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Marijuana Agriculture Law: Regulation At The Root Of An Industry

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MARIJUANA AGRICULTURE LAW: REGULATION AT THE ROOT OF AN INDUSTRY

*Ryan B. Stoa**

Abstract

Marijuana legalization is sweeping the nation. Recreational marijuana use is legal in eight states. Medical marijuana use is legal in thirteen states. Only three states maintain an absolute criminal prohibition on marijuana use. Many of these legalization initiatives propose to regulate marijuana in a manner similar to alcohol, and many titles are variations of the “Regulate Marijuana Like Alcohol Act.” For political and public health reasons the analogy makes sense, but it also reveals a regulatory blind spot. States may be using alcohol as a model for regulating the distribution, retail, and consumption of marijuana, but marijuana is much more than a retail product. It is also an agricultural product, and by some measures, the largest cash crop in the United States. Since marijuana prohibition laws were passed long before any cultivation regulations, states now face an unprecedented challenge: to regulate, for the first time ever, one of the country’s largest agricultural industries.

Major regulatory challenges lie ahead, and how states respond to those challenges will shape the course of the marijuana industry. At present, there is a lack of understanding of the regulatory challenges marijuana agriculture presents and the options states have to address them. This Article identifies those challenges and the regulatory approaches most capable of addressing them. The study begins by describing the existing state of marijuana agriculture regulations. States are likely to find that the marijuana industry’s unique characteristics justify a tailored regulatory approach; relying on existing agricultural policies may be ineffectual or lead to perverse outcomes. Next, the study explores fundamental questions about the “marijuana fragmentation spectrum.” Will the industry come to be dominated by agricultural conglomerates mass-producing a marijuana commodity, as many have feared? Or will

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governments and the industry adopt the appellation model favored by the wine industry to protect local farmers and differentiate between products? The study also analyzes the major environmental impacts of marijuana agriculture, including regulations that address water allocation, water quality, energy, organic certification, and crop insurance. Finally, the study addresses power distribution trade-offs within marijuana agriculture regulation frameworks, including local vs. state, and consolidated vs. fragmented, regulatory authority dilemmas. The findings suggest that responsible and sustainable marijuana agriculture can be fostered at the state level, but only if regulations are responsive to the unique and unprecedented challenges that marijuana agriculture presents.

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INTRODUCTION

Across the United States, voters are weighing the costs and benefits of marijuana legalization. As many as sixty marijuana legalization initiatives were proposed to appear on election ballots in 2016.¹ Following the elections, recreational marijuana use is now legal in eight states. Medical marijuana use is legal in thirteen states. Only three states maintain an absolute criminal prohibition on marijuana use.² As states move toward legalization, governments will need to address a broad range of regulatory issues, including the distribution, sale, and consumption phases of the supply chain. But legal marijuana's track record so far suggests that the agricultural component of the marijuana industry is being ignored. Whether states are failing to appreciate marijuana's agricultural roots or choosing to disregard them, the industry's direction will be out of state control until regulatory frameworks are in place.

Nowhere has this been more apparent than in California. In 1996, California voters passed Proposition 215, the Compassionate Use Act (CUA).³ With the CUA, California became the first state to legalize the medicinal use of marijuana, exempting patients and prescribing physicians from criminal prosecution.⁴ The text of the Act was short and did not address how the state or local governments should regulate the marijuana industry. It did not, for example, assign regulatory authority to an administrative agency, articulate limits on possession or cultivation, or propose a broad regulatory framework from which the state or local governments could operate.

In the wake of the CUA a legal medical marijuana industry developed in California, and the industry experienced tremendous growth,⁵ notwithstanding the absence of any meaningful state regulations. But the CUA's omissions prompted the state legislature to enact the Medical

1. David Downs, *20 States Report Pot Legalization Measures in 2016 Election*, SF GATE (Feb. 18, 2016, 10:41 AM), <http://blog.sfgate.com/smellthetruth/2016/02/18/20-states-report-pot-legalization-measures-in-2016-election>.

2. See *28 Legal Medical Marijuana States and DC*, PROCON.ORG, <http://medicalmarijuana.procon.org/view.resource.php?resourceID=000881&print=true> (last updated Dec. 28, 2016, 11:36 AM) (listing marijuana state laws along with the year in which they were passed).

3. 1996 Cal. Legis. Serv. Prop. 215 (West) (codified at CAL. HEALTH & SAFETY CODE § 11362.5 (West 2016)).

4. *Id.*

5. See Tony Pugh, *Medical Marijuana Industry Rapidly Grows Mainstream*, McCLATCHYDC (Mar. 30, 2011, 7:21 PM), <http://www.mcclatchydc.com/news/nation-world/national/article24618997.html>. According to one study, by 2010 nearly 80% of marijuana consumed in the United States came from California. See *id.*

Marijuana Program Act (MMPA) in 2003,⁶ which, among other measures, restricted the number of plants medical marijuana patients or designated caregivers could cultivate,⁷ and assigned further regulatory authority to the Attorney General.⁸ Even these limits, however, became legally ambiguous guidelines after the California Supreme Court ruled that the rights established by constitutional amendment Proposition 215 could not be limited by legislative act.⁹ The upshot of these early experiments with marijuana legalization is that California's burgeoning marijuana industry has been more or less unregulated for twenty years.¹⁰

In the absence of regulation, marijuana cultivation in California has exploded, with approximately fifty thousand marijuana farms accounting for 60% of all marijuana grown in the United States.¹¹ There are as many marijuana farms in Humboldt County, California, as there are wineries statewide.¹² And this unchecked growth in marijuana agriculture has consequences for the sustainability and potential growth of the industry. Marijuana farming has been blamed for sucking rivers dry,¹³ poisoning soil and water resources with pesticides and rodenticides,¹⁴ and clearing mature forests.¹⁵ Many of these criticisms are flawed, as research on the

6. 2003 Cal. Stat. 6422 (codified at CAL. HEALTH & SAFETY CODE §§ 11362.7–.83 (West 2016)).

7. CAL. HEALTH & SAFETY CODE § 11362.77.

8. *Id.* § 11362.77(e).

9. *People v. Kelly*, 222 P.3d 186, 209, 210 (Cal. 2010).

10. See Josh Harkinson, *New California Laws Are a Big Deal for People Who Care Where Their Pot Comes from*, MOTHER JONES (Sept. 16, 2015, 5:00 AM), <http://www.motherjones.com/politics/2015/09/california-medical-marijuana-bill-pot-smokers-environment> (noting California's unique "hands-off approach").

11. Alissa Walker, *How Growing More Weed Can Help California Fix Its Water Problems*, GIZMODO (Oct. 12, 2015, 1:40 PM), <http://gizmodo.com/how-growing-more-weed-can-help-california-fix-its-water-1732169259>.

12. See *id.* (comparing the four thousand wineries in California to the four thousand pot farms in Humboldt County).

13. See, e.g., *Endangered and Threatened Species; Recovery Plans*, 79 Fed. Reg. 58,750 (Sept. 30, 2014) (discussing one of the objectives of the Endangered and Threatened Species Recovery Plans "to improve degraded habitat"); Scott Bauer et al., *Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds*, PLOS ONE, Mar. 18, 2015, at 1, 17; Munchies Staff, *Your Marijuana Habit Is Still Sucking California Dry*, VICE: MUNCHIES (Apr. 10, 2015), <https://munchies.vice.com/en/articles/your-marijuana-habit-is-still-sucking-california-dry>.

14. See, e.g., Craig Thompson et al., *Impacts of Rodenticide and Insecticide Toxicants from Marijuana Cultivation Sites on Fisher Survival Rates in the Sierra National Forest, California*, 7 CONSERVATION LETTERS 91, 97 (2014).

15. See, e.g., Jennifer K. Carah et al., *High Time for Conservation: Adding the Environment to the Debate on Marijuana Liberalization*, 65 BIOSCIENCE 822, 824 (2015), citing Jim F. Milestone et al., *Continued Cultivation of Illegal Marijuana in U.S. Western National Parks*, Proceedings from the 2011 George Wright Society Conference on Parks, Protected Areas, and Cultural Sites 209 (2012).

environmental impacts of marijuana farming is nascent and rarely acknowledges that farmers can grow responsibly and sustainably on private lands.

Many farmers would welcome the security of compliance with state and local laws, while being distinguished from cartel operations or destructive “trespass grows” on public lands. As it stands, farms on private property remain vulnerable to police raids and asset forfeiture laws¹⁶ and are unable to take advantage of typical agricultural government services, such as crop insurance programs or pesticide-free certifications. Because marijuana agriculture’s regulatory contours have remained ambiguous for so long, states and the public alike poorly understand the marijuana agriculture industry. This disconnect presents a threat to responsible management of legal marijuana markets.

Fortunately, change is on the horizon in California. In January 2016, the Medical Marijuana Regulation and Safety Act (MMRSA) came into effect,¹⁷ with ambitious proposals to create comprehensive regulations for marijuana agriculture.¹⁸ The MMRSA assigns authority for various regulatory responsibilities to a variety of state agencies, including the Department of Food and Agriculture, Department of Fish and Wildlife, Department of Public Health, and the State Water Resources Control Board.¹⁹ Said the author of the bill, “Cultivators are going to have to comply with the same kinds of regulations that typical farmers do. . . . [I]t’s going to be treated like an agriculture product”²⁰ It took twenty years to get there, but marijuana cultivation has finally been recognized as an agricultural activity in California, and may now be regulated as such.²¹

The same cannot be said for every state that has legalized, or is considering legalizing, medicinal or recreational marijuana. In many states, the immediate regulatory priority is the distribution, sale, and

16. See Adrian Fernandez Baumann, *A Carrot and Stick for Pot Farmers*, E. BAY EXPRESS (Aug. 12, 2015), <http://www.eastbayexpress.com/oakland/a-carrot-and-stick-for-pot-farmers/Content?oid=4454890&showFullText=true> (“Asset forfeiture laws allow police to seize large amounts of money and assets in pot busts.”).

17. 2015 Cal. Stat. 5293 (codified as amended in scattered sections of CAL. BUS. & PROF. CODE).

18. *Id.*

19. CAL. BUS. & PROF. CODE § 19332 (West 2016).

20. *Assemblymembers Urge Governor Brown to Sign Medical Marijuana Package*, NEWS CHANNEL 3, <http://kiem-tv.com/video/assemblymembers-urge-governor-brown-sign-medical-marijuana-package> (last visited Nov. 2, 2016).

21. Patrick McGreevy, *California Sets New Rules for Medical Pot Industry*, L.A. TIMES (Oct. 9, 2015, 6:09 PM), <http://www.latimes.com/local/political/la-me-pc-gov-brown-on-medical-marijuana-regulations-20151009-story.html>.

consumption of marijuana.²² Colorado legalized recreational marijuana by passing Amendment 64: The Regulate Marijuana Like Alcohol Act of 2012.²³ For political and public health reasons the analogy makes sense, but it also reveals a regulatory blind spot. States may be using alcohol as a model for regulating the distribution, retail, and consumption of marijuana, but marijuana is much more than a retail product. It is also an agricultural product and, by some measures, the largest cash crop in the United States.²⁴ Since marijuana prohibition laws were passed long before any regulations for cultivation developed, states now face an unprecedented challenge: to regulate, for the first time ever, one of the country's largest agricultural industries.

Early indications suggest that states are making little effort to regulate marijuana cultivation, or are failing to appreciate the disruptive potential of marijuana agriculture.²⁵ Eight states have legalized recreational marijuana cultivation and use. Thirteen states have legalized medical marijuana cultivation and use.²⁶ But few of these states are anticipating the unique regulatory challenges that marijuana agriculture presents. Even fewer are prepared to tackle them.

This Article argues that marijuana is a burgeoning agricultural industry and calls for regulations that recognize it as such. As the field of marijuana agriculture law is incipient, this Article provides a roadmap for the major regulatory issues states and the industry are likely to encounter. Many agricultural policies and programs are created or supported by the federal government, and these would not apply to marijuana agricultural activities that run afoul of federal marijuana prohibition laws. Therefore, states and the marijuana industry will need to be creative in providing analogous regulatory functions.

The most immediate choice regulators will have to make is between an approach that incorporates the marijuana industry into the existing regulatory framework for agriculture (essentially treating marijuana like any other agricultural product), or an approach that creates a separate regulatory framework for marijuana cultivation. While the former has its benefits, and may be achievable long-term, marijuana's transition from the black market may call for a targeted regulatory scheme in the interim.

22. *State Marijuana Laws Map*, GOVERNING DATA, <http://www.governing.com/gov-data/state-marijuana-laws-map-medical-recreational.html> (last updated Nov. 11, 2016).

23. 2013 Colo. Sess. Laws 3291 (codified as amended at COLO. CONST. art. XVIII, § 16).

24. JON GETTMAN, MARIJUANA PRODUCTION IN THE UNITED STATES 4 (2006), http://www.drugscience.org/Archive/bcr2/MJCropReport_2006.pdf.

25. See generally MARIJUANA POLICY PROJECT, STATE-BY-STATE MEDICAL MARIJUANA LAWS (2015) (discussing an overview of state laws on marijuana from 1978 to the present).

26. *State Marijuana Laws Map*, *supra* note 22.

Another fundamental issue facing the marijuana agriculture industry has not yet been conclusively resolved: Is marijuana an agricultural commodity? Commodities are fungible goods with no qualitative differentiation, such as wheat or soybeans. Many existing farmers fear that marijuana markets will be flooded with cheap, indistinct marijuana grown by “Big Ag” conglomerates.²⁷ To counteract these concerns, some industry groups advocate for states to adopt an appellation model²⁸ of marijuana cultivation that would preserve markets for regional marijuana products and maintain quality standards.²⁹ States and counties can play a large role in this existential question by adopting or rejecting the appellation model, or by enacting other regulations that facilitate or preclude the consolidation of marijuana agriculture.

The environmental component of marijuana agriculture will also require regulatory attention. Pesticides and fertilizers facilitate plant growth but may reduce soil and water quality.³⁰ States and the marijuana industry may wish to cultivate a market for organic or pesticide-free marijuana.³¹ Marijuana agriculture also requires appropriate quantities of water for irrigation and, when grown indoors, energy resources. Regulators must balance an interest in providing resources to a growing industry with the need to manage those resources sustainably.

When the environment does not cooperate, the federal government has been instrumental in providing stability to the agricultural industry by regulating crop insurance and providing disaster relief.³² As marijuana

27. Jeremy B. White, *California Pot Farmers Wrestle with New Medical Marijuana Rules*, SACRAMENTO BEE (Nov. 17, 2015, 10:10 AM), <http://www.sacbee.com/news/politics-government/capitol-alert/article45255678.html>.

28. Derived from the French term, *appellation d'origine contrôlée*, an appellation is a legally protected geographic designation, known most commonly for its adoption by the wine industry. *Appellation d'Origine Contrôlée*, OXFORD ENGLISH DICTIONARY (3d ed. 2011).

29. See, e.g., Anita Chabria, *Why Marijuana Growers Want Champagne-Like Labels for Their Weed*, GUARDIAN (Jan. 12, 2016, 2:43 PM), <https://www.theguardian.com/society/2016/jan/12/marijuana-growers-labels-cannabis-california-legal-weed>; Paul Payne, *Mendocino County Growers Plan Pot Appellations to Promote Cannabis Country*, PRESS DEMOCRAT (Aug. 27, 2016), <http://www.pressdemocrat.com/news/5958381-181/mendocino-county-growers-plan-pot?artslide=0>.

30. See Wasim Aktar et al., *Impact of Pesticides use in Agriculture: Their Benefits and Hazards*, 2 INTERDISC. TOXICOLOGY 1, 8 (2009); James Stephen Carpenter, *Farm Chemicals, Soil Erosion and Sustainable Agriculture*, 13 STAN. ENV'T L.J. 190, 198, 201 (1994).

31. See, e.g., Rachel E. Gross, *Why Is It So Hard to Get Clean Weed?*, SLATE (Apr. 20, 2016, 11:54 AM), http://www.slate.com/articles/business/moneybox/2016/04/there_s_a_clean_natural_weed_movement_but_it_can_t_call_itself_organic_here.html; Susan Squibb, *Desperately Seeking Outdoor-Grown, Organic Colorado Marijuana*, CANNABIST (Jan. 4, 2016, 6:09 PM), <http://www.thecannabist.co/2016/01/04/organic-marijuana-outdoor-pesticides/38301>.

