OFPA & NOSB*, NAT'L ORGANIC COAL., https://www.nationalorganiccoalition.org/ofpa-nosb (last visited Aug. 10, 2022).

299 *See id*.

300 *See* Savasta-Kennedy, *supra* note 187, at 880.

301 *See Organic Agriculture*, U.S. DEP'T OF AGRIC. ECON. RSCH. SERV., https://www.ers.usda.gov/topics/natural-resources-environment/organic-agriculture.aspx (last visited Aug. 1, 2022).

302 *See* Bart Pfankuch, *Fraud and Weak USDA Oversight Chip Away at Integrity of Organic Food Industry*, S.D. NEWS WATCH (Aug. 3, 2022), https://www.sdnewswatch.org/stories/fraud-and-weak-usda-oversight-chip-away-at-integrity-of-organic-food-industry.

303 *See* Peter Whoriskey, *The Labels Said 'Organic.' But These Massive Imports of Corn and Soybeans Weren't*, WASH. POST (May 12, 2017), https://www.washingtonpost.com/business/economy/the-labels-said-organic-but-these-massive-imports-of-corn-and-soybeans-werent/2017/05/12/6d165984-2b76-11e7-a616-d7c8a68c1a66_story.html.

304 *See* Pfankuch, *supra* note 302.

305 *See* Savasta-Kennedy, *supra* note 187, at 889.

the organic industry for stringent regulation and enforcement to uphold the credibility of carbon credits.

The critics of the GCSA feared it would allow VCMs to create their own standards "under the USDA's sheen of legitimacy, but the agency will have a limited role in research and oversight."[306] Other concerns about the framework proposed by the GCSA included the fact that large agricultural integrators would reap the financial benefits, and the problem of environmental injustice that would result from allowing ongoing pollution in communities of color.[307] Unlike other legislative attempts to address climate change, however, the GCSA was widely supported because it proposed to establish a validation system for farmers to use federal conservation programs.[308] Despite bipartisan support for the GCSA, it failed to proceed to a vote in the House and was stalled until a revised version of the Act was passed as part of the Consolidated Appropriations Act of 2023.[309]

Much of the GCSA remained intact in the revised version, including the authorization for the USDA to publish carbon credit protocols[310] and be guided by an interdisciplinary advisory council.[311] Unlike the role it plays in the NOP, in which it defines and defends the use of a label, the USDA's role will be limited to disseminating trusted information about the creation and verification of carbon credits. According to the Act, the USDA will publish "widely

306 H. Claire Brown, *The Senate Appears Poised to Pass a Bipartisan Bill to Help Farmers Sell Carbon Credits. Not Everyone Is Happy*, THE COUNTER (Apr. 27, 2021), https://thecounter.org/senate-carbon-credits-farms-growing-climate-solutions-act.

307 *See id.*

308 *See id.*

309 *See* Consolidated Appropriations Act, 2023, Pub. L. No. 117-328, div. HH, tit. I, § 201; *see also* Marc Heller, *Climate-Focused Agriculture Bill Hitches Ride on Omnibus*, E&E DAILY (Dec. 20, 2022), https://www.eenews.net/articles/climate-focused-agriculture-bill-hitches-ride-on-omnibus.

310 *See* Consolidated Appropriations Act, 2023, Pub. L. No. 117-328, div. HH, tit. I, § 201 (After providing a public notice and comment period, USDA, "shall publish (A) a list of . . . protocol documents and details relating to— (i) calculations; (ii) sampling methodologies; (iii) voluntary environmental credit accounting principles; (iv) systems for verification, monitoring, measurement, and reporting; and (v) methods to account for additionality, permanence, leakage, and, where appropriate, avoidance of double counting.").