32. *Federal Disaster Assistance & Crop Insurance Programs: An Overview*, NAT'L AGRIC. L. CTR., <http://nationalaglawcenter.org/overview/disasterassistancecropinsurance> (last updated Jan. 23, 2014); see, e.g., *What Is the Role of the Federal Government in Crop Insurance?*,

farmers would not be eligible for these programs, states may want to provide their own support structures. However, it may be difficult to avoid the federal government's institutional and legal reach, presenting federal preemption concerns.

Another question concerns power sharing: Where can (or should) regulatory authority be placed? Local governments may play a large role in the direction of marijuana agriculture, as states with marijuana regulations have so far been broadly permissive of counties and municipalities creating their own (often more restrictive) marijuana agriculture regulations.³³ Local governments can utilize their lawmaking powers to shape agricultural policy for the marijuana industry, but this decentralized form of policy making may come at the expense of regulatory clarity for the state as a whole.

Keeping the regulatory framework centralized on the state level provides more consistency but may be difficult to apply in states where political support for marijuana cultivation changes drastically by jurisdiction. In addition, states will need to decide whether to consolidate regulatory authority for marijuana into one state agency, or to assign different roles and responsibilities to several agencies and regulate cooperatively. Colorado has adopted the former model,³⁴ while California has adopted the latter.³⁵

In February 2016, Humboldt County passed a comprehensive commercial marijuana cultivation ordinance,³⁶ one of the first of its kind. As the heart and soul of California's marijuana agriculture sector, Humboldt County has consistently played a leadership role in the development of the marijuana industry, and this ordinance may prove instrumental in shaping marijuana agriculture policies around the country. The ordinance addresses many of the issues identified in this Article, placing limits on farm size, water, and energy use, while developing an artisanal labelling program.³⁷ The Humboldt County ordinance is an ideal case study for the nascent field of marijuana agriculture law and underscores the need for state and local governments across the nation to start developing their own regulatory framework.

Never before has a major agricultural product entered legal markets with the pace and scale that marijuana is entering them today. States face

CROP INS., http://www.cropinsuranceinamerica.org/just-the-facts/what-is-the-role-of-the-federal-government-in-the-crop-insurance-program/#.V-n6zmO_tFJ (last visited Jan. 20, 2017).

33. See, e.g., BUTTE, CAL., CODE ch. 34A (2017).

34. See, e.g., PUEBLO, COLO., CODE ch. 5.12, § 5.12.030 (2013) (“[T]he Pueblo County Liquor and Marijuana Licensing Board shall have the power and authority to suspend, fine, restrict or revoke [marijuana] licenses . . .”).

35. See, e.g., KERN, CAL., CODE ch. 5.85, § 5.85.030 (2016) (discussing relationships to other laws).

36. HUMBOLDT, CAL., CODE tit. III, div. 1, ch. 3, § 313-55.4 (2016).

37. *Id.*

an unprecedented regulatory challenge, and ignoring the agricultural dimension of the marijuana industry is not a sound long-term approach. This Article will present and analyze the most significant legal and regulatory challenges states will face when legalizing marijuana. Responsible and sustainable marijuana agriculture can be fostered at the state level, but only if regulations are responsive to the unique and unprecedented challenges that marijuana agriculture presents.

I. THERE AND BACK AGAIN: MARIJUANA'S LONG ROAD TO REGULATED AGRICULTURAL PRODUCT

Marijuana is one of humanity's oldest cultivated crops. It can be traced back 12,000 years to hunter-gatherers who appreciated its nutritious and psychoactive properties.³⁸ In Neolithic times it traveled from its roots in China and Siberia along the Silk Road to the Middle East and Europe,³⁹ and, once established, it flourished in classical Greek, Roman, and Arab societies.⁴⁰ European colonists spread marijuana cultivation, trade, and use throughout the Western Hemisphere and into what is now the United States.⁴¹

For many years, marijuana's presence in the United States was overshadowed by the other major derivative of its taxonomic species *cannabis sativa*: hemp.⁴² Marijuana is primarily grown and used for its medicinal or recreational psychoactive properties. Hemp strains, however, are grown to produce food, textiles, paper, and other materials.⁴³ Queen Elizabeth required large landowners throughout the British Empire to grow hemp to counter Britain's reliance on Russian hemp imports;⁴⁴ later the Jamestown colonists would be required to do the same.⁴⁵ Both George Washington and Thomas Jefferson were hemp

38. Barney Warf, *High Points: An Historical Geography of Cannabis*, 104 GEOGRAPHICAL REV. 414, 418–19 (2014).

39. *Id.* at 420.

40. *Id.* at 423.

41. *Id.* at 425–26.

42. For a review of the taxonomy of marijuana and hemp, see generally Shannon L. Datwyler & George D. Weiblen, *Genetic Variation in Hemp and Marijuana (Cannabis Sativa L.) According to Amplified Fragment Length Polymorphisms*, 51 J. FORENSIC SCI. 371 (2006); Ernest Small & Arthur Cronquist, *A Practical and Natural Taxonomy for Cannabis*, 25 TAXON 405 (1976).

43. See generally ROWAN ROBINSON, *THE GREAT BOOK OF HEMP: THE COMPLETE GUIDE TO THE ENVIRONMENTAL, COMMERCIAL, AND MEDICINAL USES OF THE WORLD'S MOST EXTRAORDINARY PLANT* (1996) (describing the development of a modern industrial hemp industry and the various uses of hemp therein).

44. Warf, *supra* note 38, at 426.

45. MARTIN A. LEE, *SMOKE SIGNALS: A SOCIAL HISTORY OF MARIJUANA—MEDICAL, RECREATIONAL AND SCIENTIFIC* 16 (2012).

growers, and a draft of the Declaration of Independence was written on hemp.⁴⁶ John Adams was a prominent supporter of hemp cultivation, writing frequently about its benefits.⁴⁷ “Seems to me if grate Men dont leeve off writing Pollyticks, breaking Heads, boxing Ears, ringing Noses and kicking Breeches, we shall by and by want a world of Hemp more for our own consumshon,” Adams wrote.⁴⁸

Hemp and marijuana would continue to be grown throughout the nineteenth and early twentieth centuries.⁴⁹ Like any other legal agricultural commodity, marijuana would have been subject to variations in state agricultural laws and policies.⁵⁰ In jurisdictions east of the Mississippi River, for example, marijuana cultivation would have been permitted as long as it was reasonable vis a vis other riparians.⁵¹ The fact that a water rights dispute before the Supreme Court of Pennsylvania in 1852 involved a contractual obligation to use water solely for certain purposes that included a hemp-mill was found unremarkable by the court.⁵²

In western states, marijuana cultivation—perceived as agriculture—would have met the requirements of beneficial use, thereby vesting water rights in accordance with temporal seniority. An early Colorado case establishing the prior appropriation doctrine noted the “necessity for artificial irrigation of the soil.”⁵³ In 1947, a California tax dispute involved the development of wells for purposes of irrigating hemp.⁵⁴ The court thought the plan could “prove a profitable industry,” before moving on to the legal matter at issue.⁵⁵

Eventually the politicization of marijuana, as well as the widespread use of both hemp and marijuana in the United States catalyzed opposition to *cannabis sativa*’s legality from multiple angles. On the one hand, marijuana’s early popularity with immigrants and bohemian communities produced reactionary prejudices that prompted crude public campaigns

46. *Id.* at 16, 18.

47. Corliss Knapp Engle, *John Adams, Farmer and Gardener*, ARNOLDIA, 2002, at 9, 10.

48. Letter from Humphrey Ploughjogger to the Boston Evening-Post (June 20, 1763), in 1 PAPERS OF JOHN ADAMS 63, 66 (Robert J. Taylor et al. eds., 1977).

49. By some accounts, it became the third largest cash crop in the United States by the mid-nineteenth century. LEE, *supra* note 45, at 19.

50. See *Production Contracts*, NAT’L AGRIC. L. CTR., <http://nationalaglawcenter.org/research-by-topic/production-contracts> (last visited Jan. 2, 2017).

51. *E.g.*, *Hendrick v. Cook*, 4 Ga. 241, 256 (1848) (“Each riparian proprietor is entitled to a reasonable use of the water, for domestic, agricultural and manufacturing purposes . . .”).

52. See *Washabaugh v. Oyster*, 18 Pa. 497, 498 (1852).

53. *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443, 449 (1882).

54. *Lerdo Land Co. v. Comm’r*, 6 T.C.M. 1285 (1947).

55. *Id.*

to criminalize the drug.⁵⁶ On the other hand, hemp's industrial versatility was a threat to the cotton industry and other producers of textiles.⁵⁷ Despite strong support in the medical and pharmaceutical industries (the agriculture industry was less supportive), twenty-nine states banned *cannabis* between 1915 and 1931.⁵⁸

The federal government then passed the Marihuana Tax Act of 1937,⁵⁹ creating barriers to marijuana production, sale, and consumption.⁶⁰ The Supreme Court's ruling in *Leary v. United States*⁶¹ overturned the Marihuana Tax Act on the grounds that compliance would violate a person's right against self-incrimination.⁶² But the decision prompted Congress to repeal the Act and replace it with the Comprehensive Drug Abuse Prevention and Control Act of 1970,⁶³ which categorized marijuana as a Schedule I narcotic with prohibitions on cultivation, sale, possession, and use.⁶⁴ Cannabis (including marijuana and hemp) has been a black market crop ever since.

Because states developed modern regulatory regimes in the latter half of the twentieth century (after marijuana was criminalized),⁶⁵ those regimes have never regulated the marijuana industry. This is true of many agricultural laws and policies as well, which federal agricultural policy has traditionally dictated or influenced. Until the Dust Bowl of the 1930s ravaged farming communities, the federal government's role in agriculture was minimal;⁶⁶ if droughts or crop failures caused farmland to become unusable, farmers were forced to relocate without any type of

56. Warf, *supra* note 38, at 429; *see also* TELL YOUR CHILDREN (G and H Productions 1936) (depicting the graphic horrors of marijuana use in ways that would appear satirical today).

57. *See* Warf, *supra* note 38, at 429.

58. Collin B. Walsh & Daniel T. Nau, *The History, Law, and Psychology of Criminalizing Marijuana: A Comparative Analysis with Alcohol and Tobacco* 19 (Ind. Univ. Maurer Sch. of Law, Legal Studies Research Paper Series, Paper No. 274, 2013), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2355151##.

59. Pub. L. No. 75-238, 50 Stat. 551 (1937), *repealed by* Comprehensive Drug Abuse Prevention and Control Act of 1970, Pub. L. No. 91-513, 84 Stat. 1236.

60. *Id.*

61. 395 U.S. 6 (1969).

62. *Id.* at 13.

63. Pub. L. No. 91-513, 84 Stat. 1236 (codified as amended at 21 U.S.C. § 812 (2012)).

64. *Id.*; Walsh & Nau, *supra* note 58, at 23.

65. *See* Ryan Stoa, *Florida Water Management Districts and the Florida Water Resources Act: The Challenges of Basin-Level Management*, 7 KY. J. EQUINE AGRIC. & NAT. RES. L. 73, 79 (2015) (describing how the spread of environmental awareness led to the passing of four major pieces of legislation in the 1960s).

66. *See* Zeynep K. Hansen & Gary D. Libecap, *Small Farms, Externalities, and the Dust Bowl of the 1930s*, 112 J. POL. ECON. 665, 666, 684 (2004) (discussing the disastrous consequences of the Dust Bowl and the eventual government intervention in the late 1930s).

federal assistance.⁶⁷ The Dust Bowl marked a turning point as the public recognized the vital role agriculturalists played in providing food supply. New Deal policies created agricultural programs designed to minimize risk for farmers, including subsidized feed, subsidized crop insurance, and financial aid grants.⁶⁸ The federal government also intervened in commodity markets to stabilize supply and demand. Successive Agricultural Adjustment Acts⁶⁹ provided grants that incentivized agricultural development in arid regions with the knowledge that government-backed insurance programs would spread the risk across society.⁷⁰ These policies were not just meant to protect farmers—they were designed to prop up entire farming communities.⁷¹

Post-World War II policies created general disaster relief funding frameworks, in which governors can request, and the President can grant, disaster assistance.⁷² In the 1970s, the federal government encouraged large-scale consolidation of small farms into large agribusinesses, while maintaining subsidies, to dramatically increase yields and promote agricultural exports.⁷³ For the most part, the pillars of agricultural law and policy set in motion in the twentieth century—crop subsidies, government-backed insurance, and direct relief payments—are still in place today.⁷⁴ Needless to say, the marijuana industry was not swept up

67. See Robert W. Adler, *Balancing Compassion and Risk in Climate Adaptation: U.S. Water, Drought, and Agricultural Law*, 64 FLA. L. REV. 201, 245–46 (2012).

68. *Id.* at 247.

69. *E.g.*, Agricultural Adjustment Act of 1933, Pub. L. No. 73-10, 48 Stat. 31, *invalidated* by *United States v. Butler*, 297 U.S. 1 (1936); Agricultural Adjustment Act of 1938, Pub. L. No. 108-357, 52 Stat. 31 (codified as amended at 7 U.S.C. §§ 1281–1407 (2012)).

70. See Adler, *supra* note 67, at 250.

71. *Id.* at 253.

72. See, *e.g.*, Federal Disaster Relief Act of 1950, Pub. L. No. 81-875, 64 Stat. 1109 (codified as amended at 42 U.S.C. § 5121 (1995)); see also Joanna M. Foster, *Oregon, Washington Declare States of Emergency as Wildfires Spread*, THINKPROGRESS (July 17, 2014), <https://thinkprogress.org/oregon-washington-declare-states-of-emergency-as-wildfires-spread-a-afd1a2fee09#.m7eiipg55> (reporting that the federal government has sent the National Guard and the National Weather Service to assist states with wildfire problems); Ian Lovett, *California Approves Forceful Steps amid Drought*, N.Y. TIMES (July 15, 2014), http://www.nytimes.com/2014/07/16/us/forceful-steps-amid-a-severe-drought.html?_r=0 (showing an example of California legislators approving regulation as assistance for droughts).

73. Adler, *supra* note 67, at 260.

74. The Agricultural Act of 2014, which establishes agricultural spending for the next ten years, allocates \$44.4 billion for commodity programs and \$90 billion for crop insurance. The government distributed disaster relief funds a week after the Act was signed into law, including \$100 million for livestock losses in California. Agricultural Act of 2014, Pub. L. No. 113-79, 128 Stat. 649 (to be codified in scattered sections of 7 U.S.C.); News Release, U.S. Dep't of Agric., *Obama Administration Announces Additional Assistance to Californians Impacted by Drought* (Feb. 14, 2014), <http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=2014/02/0022.xml>; Brad Plumer, *The \$956 Billion Farm Bill, in One Graph*, WASH. POST (Jan.

in these initiatives. For the most part, marijuana cultivation in the United States for much of the twentieth century was conducted by small-scale farmers acting independently (or, more accurately, in violation) of state and federal agricultural policies.

If this assortment of agricultural policies had developed in the presence of a legal marijuana industry, there is little reason to believe marijuana cultivation would have been any more challenging than the regulation of other crops. Regulation by federal agencies like the Food and Drug Administration (FDA)⁷⁵ and the U.S. Department of Agriculture (USDA)⁷⁶ would have been likely, while states may or may not have developed marijuana-specific agricultural policies.⁷⁷ Preliminary marijuana legalization initiatives have forced agencies to consider the marijuana industry anew, but those efforts remain limited.

A. *Marijuana Cultivation Is an Unregulated Agricultural Activity*

To determine how marijuana will fit into modern regulatory regimes, it is necessary to understand how the marijuana industry has evolved on the black market. The size of the marijuana industry today, like any rooted (at least in part) in the black market, is notoriously difficult to estimate, and there is a lack of peer-reviewed research. A 2006 pro-marijuana study focused on valuation pegged the total value of domestic marijuana production at \$35.8 billion.⁷⁸ If the estimate is accurate, marijuana would be the largest cash crop in the United States and a top five cash crop in 39 states.⁷⁹ In 2012 a generalist book on legalization questioned those results, claiming the industry production value is closer

28, 2014), <https://www.washingtonpost.com/news/wonk/wp/2014/01/28/the-950-billion-farm-bill-in-one-chart>.

75. The FDA regulates prescription and pharmaceutical drugs, among other products affecting public health. *See, e.g.*, Federal Food, Drug, and Cosmetic Act of 1938, Pub. L. No. 75-717, 52 Stat. 1040 (codified as amended at 21 U.S.C. §§ 301-99 (2012)).

76. The USDA provides “leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on public policy, the best available science, and efficient management.” *About the U.S. Department of Agriculture*, U.S. DEP’T AGRIC., http://www.usda.gov/wps/portal/usda/usdahome?navtype=MA&navid=ABOUT_USDA (last modified Oct. 6, 2016).

77. In regulated riparian jurisdictions, agencies can issue permits, or legislatures can craft laws, in a manner that prefers one use over another, or in some cases, one crop over another. The Regulated Riparian Model Water Code, for example, proscribes the following preferences among water rights: (1) water for human health; (2) water to protect crops and livestock; and (3) all other uses. The latitude agencies and legislatures have to interpret what is a “reasonable use,” which may facilitate agricultural favoritism. In Florida, for example, the influence of the citrus industry has strained efforts to protect the Everglades. *See Stoa, supra* note 65, at 83–85.

78. *See* GETTMAN, *supra* note 24, app. 3b, at 24. The \$35.8 billion figure is based on an estimate of over 56 million plants grown annually.

79. *See id.* at 13 & tbl. 7.

to \$4.3 billion.⁸⁰ A 2016 study on the nascent legal marijuana market was more bullish, finding annual sales of legal products topping \$2.7 billion and growth outpacing any other industry.⁸¹

As the marijuana industry matures and a greater proportion of its economic activities take place in legal markets, more precise estimates will become available. For now, even low estimates make clear that the transition from black market to legalized and regulated cultivation will transfer a burgeoning agricultural industry into regulatory systems. This transfer will not occur all at once. Aggressive taxation of producers and consumers of marijuana may keep less expensive black market opportunities alive and well.⁸² In Colorado's legal marijuana market, an estimated 40% of consumers still purchase marijuana on the black market, likely due to lower prices.⁸³ While that may be a disappointment to law enforcement and tax revenue authorities, administrative agencies may benefit from a gradual transition to legalization. And if obtaining the necessary agricultural permits is perceived to be excessively onerous by farmers, regulations may themselves contribute to the perpetuation of the black market.

What is clear is that marijuana cultivation is an agricultural activity. Marijuana can be grown in many different ways, in many different places, under many different growing conditions.⁸⁴ It can be grown indoors or outdoors, in arid or humid climates, with rain-fed or irrigated water.⁸⁵ Cultivation sites range from one or two plants grown for personal use, to small-scale farms, to large-scale "trespass" grows on public lands.⁸⁶

80. JONATHAN P. CAULKINS ET AL., MARIJUANA LEGALIZATION 41 (2012); see Michael Montgomery, Cal. Watch, *Marijuana Not Top U.S. Cash Crop: Book*, NBC BAY AREA (Aug. 14, 2012, 6:14 AM), http://www.nbcbayarea.com/news/local/New_book_discounts_theory_of_marijuana_as_top_US_cash_crop-166081066.html.

81. Jeff Daniels, *There's a New Gold Rush in California as Investors Prep for Pot Legalization Vote*, CNBC (June 30, 2016, 11:07 AM), <http://www.cnbc.com/2016/06/30/theresa-a-new-gold-rush-in-california-as-investors-prep-for-pot-legalization-vote.html>.

82. See Robert W. Wood, *Feds Propose Taxing Marijuana, True Cash Crop*, FORBES (Dec. 10, 2014, 1:41 AM), <http://www.forbes.com/sites/robertwood/2014/12/10/feds-propose-taxing-marijuana-true-cash-crop/#164a628c35f6>. But see JANE G. GRAVELLE & SEAN LOWRY, CONG. RESEARCH SERV., R43785, FEDERAL PROPOSALS TO TAX MARIJUANA: AN ECONOMIC ANALYSIS 18 (2014), <https://www.fas.org/sgp/crs/misc/R43785.pdf> ("[T]he initial tax rate for legalized marijuana could be set low enough to undermine the illicit market . . .").

83. See Katie Lobosco, *Colorado's Missing Marijuana Taxes*, CNN MONEY (Sept. 2, 2014, 8:01 AM), http://money.cnn.com/2014/09/02/news/economy/marijuana-taxes-colorado/index.html?section=money_topstories.

84. ROBERT CONNELL CLARKE, MARIJUANA BOTANY app. II, at 162–63 (1981).

85. *Id.*

86. See Phillip Smith, *Federal Bill Would Up Penalties for Marijuana "Trespass Grows," STOPTHEDRUGWAR.ORG* (July 19, 2013, 5:10 PM), http://stopthedrugwar.org/chronicle/2013/jul/19/federal_bill_would_penalties_mar.

Some envision a future dominated by large consolidated farms producing generic marijuana. Because the marijuana industry is so fragmented and diverse, it is difficult to paint a picture of marijuana farming that is representative of the diversity of cultivation methods.

Fundamentally, however, marijuana is a plant that must be cultivated to produce a market value. Marijuana buds (used to create marijuana products) can only be produced when female marijuana plants have not been pollinated by male plants, an exceedingly unlikely scenario in the wild.⁸⁷ To provide marijuana products to markets (legal or otherwise), therefore, requires human intervention and agricultural activity. This is an aspect of the marijuana industry, however, that many states have not fully appreciated. For twenty years after the state of California legalized medicinal marijuana, the state, to the extent it regulated the marijuana industry at all, focused mainly on regulating physicians, patients, and dispensaries.⁸⁸ The state acted as if marijuana appeared out of thin air. Or perhaps, the state's regulatory priorities suggested that marijuana agriculture did not need regulation.

Some states that have legalized the medicinal or recreational use of marijuana more recently have shown greater awareness of the agricultural component of the marijuana industry, but so far regulations have been limited relative to the scope of issues identified in this Article, or in some cases, non-existent. In New York, the approach has been dismissive of the agricultural component of the marijuana industry. While the state passed the Compassionate Care Act legalizing medicinal marijuana in 2014,⁸⁹ the law only allowed for five cultivators state-wide.⁹⁰ The law seemingly rejects the concept of marijuana agriculture altogether, referring to the process of growing marijuana plants as "manufacturing."⁹¹ To the extent the law addresses marijuana

87. See Ernest Small & Steve G. U. Naraine, *Expansion of Female Sex Organs in Response to Prolonged Virginity in Cannabis Sativa (Marijuana)*, 63 GENETIC RESOURCES & CROP EVOLUTION 339, 346 (2016).

88. See STEPHEN A. MCEWEN, LEAGUE OF CAL. CITIES, MEDICAL MARIJUANA—REVISITED AFTER NEW STATE LAWS (2016), <https://www.cacities.org/Resources-Documents/Member-Engagement/Professional-Departments/City-Attorneys/Library/2016/Spring-2016/5-2016-Spring-Medical-Marijuana-%E2%80%93Revisited-After.aspx>.

89. 2014 N.Y. Sess. Laws ch. 90 (McKinney) (codified at N.Y. PUB. HEALTH LAW §§ 3360–69 (McKinney 2014)).

90. N.Y. PUB. HEALTH LAW § 3365(9); see also Jesse McKinley, *New York State Awards 5 Medical Marijuana Licenses*, N.Y. TIMES (July 31, 2015), http://www.nytimes.com/2015/08/01/nyregion/new-york-state-awards-5-medical-marijuana-licenses.html?_r=0 (discussing the companies now allowed to grow and sell medicinal marijuana in New York).

91. The bill's summary begins, "Relates to the medical use of marihuana; legalizes the possession, manufacture, use, delivery, transport or administration of medical marihuana by a designated caregiver for a certified medical use" Summary, A.B. A06357, 2013–14 Gen. Assemb., Reg. Sess. (N.Y. 2014).

manufacturing at all, it requires that plants be grown indoors.⁹² This approach is flawed in several respects, as it pays little attention to the cultivation stage marijuana products must go through.

Other states have been more realistic about issues surrounding marijuana agriculture, though many blind spots remain. Licensing producers has been a common feature of these regulatory frameworks, and the licensing process may address agricultural issues, but often the focus has been limited to pesticide use, cultivation limits, or labelling.⁹³ In Colorado, for example, a task force established to investigate legal and regulatory issues and propose legislative and executive actions appropriately identified some agricultural issues,⁹⁴ such as the need to regulate pesticides and waste products, tax cultivators, and establish cultivation limits,⁹⁵ but broader issues central to agricultural development (such as water use or permitted cultivation practices) were not addressed.

While states appear to be aware that the marijuana industry is predicated on the cultivation of marijuana plants, the early record of marijuana regulations suggests that most states are ill-equipped to address marijuana agriculture. That may be due to a lack of institutional knowledge on the part of policy makers, which is understandable, but that does not excuse states that do not attempt to identify agricultural issues in the marijuana industry or develop a regulatory response.

B. Tailored Regulations vs. Equal Treatment

If there has been a trend in marijuana regulation among states that have legalized the medicinal or recreational use of marijuana, it has been to either reject that marijuana cultivation constitutes agriculture in the first place (as in New York),⁹⁶ or to license cultivators without also creating a broader marijuana agriculture regulation framework (as in Colorado).⁹⁷ California has been the only state to acknowledge that marijuana cultivation is an agricultural activity and that it requires

92. “Manufacturing of medical marihuana by a registered organization shall only be done in an indoor, enclosed, secure facility located in New York state, which may include a greenhouse.” N.Y. PUB. HEALTH LAW § 3364(8).

93. See, e.g., Bryce Pardo, *Cannabis Policy Reforms in the Americas: A Comparative Analysis of Colorado, Washington, and Uruguay*, 25 INT’L J. DRUG POL’Y 727, 731 (2014).

94. COLO. TASK FORCE, REPORT ON THE IMPLEMENTATION OF AMENDMENT 64, at 66–68 (2013), <http://www.colorado.gov/cms/forms/dor-tax/A64TaskForceFinalReport.pdf>.

95. Pardo, *supra* note 93, at 731–32. The task force’s recommendations were largely adopted by the state legislature and passed in May 2013. See H.B. 13-1317, 69th Gen. Assemb., Reg. Sess. (Colo. 2013).

96. See *supra* notes 89–91 and accompanying text (discussing New York’s use of “manufacture” instead of a word that represents cultivation or the growing of marijuana).

97. See *supra* notes 94–95 and accompanying text (discussing the failure of Colorado regulatory regimes to create a broad regulatory framework).

agricultural regulations.⁹⁸ As marijuana regulations are generally in their infancy, it is difficult to judge the validity of these approaches. One of these difficulties is that few crops share the same biological characteristics or legal history as marijuana, so states are starting from scratch in their regulatory efforts. But these regulatory struggles raise a broader question: Do states need to develop a regulatory framework tailored for marijuana agriculture? Perhaps, instead, it would be expedient to regulate marijuana like any other crop, using established state agricultural policies and institutions.

Treating marijuana like any other legal agricultural product has some advantages. Most states already have extensive regulations in place to address farm business organizations; commercial transactions; crop insurance; agricultural estate planning; agricultural financing and taxation; product safety, storage, and labelling; agricultural workers and labor standards; land use and areas zoned for agriculture; and environmental challenges such as water use, pesticides, fertilizers, and agricultural runoff.⁹⁹ Some adjustments would be necessary, of course, to integrate marijuana agriculture into these frameworks, especially when state regulations are intimately connected with federal agricultural laws and policies. But it would not be excessively burdensome for state agencies addressing these components of the agriculture industry to make the necessary adjustments upon legalization and regulate marijuana comparably to other crops. Similarly, a farmer growing several crops will already be accustomed to those rules and regulations, and it would not be impractical for that farmer to incorporate marijuana into their crop portfolio and resume business as usual.

It may be that, in several years or decades, marijuana is regulated like other crops. It seems unlikely that New York will continue to restrict marijuana cultivation to a small group of five “manufacturers,” for example. At least initially, however, as states transition to a legal marijuana market, existing frameworks likely cannot accommodate marijuana without creating significant regulatory disruptions. As a preliminary matter, there is insufficient political will to legalize marijuana and treat it like other crops. Because so much regulatory attention focuses on where and how marijuana is sold, purchased, and consumed, naturally regulators have included marijuana cultivation in their tailored regulatory frameworks to maintain oversight of the supply chain.¹⁰⁰ While that has not induced regulators to consider the full

98. A.B. 243, 2015–2016 Gen. Assemb., Reg. Sess. (Cal. 2015).

99. The National Agricultural Law Center compiles an index of publications on these and other topics pertinent to the regulation of agriculture. See *Research Articles*, NAT’L AGRIC. L. CTR., <http://nationalaglawcenter.org/center-publications> (last visited Mar. 28, 2016).

100. In some cases, the impulse to maintain oversight has prompted states to require vertical integration of the supply chain. See discussion *infra* Section II.C.

spectrum of marijuana-related agricultural issues, it has removed marijuana cultivation from the usual regulatory process.

In addition, where states have restricted the number of farmers cultivating marijuana, or the amount of marijuana that each farmer may cultivate, they have done so in part to restrict the size of the legal marijuana market. This may not affect the size of the overall marijuana market—including the black market—and in that respect states may be losing out on tax revenues,¹⁰¹ but the objective is not without merit. The marijuana industry is large and unwieldy, and regulating the industry without help from the federal government is a heavy burden for state agencies. In fact, Colorado's neighboring states have argued to the U.S. Supreme Court that Colorado's legal marijuana products have placed undue stress on their own state agencies.¹⁰² It is not unreasonable that states would seek to gradually incorporate marijuana into their regulatory frameworks, and doing so may require tailored regulations that remove marijuana from established agricultural regulations.

Beyond this pragmatic concern, it may not be in the interest of the marijuana industry, or the individual states and their marijuana farming communities, to treat marijuana indifferently. As discussed below, an unrestricted approach may lead to the commoditization of marijuana and consolidation of marijuana farms.¹⁰³ Additionally, because marijuana has been a black market agricultural product for decades, it does not enter legal frameworks looking like a traditional agricultural product. Many marijuana farmers grow their plants indoors, for example, instead of in outdoor fields.¹⁰⁴

Moreover, many farmers that cultivate marijuana on the black market are not subject to any agricultural rules and regulations. They may not, for example, have valid water rights,¹⁰⁵ land zoned for agriculture,¹⁰⁶ or a sophisticated understanding of administrative law and the permitting process.¹⁰⁷ Subjecting these farmers to the weight of existing regulations overnight is within a state's administrative powers, but that approach may come at the cost of alienating those farmers and discouraging them from participating in the legal system, perpetuating a robust black-market

101. See Lobosco, *supra* note 83.

102. Complaint at 3–4, *Nebraska v. Colorado*, 136 S. Ct. 1034 (2016) (No. 144). The Supreme Court declined to hear the case. *Nebraska*, 136 S. Ct. at 1034.

103. See discussion *infra* Section II.A.

104. Indoor growing offers many advantages such as controlled climate, environment, and light. ROBERT BERGMAN, *THE MARIJUANA GROW BIBLE* ch. 2 (2014) (ebook), <http://www.ilovegrowingmarijuana.com/wp-content/uploads/guides/Ilovegrowingmarijuana.com-grow-bible.pdf>.

105. See discussion *infra* Section III.A.

106. See *infra* note 276 and accompanying text (discussing the custom of growing indoors as a result of prohibition).

107. See *infra* note 197 and accompanying text.

farming community. If states are to incentivize participation from existing marijuana farmers—while creating a framework for marijuana agriculture that is responsive to the best interests of states, farming communities, and the marijuana industry—a tailored approach that provides a gradual transition into existing agricultural regulation frameworks may be necessary.

II. THE MARIJUANA FRAGMENTATION SPECTRUM: COMMODITIZATION, INTEGRATION, OR APPELLATION?

In 2010, California voters decisively rejected Proposition 19 (the Regulate, Control, and Tax Cannabis Act), a measure that would have legalized recreational marijuana and commercial cultivation.¹⁰⁸ The usual arguments against legalization were made by advocates skeptical of the marijuana industry, who were concerned about marijuana's impact on public health and safety¹⁰⁹ or the inherent regulatory and enforcement challenges marijuana legalization presents.¹¹⁰

What came as a surprise to many, however, was an apparent lack of support for legalization from marijuana farming strongholds. In the so-called “Emerald Triangle” of Mendocino County, Trinity County, and

108. *Accord California Proposition 19, the Marijuana Legalization Initiative (2010)*, BALLOTPEdia, [https://ballotpedia.org/California_Proposition_19,_the_Marijuana_Legalization_Initiative_\(2010\)](https://ballotpedia.org/California_Proposition_19,_the_Marijuana_Legalization_Initiative_(2010)) (last visited Dec. 19, 2016).