311 *See id*.

accepted protocols that are designed to ensure consistency, reliability, effectiveness, efficiency, and transparency of voluntary environmental credit market."[312] The advisory council will be made up of representatives from the agricultural, forestry, carbon credit, farming, and academic sectors and will be charged with reporting to Congress and the USDA on the status of the carbon marketplace and how to reduce barriers to entry for credit generators.[313]

The revised GCSA, however, does not authorize the USDA to certify third-party verifiers as it does the NOP and did in the GCSA.[314] According to the former Ranking Member and current Chairman of the House Agriculture Committee, Representative Glen Thompson, the Act, "[w]as too focused on certifying vendors, who might benefit more financially from the bill than the farmers they served."[315] Instead of certifying the verifiers, the USDA will establish qualifications for technical service providers[316] and create and maintain an online registry of qualified service providers that farmers can use to aid them with their carbon credit generation and verification.[317] Pursuant to the newly passed law, the USDA has the authority to remove a service provider from the list if the provider acts in bad faith.[318] Another difference between the GCSA as introduced and the version that was signed into law is a directive to the USDA to ensure that participating farmers "receive a fair distribution of revenues derived from the sale of an agriculture or forestry credit."[319]

The Consolidated Appropriations Act of 2023 also includes a legal authorization for the USDA to accept and match private financial contributions for multiple purposes including addressing climate change and sequestering carbon.[320] The passage of the revised

312 *Id*.

313 *See id*.

314 *See* Heller, *supra* note 309.

315 *Id*.

316 *See* Consolidated Appropriations Act, 2023, Pub. L. No. 117-328, Div. HH, Title I, § 201.

317 *See id.*

318 *See id*.

319 *Id*.

320 *See* Consolidated Appropriations Act, 2023, Pub. L. No. 117-328, div. HH, tit. I, § 202; *see also* Heller, *supra* note 309.

GCSA has the potential to support the functionality of VCMs by authorizing the USDA to serve as a centralized source of trusted information. However, only time will tell if this public-private hybrid form of environmental governance will bring much needed consistency to the fragmented voluntary carbon marketplace.

E. The Inflation Reduction Act of 2022 and Carbon Sequestration Collaboration Act

On August 6, 2022, the Inflation Reduction Act was introduced in the Senate as a replacement of the Build Back Better Act.[321] On the day the Inflation Reduction Act was introduced, the Biden administration released a statement supporting its passage[322] and it was signed into law on August 16, 2022.[323] The Inflation Reduction Act contains many subsidies and tax rebates for renewable and efficient energy and $19.5 billion for existing agricultural conservation programs, like EQIP, that improve soil carbon sequestration and reduce GHG emissions from agriculture.[324] The Act also provides $1 billion to increase USDA-NRCS conservation technical assistance and $300 million for the USDA to quantify and track the carbon sequestration and GHG emission reduction capacity of the agricultural conservation programs authorized to receive additional funding through the Act.[325] According to Senator Debbie Stabenow, through the passage of the Inflation Reduction Act, "we are equipping farmers, foresters, and rural communities with the necessary tools to be part of the solution."[326] However, critics of the Act claim it merely supports existing voluntary agricultural conservation

321 *See* 168 CONG. REC. 4,069–70 (2022).

322 *See* Presidential Statement on Legislation to Combat Inflation, Promote Clean Energy Production, and Reduce Prescription Drug Costs, 2022 DAILY COMP. PRES. DOC. 662 (July 27, 2022), https://www.govinfo.gov/content/pkg/DCPD-202200662/pdf/DCPD-202200662.pdf.

323 *See* Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818 (2022).

324 In addition to EQIP, the Inflation Reduction Act authorizes additional funding for the Conservation Stewardship Program, the Agricultural Conservation Easement program, and the Regional Conservation Partnership program. *See* Inflation Reduction Act of 2022, Pub. L. No. 117-169, tit. II, § 21001, 136 Stat. 1818, 2015 (2022).

325 *See id.* § 21002.