109. The Monterey County Herald wrote:

[W]e fear that a California-only pot industry operating under inconsistent and even contradictory rules would create serious crime problems of its own.

Proposition 19 doesn't set a measurable standard for driving under the influence of marijuana, and it could make it much more difficult for employers to bar employees from using marijuana even if it might undermine their ability to work safely.

Editorial, *Legalized Marijuana Measure Proposition 19 Is the Right Idea, but the Wrong Law*, MONTEREY CTY. HERALD (Sept. 29, 2010, 12:01 AM), <http://www.montereyherald.com/general-news/20100929/editorial-legalized-marijuana-measure-proposition-19-is-the-right-idea-but-the-wrong-law>.

110. The Santa Rosa Press Democrat wrote:

Proposition 19 is so poorly worded and filled with loopholes that it's likely to create more confusion than clarity. And, as with Proposition 215, which legalized medicinal uses of marijuana, it would still leave California law in conflict with federal law, creating more regulatory and policy gridlock at all levels of government.

Pot Measure Is Poorly Worded and Potentially Dangerous, PRESS DEMOCRAT (Sept. 27, 2010), <http://www.pressdemocrat.com/csp/mediapool/sites/PressDemocrat/News/story.csp?cid=2246942&sid=555&fid=181>.

Humboldt County—jurisdictions whose economics are dominated by marijuana cultivation—voters were even less enthusiastic about Proposition 19 than the state as a whole.¹¹¹ In Trinity County, barely 40% of voters supported the measure.¹¹² The simple narrative that emerged was that marijuana farmers were driven by greed: The price of marijuana, after all, is inflated on the black market, and having been successful operating in the shadows for so long, these farmers were perfectly happy to maintain the prohibition status quo.¹¹³

The narrative was misleading but not altogether unfounded. Just as many legalization opponents voiced concerns that Proposition 19 was vague and would prove difficult to enforce,¹¹⁴ some marijuana farmers were concerned that ambiguously worded legalization would lead to a proliferation of marijuana conglomerates akin to the tobacco industry.¹¹⁵ Mass production of marijuana on this scale would threaten to drive out California's fifty thousand marijuana farms¹¹⁶ and replace them with Big Ag producers.¹¹⁷

As California prepared to vote on another marijuana legalization measure in November 2016—the Adult Use of Marijuana Act¹¹⁸—marijuana farmers remained skeptical.¹¹⁹ Fearing the initiative and its financial backers are likely to push for commoditization of the marijuana

111. *Prop. 19: Election Results by County*, FRESNO CANNABIS ASS'N, <http://fresnocannabis.org/prop-19-election-results-by-county> (last visited Dec. 19, 2016).

112. *Id.*

113. See Thadeus Greenon, *Up in Smoke: A Closer Look at How Humboldt Voters Shot Down Proposition 19*, TIMES-STANDARD (Dec. 9, 2010, 12:01 AM), <http://www.times-standard.com/article/ZZ/20101209/NEWS/101209406>.

114. See *supra* note 110.

115. Phil Willon, *Only One of California's Pot Legalization Initiatives Has the Green That Counts*, L.A. TIMES (Feb. 22, 2016, 12:05 AM), <http://www.latimes.com/politics/la-pol-ca-marijuana-legalization-california-ballot-20160222-story.html>.

116. Kate Maxwell, *Cannabis Now Considered Agriculture*, WILLITZ NEWS (Feb. 10, 2016), <http://www.willitsnews.com/article/NR/20160210/NEWS/160219981>.

117. See Rory Carroll, *California Marijuana Legalization Faces Unlikely Foe: Growers*, REUTERS (Oct. 4, 2016, 4:49 PM), <http://www.reuters.com/article/us-usa-marijuana-growers-idUSKCN1240AF>.

118. 2016 Cal. Legis. Serv. Prop. 64 (West) (to be codified in scattered sections of CAL. HEALTH & SAFETY CODE).

119. See, e.g., Willon, *supra* note 115.

Hezekiah Allen of the California Growers Assn., which represents growers and other businesses in the cannabis industry, fears the interests influencing this vote could wipe out California's small marijuana operations and lead to "big marijuana" companies akin to the nation's powerful tobacco giants.

"We don't want there to be a Philip Morris of marijuana," he said.

Id.

industry, support for the initiative remains lukewarm.¹²⁰ The existential struggle exposes one of the most fundamental questions facing the marijuana industry: Should states regulate to protect small-scale marijuana farmers or allow the industry to consolidate and commoditize? On one end of the spectrum, the marijuana industry becomes like the wine industry: driven by geography and protected by appellation designations. On the other end, marijuana becomes an agricultural commodity: indistinct and inexpensive. Contrary to the views of many prognosticators,¹²¹ the eventual consolidation of the marijuana industry is not a foregone conclusion. In this matter, states and local governments have a choice to make.

A. *Marijuana as Agricultural Commodity*

Agricultural commodities are agricultural products that have no qualitative differentiation in the marketplace.¹²² They are fungible and treated equally with little regard for where, how, or by whom they were produced. As economist Karl Marx wrote, “From the taste of wheat it is not possible to tell who produced it, a Russian serf, a French peasant or an English capitalist.”¹²³ Commodities are not differentiated by brand, quality (or perceived quality), or sustainability of production. Besides wheat, other examples include tobacco, rye, barley, oats, cotton, soybeans, and rice.¹²⁴ The commoditization of agricultural products allows them to be mass-produced and widely available, increasing supply and driving down prices for consumers.¹²⁵ On the other hand, by making products uniform, commoditization makes it difficult for producers and consumers to create a market for unique products.¹²⁶

The transition from a differentiated product to an undifferentiated product is not black and white, because some products retain niche

120. *Id.*

121. The Economist’s February 13, 2016 cover story on marijuana regulation finds the emergence of large-scale agricultural companies and consolidation of the industry likely. *Legalising Cannabis: Reeferegulatory Challenge*, ECONOMIST (Feb. 13, 2016), <http://www.economist.com/news/briefing/21692873-growing-number-countries-are-deciding-ditch-prohibition-what-comes>.

122. For a list of agricultural commodities defined in the U.S. Code, see 7 U.S.C. § 1518 (2012).

123. KARL MARX, A CONTRIBUTION TO THE CRITIQUE OF POLITICAL ECONOMY (1859), reprinted in 29 COLLECTED WORKS OF MARX AND ENGELS 257, 270 (2010) (ebook).

124. 7 U.S.C. § 1518.

125. *Commoditize*, INVESTOPEDIA, <http://www.investopedia.com/terms/c/commoditize.asp> (last visited Dec. 21, 2016).

126. See Martin Rapaport, Op-ed, *Commoditization: Diamond Industry to Establish Fair, Open, Competitive Markets*, RAPAPORT MAG. (July 2007), <http://www.diamonds.net/Magazine/Article.aspx?ArticleID=18283&RDRIssueID=12>.

markets with unique characteristics, and regulations can intervene to create unique markets or prevent products from becoming commodities altogether. Eggs, for example, may be somewhere in the middle: some consumers view them as fungible and reach for the cheapest eggs available,¹²⁷ while other consumers pay more for eggs produced sustainably or ethically.¹²⁸ States can create parallel markets by establishing regulations that impose certain requirements on otherwise fungible products. California, for example, requires all eggs sold in the state to be laid by hens raised in adequately large pens.¹²⁹ In the most aggressive cases, jurisdictions create appellations for agricultural products (such as wine or cheese), providing a protected indication based on where or how the product was created.¹³⁰

The conventional wisdom is that absent regulation, the marijuana industry will come to be dominated by large-scale, mass-produced marijuana farms that flood the market with marijuana and drive down prices.¹³¹ As prices drop, small-scale farming will become unprofitable, leading the industry to consolidate into fewer farms cultivating larger quantities of marijuana. The U.S. tobacco farming industry has experienced a similar process over the past several decades. While tobacco farms have traditionally been relatively small due to the labor-intensive nature of tobacco cultivation, aggregation-friendly policies and the emergence of labor-reducing technologies have led to a dramatic decline in the number of tobacco farms—in tandem with an increase in tobacco acreage per farm.¹³² The trend toward fewer larger farms has made it easier for the industry as a whole to consolidate.¹³³ Left unchecked, the marijuana industry may consolidate in similar fashion.

127. See, e.g., Annie Baxter, *Eggs Are Cheap, the U.S. Is Stepping in to Buy Some*, MARKETPLACE (Sept. 2, 2016, 4:14 PM), <http://www.marketplace.org/2016/09/02/world/depression-era-program-behind-uncle-sams-egg-buys> (describing the rise of egg prices and drop of demand in eggs after the avian flu).

128. See, e.g., Dan Charles, *Most U.S. Egg Producers Are Now Choosing Cage-Free Houses*, NPR (Jan. 15, 2016, 5:26 PM), <http://www.npr.org/sections/thesalt/2016/01/15/463190984/most-new-hen-houses-are-now-cage-free> (discussing the higher price of cage-free eggs and how “[m]any consumers appear willing to stomach that increase, and the cage-free label has proved powerfully attractive”).

129. See Shruti Date Singh & Lydia Mulvany, *Egg Market Disrupted in U.S. as Cages Made Roomier*, BLOOMBERG (Dec. 12, 2014, 12:00 AM), <http://www.bloomberg.com/news/articles/2014-12-12/egg-market-disrupted-by-bigger-cages-boosting-price-commodities>.

130. See, e.g., 27 C.F.R. § 4.25 (2012) (setting rules for appellations of origin).

131. See *Legalising Cannabis: Reeferegulatory Challenge*, *supra* note 121.

132. TOM CAPEHART, U.S. DEP’T OF AGRIC., TRENDS IN U.S. TOBACCO FARMING 3 (2004).

133. Ross Hammond, *Consolidation in the Tobacco Industry*, 7 TOBACCO CONTROL 426, 426–28 (1998).

There is evidence consolidation is taking place within states already,¹³⁴ but the truly disruptive force would be federal marijuana legalization that permits interstate marijuana commerce.

While policy makers may consider the costs and benefits of marijuana commoditization and consolidation, consolidation of marijuana farms is not a given, even in an unregulated environment. While marijuana is typically described as a uniform product, in reality the industry cultivates hundreds of unique “strains” of marijuana.¹³⁵ The strains vary in appearance, texture, smell, taste, and effect.¹³⁶ Some have been bred to maximize tetrahydrocannabinol (or “THC,” the chemical principally responsible for producing psychoactive effects) to produce a stronger high.¹³⁷ The rise of the medical marijuana market, meanwhile, has prompted farmers to grow strands that minimize THC while maximizing cannabidiol (or “CBD,” a chemical believed to have a variety of medical applications).¹³⁸ In addition, some strains have become de facto branded products (e.g., “DJ Short’s Blueberry”),¹³⁹ while others denote a geographic place of origin (e.g., “Dutch Treat”).¹⁴⁰

Many of these strains are challenging to grow and require labor-intensive, thwarting efforts to mass-produce them.¹⁴¹ Patent law may

134. See, e.g., John Ingold, *Colorado Medical-Marijuana Businesses Have Declined by 40 Percent*, DENV. POST (Mar. 2, 2013, 12:31 PM), <http://www.denverpost.com/2013/03/02/colorado-medical-marijuana-businesses-have-declined-by-40-percent>; John Maxfield, *The Making of Colorado’s Marijuana Millionaires*, MOTLEY FOOL (Jan. 4, 2014, 11:08 AM), <http://www.fool.com/investing/general/2014/01/04/the-making-of-colorados-marijuana-millionaires.aspx> (“[T]he [marijuana] industry is beginning to consolidate around two distinct centers of gravity. The first consists of early adopters The second center of gravity consists of newer but deeper-pocketed local entrepreneurs.”).

135. See Jason Sawler et al., *The Genetic Structure of Marijuana and Hemp*, PLOS ONE, Aug. 26, 2015, at 1, 2.

136. See generally MED. MARIJUANA STRAINS, <http://www.medicalmarijuanastrains.com/> (last visited Dec. 22, 2016) (providing a description of various strains of medical marijuana based on several factors including appearance, smell, taste, and effect).

137. T. Kid, *The Quest to Grow the World’s Most Powerful Pot*, VICE (Apr. 10, 2015, 12:00 AM), <http://www.vice.com/read/marijuanas-growers-are-upping-the-thc-ante-with-super-potent-pot-456>.

138. See Sarah Jacoby, *Why THC Isn’t the Only Thing in Weed That Matters*, REFINERY29 (Aug. 26, 2015, 8:00 PM), <http://www.refinery29.com/2015/08/92201/cbd-medical-marijuana-facts#.7i9f2t:fdGW>; *The Rapid Rise in CBD Interest*, LEAFLY MARKETWATCH, <https://www.leafly.com/news/industry/leafly-marketwatch-the-rapid-rise-in-cbd-interest> (last visited Dec. 22, 2016).

139. *DJ Short Blueberry*, LEAFLY, <https://www.leafly.com/indica/dj-short-blueberry> (last visited Dec. 22, 2016).

140. *Dutch Treat*, LEAFLY, <https://www.leafly.com/hybrid/dutch-treat> (last visited Dec. 22, 2016).

141. Ana Campoy, *The Pot Business Suffers Growing Pains*, WALL ST. J. (Apr. 22, 2013, 4:12 PM), <http://www.wsj.com/articles/SB10001424127887324345804578426963236807452>.

create additional hurdles for commoditization. The one-year on-sale rule of patent law would likely preclude existing strains from being proprietary,¹⁴² and generic cultivation signals a move toward commoditization. But farmers may be able to patent new marijuana strains in the future,¹⁴³ and the experimentation and patenting of future strains may leave room for innovative breeders and intrepid farmers to continue providing unique products that frustrate the commoditization of marijuana.

Recalling that commoditization lies on a spectrum, one can accept that the industry will accommodate large-scale farming methods while leaving room for small-scale farming and unique specializations. Hemp products (e.g., textiles or paper) appear to fit the mold of an agricultural commodity, for example.¹⁴⁴ But many states have shown an inclination toward protectionism in the marijuana industry that further distances the possibility of commoditization and consolidation. In New Mexico, for example, state law requires that medical marijuana sold to patients be grown in New Mexico,¹⁴⁵ preventing out-of-state cultivators from flooding the New Mexico market with generic marijuana. Attempts to acquire marijuana businesses by out-of-state or out-of-country companies have also met with public backlash.¹⁴⁶ Washington has stringent residency requirements for marijuana license holders.¹⁴⁷ And Colorado has enacted similarly protective policies.¹⁴⁸

Federalism, more than protectionism, may spur marijuana import bans and residency requirements: Interstate distribution of marijuana falls more clearly under the province of federal regulation, and the Justice Department has articulated enforcement priorities under the Controlled Substances Act that include interstate marijuana commerce.¹⁴⁹ But these protectionist policies are setting precedent and expectations, and perhaps more importantly, creating individual state industries whose interests

142. See 35 U.S.C. § 102(b) (2012); *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 55 (1998).

143. See Hilary Bricken, *The Possibility of Marijuana Plant Patents*, ABOVE LAW (July 6, 2015, 4:20 PM), <http://abovethelaw.com/2015/07/the-possibility-of-marijuana-plant-patents/?rf=1>; Jonathan M. Purow, *Planting the Seeds for IP Protection of Marijuana Brands*, LAW360 (Dec. 22, 2015, 10:31 AM), <http://www.law360.com/articles/733611/planting-the-seeds-for-ip-protection-of-marijuana-brands>.

144. RENÉE JOHNSON, CONG. RESEARCH SERV., RL32725, HEMP AS AN AGRICULTURAL COMMODITY I (2015).

145. Joey Peters, *Consolidating and Cashing in on Medical Marijuana*, N.M. POL. REP. (May 8, 2015), <http://nmpoliticalreport.com/3522/consolidating-and-cashing-in-on-medical-marijuana-DEA>.