326 Dennis, *supra* note 15.

programs and doesn't provide any guarantees of GHG emissions reductions.[327]

The Inflation Reduction Act will incentivize and support the adoption of new production methods that have the potential to sequester carbon by more than doubling the available funding for the applicable federal conservation programs.[328] The newly authorized funding for increased technical assistance and quantification should also serve to reduce MRV transaction costs and may require less farm data to be shared with VCMs. However, the funding and associated technical assistance from the USDA will neither address issues related to additionality, environmental justice, and the need for restrictive long-term contract, nor unify the fragmented voluntary carbon marketplace. Farmers will continue to bear the burden of choosing among competing VCMs. The Inflation Reduction Act creates a hybrid public-private form of climate governance by positioning the USDA-NRCS as the funder of the agricultural practices that will generate the credits, provider of technical assistance to guide farmers through the process, and quantifier of the capacity of the practices to sequester carbon or reduce GHG emissions. The USDA-NRCS quantification data will most likely not replace the need for VCMs to do their own MRV.

The Carbon Sequestration Collaboration Act is another pending federal bill that, if passed, has the potential to increase research and development support for agricultural production practices that sequester carbon.[329] According to the sponsor of the Act, Representative Frank Lucas, it is meant to address "a knowledge gap when it comes to making use of smaller carbon sinks like soils and rangeland."[330] Specifically, the Act—if passed—will authorize the

327 *See id.*

328 *See* Stephanie Mercier, *Agricultural Provisions of the Inflation Reduction Act*, AGWEB FARM J. (Aug. 23, 2022), https://www.agweb.com/opinion/agricultural-provisions-inflation-reduction-act.

329 *See* Carbon Sequestration Collaboration Act, H.R. 8337, 117th Cong. (2022); Jenna Hoffman, *New Bill Aims to Strengthen Research in Ag Conservation*, AGWEB FARM J. (July 15, 2022), https://www.agweb.com/news/policy/politics/new-bill-aims-strengthen-research-ag-conservation.

330 Hoffman, *supra* note 329.

Departments of Energy, Interior, and Agriculture to collaborate on carbon sequestration research.[331]

F. Continued and Expanded Funding in the 2023 Farm Bill

Planning for the 2023 Farm Bill is underway and fostering the agricultural sector's adoption of regenerative farming practices is a priority for some federal legislators.[332] The Conservation Title of the Farm Bill provides for funding for a host of regenerative agriculture practices through conservation programs.[333] However, many of these programs are routinely oversubscribed, meaning there is not enough funding to serve the farmers who are interested in participating.[334] According to the Bipartisan Policy Center, to encourage carbon sequestration, "Congress should substantially increase funding (up to a doubling of current budgets)" for climate-friendly conservation programs in the Conservation Title of the 2023 Farm Bill.[335] The funding authorized by the Inflation Reduction Act and the Climate Smart Commodities Partnership, as described above, has jumpstarted the funding support for carbon sequestering agricultural practices in advance of the 2023 Farm Bill.[336] On May 25, 2021, the USDA announced a new $10 million initiative to do just that by quantifying the climate benefits of acres enrolled in the CRP.[337] According to the USDA, the nearly twenty-one million

331 *See* Carbon Sequestration Collaboration Act, H.R. 8337, 117th Cong. (2022).

332 *See* Downs, *supra* note 43; Press Release, Congresswoman Chellie Pingree, *supra* note 43.

333 *See* MEGAN STUBBS, CONG. RSCH. SERV., IFI2024, FARM BILL PRIMER: CONSERVATION TITLE 1 (2022), https://crsreports.congress.gov/product/pdf/IF/IF12024.

334 *See id.* at 2. (In FY2020, USDA funded 27% of eligible program applications received for EQIP, 35% for Conservation Stewardship Program, and 43% for Agricultural Management Assistance).

335 FARM & FOREST CARBON SOLUTIONS TASK FORCE, BIPARTISAN POL'Y CTR., FEDERAL POLICIES TO ADVANCE NATURAL CLIMATE SOLUTIONS 10 (2022), https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2022/02/BPC_Farm-and-Forest_RV10_Final.pdf.

336 *See* Chuck Abbott, *Farm Bill Will Benefit from Climate Funding, says Scott*, SUCCESSFUL FARMING (Aug. 15, 2022), https://www.agriculture.com/news/business/farm-bill-will-benefit-from-climate-funding-says-scott.

337 *See* Press Release, U.S. Dep't of Agric., USDA Announces New Initiative to Quantify Climate Benefits of Conservation Reserve Program (May 25, 2021),

acres enrolled in CRP in 2021 had the potential to prevent more than twelve million tons of carbon dioxide from entering the atmosphere.[338] The USDA will use the carbon sequestration data from the CRP participants to improve the COMET-farm tool and other quantification tools to assist farmers in understanding how conservation practices sequester or reduce GHG emissions.[339]

The USDA houses multiple research agencies such as the Agricultural Research Service and the Economic Research Service.[340] Following the 2008 Farm Bill, the USDA created the Office of Environmental Markets.[341] This division has developed technical guidelines and science-based methods for estimating GHG and carbon sequestration.[342] The 2023 Farm Bill could support expanded research goals such as climate benefits from regenerative practices and support of tools to verify and validate carbon sequestration modeling.[343] To overcome apprehensions about yield losses associated with regenerative practices, the Crop Insurance Title of the Farm Bill could also create insurance products that address the risk to yields "of provisioning ecosystem services."[344]

CONCLUSION

As the global economy places greater emphasis on decarbonization, "demand for carbon credits will likely increase . . . [and] is more likely to be met if a large-scale, voluntary carbon market takes shape, which is able to help companies achieve carbon neutral, net-zero and net-negative goals."[345] However, in the absence of regulatory oversight, VCMs have adopted differing programmatic

https://www.fsa.usda.gov/news-room/news-releases/2021/usda-announces-new-initiative-to-quantify-climate-benefits-of-conservation-reserve-program.

338 *See id*.

339 *See id*.

340 *See Agencies*, USDA, https://www.usda.gov/our-agency/agencies (last visited Sept. 29, 2022).

341 *See* STUBBS ET AL., *supra* note 3, at 25.

342 *See id.*

343 *See* CHRIS ADAMO & BRUCE KNIGHT, THE ROLE OF FEDERAL POLICY AT THE NEXUS OF CLIMATE, FOOD, AND WATER 3–4 (2021), https://climatefoodag.org/wp-content/uploads/sites/9/2021/02/CFAD-POVPaper_AdamoKnight_Final.pdf.

344 *Id.* at 5.

345 TASKFORCE ON SCALING VOLUNTARY CARBON MKTS., *supra* note 18, at 4.

standards that have impacted the quality of the carbon offsets generated.[346]

This Article asserts the need to address the scientific and transactional hurdles in the voluntary carbon marketplace through the adoption of a hybrid public-private form of governance.[347] The significant funding allocated in 2022 for the adoption of climate smart farming practices will support the adoption of the agricultural practices needed to generate carbon credits.[348] However, increased adoption alone will be insufficient to address all of the existing frailties within the voluntary carbon marketplace related to competing carbon protocols. The passage of the revised GCSA has the potential to address some of these frailties and improve the performance of VCMs by lending legitimacy to a USDA published list of carbon credit protocols, connecting credit generators with qualified technical assistance providers, and forming an advisory council to report on the state of the marketplace to Congress and the USDA.[349] Although the revised GCSA elevates the role of the USDA, it falls short of authorizing the USDA to act as a central authority with the power to promulgate universally accepted standards for carbon markets. VCMs could, however, by coming together and adopting multilateral private governance standards, eliminate competing protocols and improve carbon credit integrity.[350] Law and policymakers are at a pivotal moment in the fight against climate change and have the ability to offer much-needed support to fledging VCMs, and in so doing, provide farmers the assurance they need to generate and sell carbon credits.

346 *See* STUBBS ET AL., *supra* note 3, at 18.

347 *See* Miltenberger et al., *supra* note 159.

348 *See* Downs, *supra* note 43.

349 *See* Heller, *supra* note 309.

350 *See* Galperin, *supra* note 89, at 81–82.