146. *Id.*

147. WASH. ADMIN. CODE § 314-55-020 (2016).

148. Maxfield, *supra* note 134.

149. See Press Release, Office of Pub. Affairs, U.S. Dep't of Justice, Justice Department Announces Update to Marijuana Enforcement Policy (Aug. 29, 2013), <https://www.justice.gov/opa/pr/justice-department-announces-update-marijuana-enforcement-policy>.

may be politically difficult to ignore if the federal prohibition is lifted. In jurisdictions where marijuana cultivation is economically significant or even dominant—such as Humboldt, Mendocino, and Trinity counties—policy makers will receive significant pressure to avoid commoditization and consolidation of the industry. Early adopting states that are taking on the risk of legalization may especially want to ensure the benefits stay in-state. It would be unusual for a state to require an agricultural product be grown in-state or to impose residency requirements on cultivators, but given the unique state-by-state history of marijuana legalization, regulations to prevent fluid commerce and consolidation of cultivation are not inconceivable.

B. *Conglomerates as Regulatory Transition Mechanism*

The long history of small-scale marijuana farming in California may influence the movement toward limiting farm size and mass-production of marijuana in the state.¹⁵⁰ In states without such a history, allowing or even encouraging large-scale cultivation may be attractive. In fact, several states have considered regulations limiting marijuana farming to a select group of large-scale operators. These consolidation-by-design proposals would not allow a small-scale marijuana farming culture to take root, but they do offer a significant advantage to regulators. By limiting the number of legal cultivators, states can more easily monitor the industry and enforce regulations.

While California struggles to regulate tens of thousands of marijuana farms, states like Florida,¹⁵¹ New York,¹⁵² and Ohio¹⁵³ would limit cultivation licenses to less than a dozen. This type of approach has benefits. It allows the state to carefully select responsible cultivators, makes it easy to monitor cultivation, and buys time before presumably shifting to a more participatory model. With so few cultivators, states can lavish regulatory attention on the licensees to ensure compliance, or craft site-specific rules depending on the needs and cultivation infrastructure of the operation.¹⁵⁴ And in a sense the system is predictable by making it clear that only a select number of businesses may cultivate marijuana.

150. See Harkinson, *supra* note 10.

151. FLA. STAT. § 381.986(5)(b) (2016).

152. N.Y. PUB. HEALTH LAW § 3365(9) (McKinney 2016); see also Catherine Rafter, *New York State Just Granted Five Medical Marijuana Licenses*, OBSERVER (July 31, 2015, 3:00 PM), <http://observer.com/2015/07/new-york-state-just-granted-five-medical-marijuana-licenses/>.

153. Medical Marijuana and Personal Use Amendment, Initiative Petition to Ohio Atty. Gen. (Feb. 13, 2015).

154. In principle, states can tailor any number of water or agricultural permits, but there is a limit to how extensive the specifications can be when administering large volumes of permit applications. See Gary D. Lynne et al., *Water Permitting Behavior Under the 1972 Florida Water Resources Act*, 67 LAND ECON. 340, 340, 348 (1991).

There are two major drawbacks to this model. First, it is hard to find equity or public support when the state permits only a small handful of cultivators to participate in the market. Ohio's 2015 constitutional amendment initiative to legalize marijuana included a list of landowners who would have had exclusive rights to cultivate marijuana in the state.¹⁵⁵ The attempt to control the market prompted some legislators to introduce a constitutional amendment of their own that would prohibit the state's constitution from being used to create economic monopolies,¹⁵⁶ while even some pro-marijuana legalization advocacy groups urged voters to reject the initiative. Voters did reject the legalization monopoly initiative (which lacked support from some pro-legalization groups) while approving the anti-monopoly amendment.¹⁵⁷

Even if the state transitions to a more permissive model, the previously licensed cultivators will have a potentially inequitable leg-up on the competition. And while the state may have developed the capacity to create site-specific regulations under the exclusive model, those capacities would be less relevant when cultivation proliferates and a more comprehensive regulatory approach is needed.

More importantly perhaps, severe limitations on the issuance of cultivation licenses ignore the existence and persistence of black market cultivators. If marijuana cultivation were not occurring to begin with or were unlikely to take root, a limited licensing approach might be sensible in some states. But marijuana is widely available in part because domestic cultivation is increasing across the United States, particularly on private lands.¹⁵⁸ With legalization efforts gaining momentum and spreading knowledge on cultivation methods, it seems unlikely that marijuana cultivation will remain dormant for long even in states that currently lack a meaningful marijuana farming presence. Considering the size and growth of the marijuana industry, eradication of unlicensed marijuana

155. The amendment's text included the tax parcel numbers of the properties in question:

Subject to the exceptions set forth herein, there shall be only ten MGCE facilities, which shall operate on the following real properties: (1) Being an approximate 40.44 acre area in Butler County, Ohio, identified by the Butler County Auditor, as of February 2, 2015, as tax parcel numbers Q6542084000008 and Q6542084000041

Medical Marijuana and Personal Use Amendment, *supra* note 153.

156. H.R.J. Res. 4, 131st Gen. Assemb., Reg. Sess. (Ohio 2015).

157. Matt Pearce, *Ohio Voters Soundly Reject Marijuana Legalization Initiative*, L.A. TIMES (Nov. 3, 2015, 7:51 PM), <http://www.latimes.com/nation/la-na-ohio-marijuana-results-20151103-story.html>.

158. DRUG ENF'T ADMIN., U.S. DEP'T OF JUSTICE, NATIONAL DRUG THREAT ASSESSMENT SUMMARY 25 (2014).

cultivators is unlikely.¹⁵⁹ Limiting cultivation to a small handful of businesses offers transitional benefits but is unlikely to be a sound long-term solution.

C. *Vertical Integration of the Supply Chain*

An alternative method of regulatory oversight over cultivation requires the chain of supply to be vertically integrated. In other words, marijuana farmers must sell what they grow, and dispensaries must grow what they sell. There are significant advantages of the vertical integration model for regulators. Most importantly, vertical integration reduces the number of marijuana businesses in operation and makes it easier to track the supply chain from seed to sale. There are advantages for marijuana businesses as well—vertical integration may increase profit margins by reducing the number of profit-seeking firms in the supply chain, while allowing for more control over inventory. High barriers to entry are advantageous for businesses that have already overcome the barriers, after all. Vertically-integrated businesses may also cut down on redundant business expenses. Vertical integration is mandatory in Massachusetts,¹⁶⁰ Maine,¹⁶¹ New Jersey,¹⁶² New Hampshire,¹⁶³ and New Mexico.¹⁶⁴

But mandatory vertical integration has its drawbacks. It is significantly more expensive to finance a business that incorporates the cultivation, post-production, and retail sale of marijuana. By some estimates, it can be three to ten times more expensive to establish a vertically-integrated marijuana business than a retail dispensary.¹⁶⁵ More human resource expertise is required to handle a diversity of marijuana business activities.¹⁶⁶ And wedding each stage of the supply chain together increases risk: Failure in any one aspect of the business is likely to affect the other aspects as well.¹⁶⁷ In general, it is unusual to require vertical integration, and the marijuana industry is one of the only sectors

159. The Drug Enforcement Administration has described the shift in cultivation practices toward private lands as an obstacle to law enforcement and eradication. *Id.* at 26.

160. 105 MASS. CODE REGS. 725.105(N)(1)–(2) (2016).

161. 10-144-122 ME. CODE R. § 6.29 (LexisNexis Nov. 2016).

162. N.J. ADMIN. CODE § 8:64-9.1 to 9.3 (2009) (permitting approved alternative treatment centers to cultivate, grow, harvest and sell their own marijuana).

163. H.R. 573-FN, 2013 Leg., Reg. Sess. (N.H. 2013) (similar to New Jersey, does not include purchase as an acceptable activity by an alternative treatment center).

164. N.M. CODE R. § 7.34.4.8(A)(2) (LexisNexis 2015) (focusing on the amount of plants a non-profit producer is permitted to grow, but does allow for usable cannabis trade from other licensed producers).

165. 4FRONT PUBL'G, PROS AND CONS OF VERTICAL INTEGRATION 2 (2015).

166. *Id.*

167. *Id.*

in which this occurs.¹⁶⁸

Washington prohibits vertical integration.¹⁶⁹ Cultivators cannot hold dispensary licenses, while dispensaries cannot hold cultivation licenses. The model is similar to regulation of the alcohol industry, with its mandatory delineation between producers, distributors, and retailers.¹⁷⁰ The idea is that by breaking up supply chain integration, businesses have less incentive to promote alcohol or drug abuse, and each group can focus on providing goods and services in its area of specialization.¹⁷¹ The model has had limited success in the alcohol industry, where distributors have become powerful middlemen and may be dampening the potential for innovation.¹⁷²

Other states, recognizing the costs and benefits, have opted to allow, but not require, vertical integration. Nevada has adopted this approach,¹⁷³ while Colorado has abandoned its initial vertical integration requirement.¹⁷⁴ Considering the nascent state of the marijuana industry, it may be useful to allow a diversity of approaches to collect evidence on how the industry might grow and stabilize in the future. The same can be said about regulating the industry as well, however: There is value in letting states experiment with a diversity of regulatory approaches.

Vertical integration is likely to have particular implications on the agricultural component of the marijuana industry. Where required, it will make cultivation one component of a broader marijuana business, while reducing the likelihood that marijuana can become one of several crops grown on a single farm. More and more farmers growing traditional crops are considering incorporating marijuana into their crop portfolio,¹⁷⁵ but in states where vertical integration is mandatory it seems unlikely that these farmers will want to devote their resources to post-production and retail in order to do so. The effect is that the marijuana industry remains introverted, minimally engaged with the broader agricultural community. On the other hand, the supply of marijuana is presumably less likely to

168. *Id.*

169. WASH. REV. CODE § 69.50.328 (2012).

170. *See* 4FRONT PUBL'G, *supra* note 165, at 2.

171. *Id.*

172. *Id.* at 3.

173. NEV. REV. STAT. § 453A.056 (2015) (allowing retailers, cultivators, and in limited cases, users to produce usable marijuana).

174. *See* John Ingold, *Colorado Lawmakers Question Proposed Marijuana Business Rules*, DENV. POST (Mar. 21, 2013, 5:33 AM), <http://www.denverpost.com/2013/03/21/colorado-lawmakers-question-proposed-marijuana-business-rules>.

175. *See, e.g.*, Rob Hotakainen, *With No Federal Water, Pot Growers Could Be High and Dry*, McCLATCHY WASH. BUREAU (2014) (Apr. 27, 2014, 3:00 AM), <http://www.mcclatchydc.com/news/nation-world/national/article24766780.html> (describing a cantaloupe farmer in Washington who has applied to grow marijuana).

fluctuate wildly relative to its demand if farmers are required to sell what they grow. By tying cultivation and retail together, both activities may be more responsive to each other.

Finally, vertical integration may increase market consolidation. The financial and human resources needed to establish an integrated marijuana business and navigate each supply chain component's regulatory requirements may create such a high barrier to entry that small-scale farmers are shut out, leaving only a select few capital-rich businesses to dominate the market. In the early years of Colorado's medical marijuana market when vertical integration was required, the regulatory requirements were so onerous that over a third of operators went out of business.¹⁷⁶

Nonetheless, vertical integration brings both promising benefits and concerning costs. It is a unique regulatory approach in an agricultural and commercial sense, but not one without a rationale, and several states have taken proactive measures to adopt or reject integration. As states transition toward legalization and work to refine their regulatory systems, vertical integration promises to be a contentious policy consideration.

D. *The Promise of Marijuana Appellations*

In response to fears that legalization will lead to commoditization of the marijuana industry and a consequent influx of generic marijuana that runs small-scale farmers out of business, some jurisdictions have proposed adopting appellations for marijuana cultivation.¹⁷⁷ An appellation is a certified designation of origin that may also require that certain quality or stylistic standards be met.¹⁷⁸ Appellations are most commonly associated with the wine industry, but they can be applied to any agricultural or food product in which the geographic origin carries

176. See Ingold, *supra* note 134; Tim Sprinkle, *For Cannabis Entrepreneurs, Industry Expansion Brings Growing Pains*, YAHOO FIN. (Mar. 11, 2013), <http://finance.yahoo.com/news/marijuana-industry-faces-growing-pains-amid-consolidation--growth-214432335.html>.

177. Neither the state of California nor Humboldt County has established an appellation system, but Humboldt County's Marijuana Ordinance establishes an artisanal labelling program, and interest groups representing the marijuana industry have advocated for a more robust appellation system to protect the Humboldt County brand. Interview with Anonymous Member of the California Cannabis Voice Humboldt, in Arcata, Cal. (Sept. 10, 2015).

178. In the wine industry, for example, the appellation system in the United States is only concerned with geography, while the European Union's appellations typically require more stringent standards be met. See Warren Moran, *The Wine Appellation as Territory in France and California*, ANNALS ASS'N AM. GEOGRAPHERS 694, 697 (1993) (comparing appellation systems in France and California); see also David E. R. Gay & Ralph B. Hutchinson, *A Comparative Analysis of French and U.S. Wine Appellations*, ATLANTIC ECON. J., Dec. 1987, at 99, 99 (arguing that U.S. appellations have no consistent unifying structure, while French practices are systematic).

importance.¹⁷⁹ The wine industry's model rests on the assumption that environmental conditions (soil, aridity, temperature, etc., collectively known as the "terroir"¹⁸⁰) influence grape quality, and there is general agreement that this assumption has merit.¹⁸¹ Designation requirements that have quality standards also tend to increase the quality of grapes grown in the appellation, improving wine quality and the region's reputation.¹⁸² As the reputation of a region's agricultural product grows, the appellation designation creates a unique market for the product, increasing prices while precluding other producers from free-riding on the region's reputation or duplicating its products.¹⁸³ Appellations therefore create differentiation in the marketplace, frustrating efforts to commoditize the industry with one generic product.¹⁸⁴ Protectionism of local industries and their brands (e.g., Champagne, France) has a secondary benefit. By certifying that products with geographic indicators are accurately designated, consumers are assured of authenticity and are more likely to pay more for higher quality products. These twin goals of providing economic benefits and consumer protection underlie the basic motivations of most appellation systems.¹⁸⁵

The appellation model may be well-suited to the marijuana industry for several reasons. First, there is some merit to the claim that environmental conditions influence marijuana quality, and would therefore provide a basis for place-of-origin designations.¹⁸⁶ Marijuana farming has become so widespread in northern California in part because growing conditions there are ideal. While California is known for being an infamously arid state, in reality the problem is distributional: while almost all of its population is located to the south, most of the state's

179. See Mary Murphy, *What Does "AOC" Mean and What Does It Say About a Cheese?*, FORMAGGIO KITCHEN (June 18, 2010), <http://www.formaggiokitchen.com/blog/what-does-aoc-mean-and-what-does-it-tell-us-about-a-cheese>.

180. *Terroir*, in THE OXFORD COMPANION TO WINE 700 (Jancis Robinson ed., 2d ed. 1999).

181. Michael Maher, Comment, *Vino Veritas? Clarifying the Use of Geographic References on American Wine Labels*, 89 CALIF. L. REV. 1881, 1884 (2001).

182. *Geographical Delimitation*, in THE OXFORD COMPANION TO WINE, *supra* note 180, at 229, 229.

183. See Jay Kiiha, *Trade Protectionism of Wine Brand Names at the Expense of American Viticultural Areas: Arbitrary Protection of "Big Liquor" at the Expense of Small Vineyards*, 9 DRAKE J. AGRIC. L. 157, 159 (2004). Of course, the model also fosters fraud as lesser or outside cultivators attempt to claim a region as their own, or simply confuse the consumer. *Id.* at 168.

184. Christopher A. Bartlett & Sumantra Ghoshal, *Going Global: Lessons from Late Movers*, HARV. BUS. REV. (Mar.–Apr. 2000), <https://hbr.org/2000/03/going-global-lessons-from-late-movers>.

185. See Maher, *supra* note 181, at 1885–86.

186. See *Cannabis Terroir 101: What Is It, and What Factors Affect It?*, LEAFLY, <https://www.leafly.com/news/cannabis-101/cannabis-terroir-outdoor-growing/> (last visited Jan. 26, 2017).

water resources were historically located north of Sacramento.¹⁸⁷ As a double bonus, California's northern counties are dry during the summer growing season, when excess precipitation and humidity might dampen and spoil marijuana crops.¹⁸⁸ The strains being developed and cultivated in northern California are therefore well-adapted to these unique growing conditions.

In Jamaica, by contrast, marijuana farmers traditionally used genetic strains that were accustomed to tropical humidity and temperatures, cultivating marijuana with their own unique characteristics.¹⁸⁹ Seed companies regularly market their strains to match a diversity of outdoor conditions.¹⁹⁰ Instead of competing with each other to produce the most popular generic strains, appellations would allow regions to embrace the strains that grow well in their environment. France's Burgundy and Rhône regions are well-known for growing pinot noir and syrah grape varieties, respectively.¹⁹¹ Neither region is threatened by outside producers or forced to adopt ill-suited varieties because they have created individual markets for their own well-respected grapes. The same could be true of marijuana producing regions.

The economic incentive to provide monopolistic protections and marketing power to appellation regions is, without doubt, of particular interest to the marijuana industry. Counties that have developed robust marijuana farming industries may feel that the influx of mass-produced generic marijuana that would come from national legalization may wipe out their existing small-scale farmers. Appellations can protect the brand-name associated with a region, as well as the farmers that make the region economically productive. An appellation system could ensure that only marijuana grown in Humboldt County, California carries with it the Humboldt County designation. In addition, marijuana appellations can

187. Measurements taken between 1894 and 1947 showed the region north of Sacramento—including Mendocino, Trinity, and Humboldt counties—contained 73% of the state's water resources. Gordon R. Miller, *Shaping California Water Law, 1781 to 1928*, 55 S. CAL. Q. 9, 9 (1973).

188. As discussed below, this can create water allocation problems if water storage during fallow seasons is insufficient. See Bauer et al., *supra* note 13, at 17.

189. While there are myriad problems with the Jamaican marijuana industry, and little research on the subject, anecdotal evidence indicates that indigenous strains are well adapted and can produce quality marijuana. See Pete Brady, *Ganja Gardens*, CANNABIS CULTURE (Oct. 25, 2002), <http://www.cannabisculture.com/content/2002/10/25/2412>.

190. See, e.g., *Cannabis Seeds for Cool Climate, Barneys Farm Seeds*, BARNEYS FARM SHOP, <https://www.barneysfarmshop.com/barneys-farm-seeds/outdoor-cannabis-seeds/cool-climate.html> (last visited Jan. 25, 2017); *Outdoor Cannabis Seeds*, SENSI SEEDS, <https://sensiseeds.com/en/cannabis-seeds/outdoor> (last visited Jan. 25, 2017).

191. See *Main Grape Varieties by European Wine Region*, 1855 CONSULTING, <https://1855consulting.com/news-articles/main-grape-varieties-by-european-wine-region/> (last visited Jan. 25, 2017).

adopt specific standards that collectively enhance the quality and reputation of their region. In France, for example, wine appellations can require that vineyards only use certain varieties, limit irrigation practices that increase yields at the cost of grape quality, or attain a predetermined alcohol content.¹⁹² These requirements make production more challenging, and in some cases may stifle creativity and innovation, but the requirements collectively increase the region's overall product. Many of these practices could be applied to marijuana cultivation as well.

Of course, this model would benefit from a broadly inclusive (i.e., transboundary) regulatory framework in order to be effective. The United States wine industry's appellations are regulated by the Treasury Department's Alcohol and Tobacco Tax and Trade Bureau (TTB, a federal agency),¹⁹³ but the TTB is unlikely to establish a national appellation system for marijuana if cultivation remains illegal under federal law. States can develop their own appellation regulation frameworks, however, and as long as states maintain import and export bans (likely in the short-term given federal interstate commerce enforcement concerns) those state regulations may prove to be sufficiently effective. State appellation regulations may even prove resilient if the federal prohibition is lifted and a federal agency regulates the industry.¹⁹⁴

Nonetheless, it would be challenging for individual counties or local government bodies to enforce their own appellation designations if other jurisdictions do not follow suit. Enforcement of geographic indicators outside of the regulatory body's jurisdiction is notoriously difficult. In one infamous case, it took fourteen years and a trade mission for the Napa Valley Vintners Association to convince the Chinese government to grant protected status to the term "Napa."¹⁹⁵ While the marijuana industry is increasingly mobilized and represented through interest groups,¹⁹⁶ it will be challenging to persuade jurisdictions to recognize geographic indicators without the assistance of a broader regulatory framework. Still, local attempts to create appellations can generate momentum and set precedent for other jurisdictions to replicate the model. It is not a given

192. Daniel W. Gade, *Tradition, Territory, and Terrior in French Viticulture: Cassis, France, and Appellation Contrôlée*, 94 ANNALS ASS'N AM. GEOGRAPHERS 848, 852 (2004).

193. 27 C.F.R. § 4.3 (2016).

194. See *Bronco Wine Co. v. Jolly*, 95 P.3d 422, 425 (Cal. 2004) (finding that a more restrictive state wine labelling statute is not preempted by federal regulations).

195. Laura Zanzig, *The Perfect Pairing: Protecting U.S. Geographical Indications with a Sino-American Wine Registry*, 88 WASH. L. REV. 723, 724–25 (2013).

196. For example, the Cannabis Club Voice Humboldt and Emerald Growers Association represent marijuana farmers in northern California. See Peter Hecht, *California Marijuana Market Readies for "Robust" New Era*, SACRAMENTO BEE (Oct. 18, 2015, 4:00 PM), <http://www.sacbee.com/news/state/california/california-weed/article39804690.html>.

that the TTB will establish marijuana appellation regulations upon legalization, but farmers and state and local governments can make that more likely by creating the foundations for regulation.

The second incentive to create appellations—providing consumer protection—is equally compelling in the marijuana industry. Because marijuana has been (and in many jurisdictions continues to be) cultivated on the black market, consumers have traditionally had little to no information regarding where or how their marijuana was grown. This does not reflect consumer preferences, of course. It is notoriously difficult to determine the origin of marijuana even in the aggregate,¹⁹⁷ but by one estimate two-thirds of marijuana consumed in the United States came from Mexico in 2008.¹⁹⁸ Given the well-publicized violence and corruption associated with Mexican drug cartels,¹⁹⁹ it is not unreasonable to believe consumer behavior would reflect a preference for domestically grown marijuana if reliable geographic designations were provided to the consumer. Given marijuana's illicit dimensions, marijuana appellations can provide some assurance of authenticity and ethical cultivation. There is evidence that legal marijuana cultivation in the United States is driving “cartel grows” out of business;²⁰⁰ appellations can continue that trend by providing consumers with choices that meet their standards in similar fashion.

Appellations can provide consumers with more information than place of origin as well. The requirements common in French wine appellations mentioned above (e.g., restricting supply, eligible varietals, or alcohol content) are not only collectively beneficial to the region's producers, they also provide more information to the consumer.²⁰¹ Considering how many strains of marijuana are in existence, there is value in a regulatory framework that easily and reliably communicates important characteristics to consumers, such as the strain and its THC or CBD

197. See, e.g., Jon Gettman, *Lost Taxes and Other Costs of Marijuana Laws*, DRUG SCI., <http://www.drugscience.org/Archive/bcr4/5Supply.html> (last visited Jan. 21, 2017) (discussing the different methods used to estimate the amount of marijuana in the United States).

198. Deborah Bonello, *Mexican Marijuana Farmers See Profits Tumble as U.S. Loosens Laws*, L.A. TIMES (Dec. 30, 2015, 3:00 AM), <http://www.latimes.com/world/mexico-americas/la-fg-mexico-marijuana-20151230-story.html> (referring to the estimation of Beau Kilmer, co-director of the Rand Corp. Drug Policy Research Center). Other estimates complicate the picture, claiming that by 2010 approximately 80% of marijuana consumed in the United States came from California. E.g., Emily Brady, *How Humboldt Became America's Marijuana Capital*, SALON (June 30, 2013, 12:30 PM), http://www.salon.com/2013/06/30/how_humboldt_became_americas_marijuana_capital/.

199. See, e.g., William Neuman, *As Drug Kingpins Fall in Mexico, Cartels Fracture and Violence Surges*, N.Y. TIMES (Aug. 12, 2015), http://www.nytimes.com/2015/08/13/world/americas/as-mexico-arrests-kingpins-cartels-splinter-and-violence-spikes.html?_r=1.

200. See Bonello, *supra* note 198.

201. See *supra* note 192 and accompanying text.

levels.

There is reason to question the appellation model's suitability for marijuana agriculture. Perhaps the most apparent obstacle is the fact that a significant percentage of marijuana is grown indoors. Since outdoor cultivation was risky during prohibition, the marijuana industry has a long track record of, and experience with, indoor cultivation. Growing indoors now offers advantages beyond privacy, allowing farmers to manipulate growing conditions such as soil content, air temperature, and light energy to maximize yields.²⁰² As one might expect, however, growing indoors makes the "terroir," or geographic elements, much less relevant.

However, appellations can still facilitate the creation of unique localized markets if regions adopt their own growing standards. The marijuana industry has come under intense scrutiny on account of the energy demands of indoor agriculture,²⁰³ and appellations could require indoor operations to meet clean energy standards. One county has already required indoor farms to use exclusively renewable energy sources (such as solar panels, ironically).²⁰⁴ Appellations could also provide incentives for farmers to transition to, and embrace, outdoor cultivation by providing the geographic indicator protection (and its economic benefits) solely to outdoor marijuana farms.

While appellations would frustrate efforts to commoditize marijuana, an appellation system would not preclude consolidation. The U.S. wine industry has been experiencing rapid consolidation despite a robust origin-focused appellation system.²⁰⁵ The number of small-scale vineyards has remained stable, however indicating a strong market for unique wines.²⁰⁶ And it may be that consolidation is facilitated by the fact that U.S. appellation designations are only concerned with geographic origin, and do not impose quality or cultivation standards on producers. In any case, the benefits of a marijuana appellation system are sufficient to justify consideration, if not adoption. Especially in regions concerned that mass-produced generic marijuana will have devastating economic consequences for small-scale farmers, finding ways to differentiate products and generate market value will be an important policymaking objective. A marijuana appellation system may provide the regulatory framework needed to achieve that objective.

202. BERGMAN, *supra* note 104, at ch. 2.

203. *See* discussion *infra* Section III.C.

204. HUMBOLDT, CAL., CODE tit. III, div. 1, ch. 3, § 313-55.4 (2016).

205. Rachael Goodhue et al., *California Wine Industry Evolving to Compete in the 21st Century*, 62 CAL. AGRIC. 12, 16 (2008).

206. *Id.*

III. REGULATING THE ENVIRONMENTAL IMPACTS OF MARIJUANA AGRICULTURE

The underlying premise of this Article is that states that have legalized marijuana, or are transitioning toward legalization, have focused their regulatory attention on issues like taxation, public health, and retail licensing, at the expense of agricultural issues raised by marijuana legalization. The environmental impacts of marijuana agriculture exemplify this premise. Marijuana plants require significant quantities of water resources, and it is not clear that existing water laws or regulations can accommodate the marijuana industry or regulate the water resource impacts to both quantity and quality. The prevalence of indoor growing operations, meanwhile, requires inordinate energy resources and creates a disturbing carbon footprint. Energy demands are so great that energy markets in some states are being strained and the viability of indoor marijuana farming called into question.²⁰⁷ Without regulatory requirements or market-based certificate programs that recognize and reward sustainable marijuana farming, farmers have few incentives to exercise restraint. Finally, the federal marijuana prohibition prevents the marijuana industry from enjoying government programs that provide support to farmers in times of environmental stress. Without crop insurance or disaster relief programs, marijuana farmers remain vulnerable to extreme events.

A. *Regulating Water Allocations*

In the winter of 2015, I started researching the relationship between marijuana farming and state water laws. In March of that year, the first credible scientific study of the impacts of cultivation on water resources found that the demand for water to irrigate marijuana plants often outstripped water supplies.²⁰⁸ Data from the study came from the Eel River watershed in northern California.²⁰⁹ In June of 2015, a convoy of vehicles carrying enforcement officers from four different counties of northern California drove up and into the remote and rugged slopes of the Eel River watershed.²¹⁰ The enforcement officers conducted open-field searches on private lands, which was unusual up to this point, and by the end of the weeklong “Operation Emerald Tri-County” had confiscated

207. See *infra* notes 260–62 and accompanying text.

208. Bauer et al., *supra* note 13, at 17.

209. *Id.* at 10.

210. Andrew Goff, *Major Multi-Agency Marijuana Raid in Island Mountain Today*, LOST COAST OUTPOST (June 22, 2015, 1:38 PM), <https://lostcoastoutpost.com/2015/jun/22/major-marijuana-raid-island-mountain-today>.

86,578 marijuana plants.²¹¹

“Operation Emerald Tri-County” was the clearest sign yet that the rapidly evolving forces of marijuana legalization and water scarcity were about to collide. The enforcement officers were not joined by federal officials, but rather personnel from the California Department of Fish and Wildlife on suspicion of water abuses.²¹² Later the four counties claimed the raid itself was motivated by violations of state water regulations, not marijuana cultivation.²¹³ After finding unpermitted streambed alterations, diversions, and reservoirs, the officials moved to confiscate the privately grown plants.²¹⁴

The collision between marijuana legalization and state water laws prompted further research that led to a full-length law review article on the topic.²¹⁵ Because the relationship between marijuana and water resources is so important for the emerging field of marijuana agriculture in general, a brief summary of those research findings is presented here. In short, there is some potential for existing water laws to accommodate marijuana legalization without requiring regulatory intervention from the state,²¹⁶ but more than likely, states will need to develop a regulatory framework (or modify an existing one) that responds to the unique demands that legal marijuana cultivation places on water resources and water rights.²¹⁷

In the American West, states will need to balance the temptation to provide marijuana farmers with water access (lest they make illegal appropriations or move out-of-state) with existing appropriative rights that give priority to senior rights holders.²¹⁸ The federal Bureau of Reclamation will make this particularly difficult as long as the federal marijuana prohibition persists, because it has articulated a prohibition policy that would prevent marijuana agriculture from appropriating any water resources controlled by the Bureau or passing through a Bureau facility.²¹⁹ Notwithstanding the Bureau of Reclamation’s vast influence on western water resources, it is unclear if the policy will lead to

211. Adam Randall, *Tri-County Pot Raids Net 86,578 Plants*, UKIAH DAILY J. (June 29, 2015, 11:10 AM), <http://www.chicoer.com/general-news/20150629/tri-county-pot-raids-net-86578-plants>.

212. See Goff, *supra* note 210.

213. See Randall, *supra* note 211.

214. *Id.*

215. Ryan B. Stoa, *Weed and Water Law: Regulating Legal Marijuana*, 67 HASTINGS L.J. 565 (2016). The present article draws from, and builds on, the findings and research presented in *Weed and Water Law*.

216. *Id.* at 616–19.

217. *Id.* at 620.

218. *Id.*

219. *Id.* at 586–87.

meaningful enforcement.²²⁰

Fortunately, most prior appropriation states administer water rights through a regulatory agency equipped to address emerging issues proactively, without significantly interfering with existing rights.²²¹ The prior appropriation doctrine will make it challenging to appease a brand new agricultural subsector, but states have more flexibility than strict doctrinal applications would suggest.

Riparian doctrine states (found in the Eastern United States) may have a slightly easier time adjusting to legal marijuana cultivation, as riparian rights are not fixed but accommodate reasonable uses of shared waters.²²² Regulated riparian states might not have as much flexibility in the short-term if existing permits allocate all of the available water resources of a watercourse, but in the long-term agencies retain the flexibility to shape water use in the state by controlling the permit process.²²³ That flexibility could provide ample room for farmers and regulators to maneuver in the new marijuana economy.

In many states the challenges of regulating marijuana water use remains theoretical. In California, however, the issue is very real. Water is already a scarce and fiercely controlled resource, with a complex system of riparian, appropriative, and groundwater rights.²²⁴ The various water rights regimes in California provide multiple opportunities to create or recognize rights to water for marijuana cultivators, but the complexity of the system will make it challenging to navigate and capitalize on those opportunities. California's decentralized approach to marijuana regulation, meanwhile, is allowing local governments to move in many different directions, sometimes at cross-purposes.²²⁵ The size of the marijuana cultivation industry in California is the largest in the United States, and given the scarcity of water resources in the state, a more proactive and integrated approach to regulating marijuana irrigation is justified and may be explored in the future.²²⁶

Two themes emerged from this study of water law and marijuana cultivation. First, theoretical applications of water law to marijuana cultivation needs demonstrate that while these doctrines are often criticized for being rigid and antiquated, there is room in the law for jurisdictions to provide enough water to marijuana farmers that they will

220. *Id.* at 587; see Hotakainen, *supra* note 175.

221. Stoa, *supra* note 215, at 620.

222. *Id.* at 594.

223. *Id.* at 620.

224. *Id.*; see also Charles J.P. Podolak & Martin Doyle, *Conditional Water Rights in the Western United States: Introducing Uncertainty to Prior Appropriation?*, 51 J. AM. WATER RES. ASS'N 14, 14–15 (2015).

225. Stoa, *supra* note 215, at 620; see, e.g., *supra* notes 33–37 and accompanying text (demonstrating the divergent paths for counties in California and Colorado).

226. Stoa, *supra* note 215, at 620; see also Brady, *supra* note 198.

participate in the regulatory process without significantly disrupting existing water rights. This is particularly true in jurisdictions that adopt a modified or regulatory version of traditional doctrine that softens the rigidities of the common law.

The second theme is that in practice, the initial signs coming from states where marijuana cultivation is legal to some degree suggest that the theoretical ability of water law doctrine to incorporate marijuana cultivation is not sufficient to ensure a smooth or equitable transition. There are too many legal ambiguities in both water laws and marijuana agriculture laws for the application of both simultaneously to function coherently and consistently. In order to promote sustainable, responsible, and legal marijuana cultivation, while administering water rights equitably, states will need to adjust their regulatory frameworks to address the challenges that marijuana legalization presents.

Since that study was completed, California passed the Medical Marijuana Regulation and Safety Act (MMRSA), with ambitious proposals to create comprehensive regulations for marijuana agriculture, including water allocation provisions.²²⁷ The MMRSA assigns authority for various regulatory responsibilities to a variety of state agencies, including the Department of Food and Agriculture, Department of Public Health, Department of Fish and Wildlife, and the State Water Resources Control Board.²²⁸ It remains to be seen if the various agencies involved in regulating water allocations will be able to coordinate, articulate, and enforce clear policies that incentivize participation from marijuana farmers while managing water resources sustainably and respecting existing water rights holders. Still, the MMRSA is a promising sign that states are beginning to take water resource issues seriously and will begin to develop regulations that address water allocation.

B. *Regulating Water Quality and Pesticide Use*

While water quality was not the focus of the study, in many ways the distinction between water quantity and water quality is, from a hydrological perspective, illogical. When water levels drop, water quality often deteriorates as pollutants become less diluted. Conversely, introducing pollutants into a water resource reduces the quantity of clean water available. In some ways, the common laws for water allocation address this relationship—in riparian jurisdictions, water quality impact

227. A.B. 243, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2015); A.B. 266, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2015); S.B. 643, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2015).

228. A.B. 243.

can be a factor in determining whether a water use is reasonable;²²⁹ while in prior appropriation jurisdictions, instream flows (water resources left in the waterway to maintain ecological needs or water quality) have been recognized as a beneficial water use.²³⁰

For the most part, however, modern water law systems distinguish between water quantity and water quality, with some regulations addressing water allocations and others addressing water pollution.²³¹ Just as water allocation laws will need to reconcile tensions between marijuana agriculture and water rights, so too will water quality laws need to reconcile marijuana agriculture's impacts on water quality. And although research on the topic remains limited, what studies do exist suggest that if left unchecked, marijuana agriculture may have significant negative impacts on water quality.²³²

A 2013 study on wildlife mortality found a link between rodenticide found in dead mammals and the density of nearby marijuana farms, suggesting that pesticides and fertilizers may be seeping into the broader environment, including water resources.²³³ And the deforestation, land terracing, and road building associated with large marijuana grows contribute to erosion and sediment loading of streams, according to a 2012 study of western public lands.²³⁴ More research is needed, but there is sufficient evidence to conclude that marijuana agriculture produces the same three forms of runoff pollution (pesticides, fertilizers, and sediment) that have been a problem for agricultural regulation in general.²³⁵ On this basis, states may consider whether their existing water quality regulations are sufficient to address runoff pollution from marijuana agriculture.

One major difference between water allocation laws and water quality laws is that water allocation regulation has traditionally been a state function, whereas the federal government has stepped in to regulate water quality through enactment and enforcement of the Clean Water Act (CWA).²³⁶ The CWA declared, "It is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of

229. FRANK P. GRAD, TREATISE ON ENVIRONMENTAL LAW § 3.02, at 33–37 (2015); see also Peter N. Davis, *Federal and State Water Quality Regulation and Law in Missouri*, 55 MO. L. REV. 411, 489–90 (1990).

230. Lawrence J. Macdonnell, *Prior Appropriation: A Reassessment*, 18 U. DENV. WATER L. REV. 228, 279 (2015).

231. See, e.g., 7-7000 DEL. ADMIN. CODE § 5 (2016); 7-7201 DEL. ADMIN. CODE § 8 (2016).

232. See Carah et al., *supra* note 15, at 822, 866.

233. Thompson et al., *supra* note 14, at 91, 93.

234. See Carah et al., *supra* note 15, at 824–25 (citing Jim F. Milestone et al., *Continued Cultivation of Illegal Marijuana in U.S. Western National Parks*, PROC. OF THE 2011 GEORGE WRIGHT SOC'Y CONF. ON PARKS PROTECTED AREAS & CULTURAL SITES 209, 212 (2012)).

235. See *id.* at 825.

236. 33 U.S.C. § 1251(b) (2012).

States to prevent, reduce, and eliminate pollution.”²³⁷ To implement this objective, Congress uses financial incentives²³⁸ and the threat of preemption²³⁹ to obtain state participation and compliance with the Act. For example, states may create their own water pollution control plans, including state water quality standards, effluent limitations, and watercourse-specific designated uses.²⁴⁰ If the state fails to do so, or if its standards do not meet federal minimums,²⁴¹ the Environmental Protection Agency (EPA) is authorized to regulate on behalf of the state.²⁴² This rarely happens, in part because Congress provides funding for the development of pollution control programs,²⁴³ research,²⁴⁴ and construction of treatment works,²⁴⁵ a major incentive for state participation.

Unfortunately, the CWA has not been effective at eliminating pollution from agricultural runoff, largely because the CWA is not designed to address nonpoint source pollution (pollution that does not originate from a discrete source).²⁴⁶ Instead of regulating agricultural runoff directly, states and the federal government attempt to regulate runoff indirectly by funding pollution control programs that enhance monitoring or encourage sustainable farming practices.²⁴⁷ These collaborative water pollution control programs often involve a diverse set of stakeholders that include state and federal agencies, and representatives of the agricultural industry.²⁴⁸ A wide variety of policy tools and approaches are also available to address agricultural runoff.²⁴⁹

237. *Id.*; see also *District of Columbia v. Schramm*, 631 F.2d 854, 860 (D.C. Cir. 1980) (finding that “Congress carefully constructed a legislative scheme that imposed major responsibility for control of water pollution on the states”). See generally Oliver A. Houck, *Cooperative Federalism, Nutrients, and the Clean Water Act: Three Cases Revisited*, 44 ENVTL. L. REP. 10,426 (2014) (providing an analysis of the CWA and related judicial decisions).

238. 33 U.S.C. §§ 1255, 1381 (2012).

239. *Id.* § 1361.

240. *Id.* § 1313.

241. *Id.* § 1313(e)(3)(A).

242. *Id.* § 1361.

243. *Id.* § 1256.

244. *Id.* § 1255.

245. *Id.* §§ 1281–1301.

246. See Lara B. Fowler et al., *Addressing Death by a Thousand Cuts: Legal and Policy Innovations to Address Nonpoint Source Runoff*, CHOICES, 2013, at 1, 2, 4; Adena R. Rissman & Stephen R. Carpenter, *Progress on Nonpoint Pollution: Barriers & Opportunities*, 144 DAEDALUS 35, 43 (2015).

247. See 33 U.S.C. § 1251 (2012).

248. See, e.g., *Chesapeake Bay Total Maximum Daily Load*, ENVTL. PROTECTION AGENCY, <https://www.epa.gov/chesapeake-bay-tmdl> (last visited Mar. 29, 2016).

249. See, e.g., Brian M. Dowd et al., *Agricultural Nonpoint Source Water Pollution Policy: The Case of California’s Central Coast*, 128 AGRIC. ECOSYSTEMS & ENV’T 151, 152–55 (2008).

Fortunately, approaches that encourage stakeholder engagement and provide incentives for farmers to participate are precisely what is needed in the marijuana agriculture sector. As the marijuana industry has been operating in the shadows for decades, marijuana farmers are quite capable of evading onerous regulations. At least during the transition to legalization, it will be important for states to engage the marijuana farming community and tailor regulations to obtain broad-based support for regulatory programs.

Nonetheless, developing effective water quality control programs for the marijuana industry will be challenging. First, states may not have access to resources or programs fostered by the CWA given the federal marijuana prohibition. Although it would be difficult to distinguish marijuana-based agricultural runoff from general agricultural runoff, the federal government may not support programs that target and legitimize marijuana agriculture. In 2010, a Mendocino County, California program successfully partnered private growers with county officials to monitor plants and facilitate regulatory compliance, but a federal raid and subpoena of the program's paperwork shut it down and broke up the partnership.²⁵⁰ A local or state government program that does not implicate the federal government would likely avoid federal prosecution today, considering Congress passed a bill in December 2014 prohibiting the Department of Justice from using federal funds to interfere with state implementation of medical marijuana laws,²⁵¹ which a federal court subsequently held protects private individuals and businesses from prosecution as well.²⁵² However, many pollution control programs receive funding from the federal government and would be more difficult to apply to marijuana agriculture than a purely state or local program.²⁵³

Furthermore, because marijuana regulation is so novel across the board, water pollution control programs will need to work with other governments and regulatory agencies to be effective and complementary. In May 2015, one month before "Operation Emerald Tri-County" raided marijuana farms in northern California, California's North Coast Regional Water Quality Control Board held a workshop in the area to discuss the Board's proposed water quality regulations for marijuana

250. Josh Harkinson, *The Landscape-Scarring, Energy-Sucking, Wildlife-Killing Reality of Pot Farming*, MOTHER JONES (Mar./Apr. 2014), <http://www.motherjones.com/environment/2014/03/marijuana-weed-pot-farming-environmental-impacts>.

251. Commerce, Justice, Science, and Related Agencies Appropriations Act, Pub. L. No. 113-235, tit. V, sec. 538, 128 Stat. 2173, 2217 (2014).

252. *United States v. Marin All. for Med. Marijuana*, 139 F. Supp. 3d 1039, 1047-48 (N.D. Cal. 2015).

253. See, e.g., *Clean Water Partnership Loan Program Awards \$1.9 Million for Sewer Upgrades*, MINN. POLLUTION CONTROL AGENCY (July 27, 2016), <https://www.pca.state.mn.us/news/clean-water-partnership-loan-program-awards-19-million-sewer-upgrades>.

cultivation.²⁵⁴ The goal was to solicit input from marijuana farmers and invite them to participate in a mutually beneficial regulatory scheme.²⁵⁵ Farmers would be asked to clean up their operations and invest in water quality technologies, and in exchange, the Board would give farmers cover to address water quality issues openly and legally.²⁵⁶ The workshop ended on a promising note,²⁵⁷ but several weeks later, local sheriffs' departments and the California Department of Fish and Wildlife conducted the Island Mountain raids targeting farmers allegedly violating environmental regulations.²⁵⁸ The incident showed that without a clear framework for regulating marijuana cultivation, aspects of marijuana regulation like water quality control will suffer from a lack of coordination.

Notwithstanding these challenges, states have experience addressing agricultural runoff through adaptable pollution control programs. The diversity of regulatory tools and approaches available can and should be considered to develop a water pollution control program capable of incentivizing participation from marijuana farmers while making meaningful reductions in water pollution.

C. Energy Use and Indoor Agriculture

While to some extent the media have chronicled the impact of marijuana agriculture on water resources, marijuana's energy demands and carbon footprint have received widespread attention in both the press and academic scholarship.²⁵⁹ Growing marijuana indoors requires high-intensity lighting, ventilation, and climate control systems, all of which are energy-intensive.²⁶⁰ A 2012 study found that the energy consumed by indoor agriculture alone constitutes 1% of total electricity use in the United States, with carbon emissions reaching fifteen million metric tons.²⁶¹ In California, indoor cultivation accounts for 3% of total

254. Media Release, Cal. Water Bds., North Coast Water Board to Hold Workshop May 7 on Marijuana Cultivation (May 4, 2015), http://www.waterboards.ca.gov/press_room/press_releases/2015/pr050715_northcoast_fnl.pdf.

255. *Id.*

256. *See* Baumann, *supra* note 16.

257. *Id.* One farmer noted that “[t]he water board staff are our preferred regulators because they don’t carry guns and badges.” *Id.*

258. *See supra* notes 210–11 and accompanying text.

259. Tom Huddleston, Jr., *The Booming Pot Industry Is Draining the U.S. Energy Supply*, FORTUNE (Dec. 21, 2015), <http://fortune.com/2015/12/21/marijuana-energy-consumption/>; Gina S. Warren, *Regulating Pot to Save the Polar Bear: Energy and Climate Impacts of the Marijuana Industry*, 40 COLUM. J. ENVTL. L. 385, 401–08 (2015).

260. Evan Mills, *The Carbon Footprint of Indoor Cannabis Production*, 46 ENERGY POL’Y 58, 59 (2012).

261. *Id.*

electricity use.²⁶² Those estimates are likely obsolete, as many states have since legalized the recreational or medicinal use of marijuana. In Colorado, indoor marijuana farms comprise almost half of new demand for power.²⁶³ Power providers and state regulators are scrambling to adjust to rapid changes in the energy sector that indoor marijuana agriculture has caused.²⁶⁴

Unsurprisingly, the federal marijuana prohibition complicates energy regulation as well. Many utilities receive power from federal energy projects or facilities, are regulated directly or indirectly by federal agencies, or receive federal funding.²⁶⁵ Accordingly, it is unclear if those utilities are legally permitted to provide energy for purposes of marijuana cultivation. The uncertainty has prompted some agencies to refrain from creating proactive regulations to address the marijuana industry's energy use.²⁶⁶ The Supreme Court's recent ruling in *Federal Energy Regulatory Commission v. Electric Power Supply Ass'n*²⁶⁷ reinforced the Federal Energy Regulatory Commission's (FERC) authority to regulate retail electricity (traditionally a state power) if it affects wholesale power rates.²⁶⁸ But unlike the Bureau of Reclamation, the FERC has not articulated a marijuana policy.²⁶⁹

Many jurisdictions have begun to address marijuana agriculture, however, and these early experiments with energy regulation will prove instructive to states as they transition toward legalization. Approaches include a mix of sticks and carrots. In Oregon, where marijuana-induced energy demand has led to several power outages in recent months, a trust provides cash incentives and technical assistance for cultivation operations.²⁷⁰ Utilities in Denver, Colorado, and Seattle, Washington, similarly provide incentives in the form of efficient lighting upgrades or rebate programs.²⁷¹

262. *Id.*

263. Jennifer Oldham, *As Pot-Growing Expands, Electricity Demands Tax U.S. Grids*, BLOOMBERG (Dec. 21, 2015, 5:00 AM), <http://www.bloomberg.com/news/articles/2015-12-21/as-pot-growing-expands-power-demands-tax-u-s-electricity-grids>.

264. One Pennsylvania Public Utility Commissioner said, "We are at the edge of this We are looking all across the country for examples and best practices." *Id.*

265. REGULATORY ASSISTANCE PROJECT, *ELECTRICITY REGULATION IN THE US 12* (2011), <http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-electricityregulationintheus-guide-2011-03.pdf>.

266. Warren, *supra* note 259, at 411–12.

267. 136 S. Ct. 760 (2016).

268. *Id.* at 766.

269. *See supra* notes 219–20 and accompanying text.

270. Melanie Sevchenko, *Pot Is Power Hungry: Why the Marijuana Industry's Energy Footprint Is Growing*, GUARDIAN (Feb. 27, 2016, 8:58 AM), <https://www.theguardian.com/us-news/2016/feb/27/marijuana-industry-huge-energy-footprint>.

271. *Id.*

Cultivation licensing and the power granted to local governments to enact unique marijuana regulations, both common features of early marijuana regulation frameworks, provide a fruitful opportunity to impose efficiency standards or clean energy requirements on marijuana farmers. Boulder, Colorado, and Humboldt County, California, for example, require indoor farming operations to obtain 100% of their energy needs from renewable energy sources.²⁷² In cases where renewable energy is not available to meet the demands of indoor operations, Boulder County imposes a tax on consumers (2.16 cents per kWh), from which a portion of the revenue funds sustainable marijuana cultivation projects and education programs.²⁷³

Another promising approach is to encourage or require indoor agricultural operations to schedule their light cycles to coincide with periods of low demand for the electrical grid as a whole. Off-peak hours typically take place at night, while peak hours occur during the hottest periods of the day.²⁷⁴ But to plants grown indoors, outdoor conditions are irrelevant, and because off-peak energy is typically less expensive, there is reason to believe farmers will be enthusiastic about programs that facilitate “smart-metering” of electricity.²⁷⁵ Electricity providers have an interest in preventing power shortages and blow-outs, and methods to reduce consumption during peak hours are becoming more sophisticated. While the Supreme Court’s ruling in *FERC v. EPSA* reinforced federal authority over electricity regulation, the regulatory rule in question was designed to support demand-response programs that provide incentives for consumers to adjust their consumption patterns.²⁷⁶

Finally, policies designed to address the energy demands of indoor marijuana agriculture can encourage or mandate that marijuana agriculture transition to outdoor environments, where solar energy is freely obtained. There is no botanical need to grow marijuana plants indoors, but farmers who cultivated marijuana during prohibition are accustomed to indoor growing techniques, and therefore the practice has continued.²⁷⁷ Indoor agriculture allows farmers to manipulate growing

272. BOULDER, COLO., REV. CODE § 6-14-8(i) (2017); BOULDER, COLO., REV. CODE § 6-16-8(i) (2017); Humboldt, Cal., Ordinance 2544 (Jan. 26, 2016).

273. See Res. 2014-41, Bd. of Cnty. Comm’rs (Boulder, Colo. 2014) (creating the Boulder County Energy Impact Offset Fund).

274. Presh Talwalker, *Save on Electricity Costs by Avoiding Peak Hours*, MIND YOUR DECISIONS (Aug. 13, 2010), <http://mindyourdecisions.com/blog/2010/08/13/save-on-electricity-costs-by-avoiding-peak-hours>.

275. See Warren, *supra* note 259, at 411.

276. Fed. Energy Regulatory Comm’n v. Elec. Power Supply Ass’n, 136 S. Ct. 760, 786 (2016).

277. See, e.g., Sevchenko, *supra* note 270 (“[T]he vast majority of us growers have learned indoor as a result of prohibition.”).

conditions in other beneficial ways, however, and in certain climates outdoor cultivation would be challenging if not impossible.²⁷⁸ But the energy and maintenance costs of indoor agriculture are likely to make outdoor agriculture more enticing as the industry matures. The 2012 energy study estimated that electricity costs for indoor marijuana totaled \$6 billion.²⁷⁹ Outdoor marijuana cultivation creates significant energy demands, of course, such as water pumping or transportation,²⁸⁰ but as outdoor techniques improve and become more sustainable, the allure of natural sunlight may become increasingly attractive for regulators and the marijuana industry.

D. *Certified Organic*

There is a robust market for organic agricultural products. In 2014, organic sales reached an estimated \$39 billion, with more and more Americans buying organic food.²⁸¹ The rationale is straightforward: As public awareness of negative environmental and human health impacts associated with synthetic or non-organic foods or food inputs grows, so too will the demand for alternative organic agricultural products. One early form of this public awareness was conservationist Rachel Carson's *Silent Spring*, published in 1962, which identified pesticides such as DDT as the cause of a variety of observed ecological problems.²⁸² The book, along with growing public awareness and media coverage of environmental degradation nationwide, prompted a broad response that included the passage of major state and federal environmental laws.²⁸³

278. Chelsea Harvey, *The Surprisingly Huge Energy Footprint of the Booming Marijuana Industry*, WASH. POST (Feb. 18, 2016), https://www.washingtonpost.com/news/energy-environment/wp/2016/02/18/this-could-be-a-big-problem-for-the-booming-marijuana-industry/?utm_term=.8fbb0ad99ca5.

279. Mills, *supra* note 260, at 59.

280. *Id.* at 62.

281. According to one survey, 84% of Americans purchase organic food. ORGANIC TRADE ASS'N, STATE OF THE INDUSTRY (2015), http://ota.com/sites/default/files/indexed_files/StateOfOrganicIndustry_0.pdf; see also Rebecca Rivkin, *Forty-Five Percent of Americans Seek Out Organic Foods*, GALLUP (AUG. 7, 2014), <http://www.gallup.com/poll/174524/forty-five-percent-americans-seek-organic-foods.aspx>.

282. RACHEL CARSON, *SILENT SPRING* 22 (1962).

283. See, e.g., Endangered Species Act, Pub. L. No. 93-205, 87 Stat. 884 (1973) (codified as amended at 16 U.S.C. §§ 1531–44 (2012)); Federal Water Pollution Control Act, Pub. L. No. 92-500, 86 Stat. 816 (1972) (codified as amended at 33 U.S.C. §§ 1251–1387 (2012)); National Environmental Policy Act, Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321–47 (2012)); Clean Air Act, Pub. L. No. 88-206, 77 Stat. 392 (1963) (codified as amended at 42 U.S.C. §§ 7401–7515 (2012)).

This recognition that human activities and natural systems were interconnected also prompted a return to organic farming,²⁸⁴ and eventually, development of a federal organic certification system.²⁸⁵ The 1990 Organic Foods Production Act²⁸⁶ vested authority in the USDA to develop organic certification regulations.²⁸⁷ The National Organic Program is now the regulatory framework for organic agriculture and organic certification.²⁸⁸

Unsurprisingly, there is also a market for organic marijuana.²⁸⁹ As public awareness of the environmental impact of marijuana agriculture grows, so too does the pressure on marijuana farmers to adopt sustainable farming practices. The demand for organic marijuana has prompted a market response that parallels the market's response to organic foods in the 1970s.

Then, in the absence of a federal regulatory framework, third-party organizations were created to provide independent certifications of organic agriculture. The Rodale Press established voluntary standards and a certification program, and helped organize the California Certified Organic Farmers and Oregon-Washington Tilth Organic Producers Association.²⁹⁰ States passed their own organic agriculture laws.²⁹¹ Oregon created the first state organic certification program, and by 1990, twenty-two states had developed some form of organic regulation.²⁹² As the demand for organic products increased, however, these piecemeal approaches became problematic. Fraudulently labelled products flooded

284. Farming practices prior to the twentieth century are typically considered organic because synthetic pesticides, fertilizers, or genetically modified products had not yet been developed. See KEITH S. DELAPLANE, PESTICIDE USAGE IN THE UNITED STATES: HISTORY, BENEFITS, RISKS, AND TRENDS (1996) (noting that pesticide usage did not become popular until after World War II).

285. See Sara N. Pasquinelli, *One False Move: The History of Organic Agriculture and Consequences of Non-Compliance with the Governing Laws and Regulations*, 3 GOLDEN GATE U. ENVTL. L.J., 365, 370 (2010); Valerie J. Watnick, *The Organic Foods Production Act, the Process/Product Distinction, and a Case for More End Product Regulation in the Organic Foods Market*, 32 UCLA J. ENVTL. L. & POL'Y 40, 46 (2014).

286. Pub. L. No. 101-624, 104 Stat. 3935 (1990) (codified as amended at 7 U.S.C. §§ 6501–23 (2012)).

287. 7 U.S.C. § 6501 (1990); see Kyle W. Lathrop, Note, *Pre-empting Apples with Oranges: Federal Regulation of Organic Food Labeling*, 16 J. CORP. L. 885, 895 (1991).

288. 7 U.S.C. §§ 6501–22 (2012).

289. Alice Truong, *The Bay Area's Latest Movement: Organic Marijuana*, QUARTZ (Jan. 29, 2015), <http://qz.com/334826/the-bay-areas-latest-movement-organic-marijuana/>.

290. See BRIAN BAKER, ORGANIC FARMING COMPLIANCE HANDBOOK: A RESOURCE GUIDE FOR WESTERN REGION AGRICULTURAL PROFESSIONALS 1 (2005); Student Article, Aubrey Parlet, *Organic Foods Production: What Consumers Might Not Know About the Use of Synthetic Substances*, 21 LOY. CONSUMER L. REV. 392, 395 (2009).

291. Lathrop, *supra* note 287, at 891–92.

292. *Id.*

the market, state laws were inconsistent, and enforcement was unreliable.²⁹³

The federal government substantially occupies the field of organic agriculture. The term “organic” itself has been federalized, as agricultural products can only be labelled organic if they were grown in accordance with federal standards.²⁹⁴ The federal government occupies the certification process as well, as the need for uniform federal certification standards and processes was a primary justification for federal organic legislation in the first place.²⁹⁵ In practice, enforcement of federal organic legislation often takes place at the state level by state officials promulgating organic certification programs, but these programs must be approved by the USDA and in accordance with federal standards.²⁹⁶ Thus, there is room for state involvement in the form of cooperative federalism,²⁹⁷ but organic agriculture remains a federal field of regulation.

Because marijuana remains a controlled substance prohibited under federal law, and organic certification remains a federal field of regulation, marijuana products cannot be labelled organic regardless of the method of cultivation.²⁹⁸ Thus far states have not developed their own certification programs for sustainable marijuana agriculture either. As a consequence, the marijuana industry has established third-party certification programs that attempt to recognize organic marijuana agriculture in indirect ways. Certification programs mirror the USDA’s organic agriculture requirements, but instead of using the “organic” label, programs use terms such as “naturally grown,” “Clean Green certified,” or “Certified Kind.”²⁹⁹

293. *Id.*

294. 7 U.S.C. § 6505(a)(1) (2012); *see also* *Quesada v. Herb Thymes Farm Inc.*, 361 P.3d 868, 880 (Cal. 2015) (explaining that uniform federal standards for organic certification were designed to supplement and enhance state law on the matter).

295. 7 U.S.C. § 6503.

296. *Id.* § 6507.

297. *But see* Laura Fisher, Note, *Administrative Law—All (Food) Politics Is Local: Cooperative Federalism, New England Small Farms, and the Food Safety Modernization Act*, 37 W. NEW ENG. L. REV. 337, 357 (2015) (calling for more state and local involvement in agricultural policy).

298. David Migoya & Ricardo Baca, *Colorado AG’s Office Investigates Marijuana Companies Using “Organic,”* DENV. POST (Sept. 16, 2015, 12:12 PM), <http://www.denverpost.com/2015/09/16/colorado-ags-office-investigates-marijuana-companies-using-organic/> (“Marijuana may not be certified organic under the USDA organic regulations,” said a USDA spokesman who could not be named because it’s the agency’s policy when discussing marijuana. “Marijuana is considered a controlled substance at the federal level, and organic certification is reserved for agricultural products.”).

299. *See, e.g., About Us*, Clean Green [in small caps] (last visited Mar. 29, 2017), <https://www.cleangreencert.org/about-us/> (“Clean Green Certified was created in 2004 as

These marijuana certification programs compete with each other to represent the gold standard for organic agriculture. But as private third-party certifiers, their impact on the industry remains limited without a broader regulatory framework capable of evenly applying and enforcing labelling standards. Already there is evidence that marijuana being labelled and sold as “naturally grown” has not undergone certification of any kind.³⁰⁰ In Colorado, the Colorado Department of Agriculture provides organic certification and enforcement on behalf of the USDA.³⁰¹ Those obligations notwithstanding, the term “organic” has been used by many marijuana businesses in their advertising, product labelling, and branding, with little to no state enforcement.³⁰²

Because the federal government occupies the field of organic certification, it will be difficult for states to develop their own organic marijuana programs. The USDA is unlikely to approve amendments to state organic certification programs that incorporate marijuana agriculture. Absent robust certification frameworks, farmers will have few incentives to cultivate marijuana without synthetic pesticides or other substances that have adverse consequences for the environment and human health. At the same time, there will continue to be a market benefit conferred on businesses claiming to grow marijuana organically or naturally, regardless of the veracity of those claims. Without an enforcement mechanism of some kind, consumers are likely to be misled or the terms will begin to lose meaning. States and local jurisdictions may indirectly encourage organic marijuana cultivation by incorporating organic standards into their state or local cultivation licensing schemes, and if these standards are enforced and well-communicated, farmers in

a way to regulate legal cannabis-products that called themselves ‘organic.’ Consumers can rest assured when they buy a Clean Green Certified cannabis product that it has met all of the requirements of the rigorous program. Modeled on national and international sustainability, organic and biodynamic program standards, the Clean Green program requires on-site inspections and third-party lab testing. Much like third party certifications for traditional agricultural products, the whole life cycle of the plant is considered, from seed selection to harvesting and processing. In addition, soil, nutrients, pesticide use, mold treatment and dust control are analyzed. Clean Green Certified also goes further than the USDA organic in some areas, requiring every operator to undergo pesticide testing every year, rather than only a small percentage of farms.”); *About, Certified Kind* [in small caps] (last visited Mar. 29, 2017), <https://www.certified-kind.com/about/> (“Certified Kind offers certification, education, and consultation for cannabis growers and edibles processors that are committed earth friendly practices. The Certified Kind rules are similar to USDA Organic but Certified Kind has additional requirements to ensure fair treatment of labor plus rules that address environmental issues specific to cannabis production. Certified Kind is guided by leading experts in organic certification compliance.”).

300. Truong, *supra* note 289.

301. *Organic*, COLO. DEP’T AGRIC., <https://www.colorado.gov/pacific/agplants/organic> (last visited Jan. 28, 2017).

302. *See* Migoya & Baca, *supra* note 298.

that jurisdiction may reap a market benefit.³⁰³ More than likely, however, the organic marijuana industry will struggle to recognize and incentivize organic farming as long as the federal marijuana prohibition continues.

E. Replacing Federal Agricultural Resilience Programs: Crop Insurance and Disaster Relief

One of the most important influences on crop production is one that cannot be controlled: weather. Farmers can control or influence many aspects of cultivation, including soil conditions, crop type, and the timing of key activities like seed planting and crop harvesting, but the weather can be difficult to predict. Routine weather events that fluctuate mildly from expectations—more or less rain than anticipated, for example—can have significant consequences for crop yields.³⁰⁴ But extreme weather events like droughts, freezes, floods, or fires can devastate crops, farmers, and, in turn, the stability of the market for an agricultural product.³⁰⁵ In the face of climate change and an increase in weather uncertainty, developing resilience to environmental variability and extreme events will become an important goal of agricultural policy.³⁰⁶

If farmers were left to shoulder the burden of climactic uncertainty alone, there would likely be adverse consequences on rural economies and the agricultural industry as a whole. Major crop failures could lead to farm failures, job losses, agricultural business failures, financial sector stress, and price increases. Farming would become riskier and less attractive. Recognizing this, U.S. agricultural policy has focused on two mechanisms to help farmers and the agricultural industry develop resilience to variability and crop failures.

The first mechanism consists of disaster relief. From 1989 to 2012, Congress made forty-two emergency funding appropriations that

303. For reasons similar to the benefits of appellations, see Goodhue et al., *supra* note 205, at 16.

304. Erik Chavez et al., *An End-to-End Assessment of Extreme Weather Impacts on Food Security*, 5 NATURE CLIMATE CHANGE 997, 997 (2015) (“[C]hanges in the large-scale climate processes that drive both regional and global climate variability affect the annual onset of rainfall in the tropics and subtropics, as well as rainfall patterns in temperate latitudes, thus playing a significant role in the variability of regional rain-fed crop production.”); see Mark R. Rosenzweig & Hans P. Binswanger, *Wealth, Weather and the Composition and Profitability of Agricultural Investment*, 103 ECON. J. 56, 63 (1993).

305. Steffen N. Johnson, *A Regulatory ‘Wasteland’: Defining a Justified Federal Role in Crop Insurance*, 72 N.D. L. REV. 505, 507 (1996).

306. See JOHN BEDDINGTON ET AL., CGIAR RESEARCH PROGRAM ON CLIMATE CHANGE, AGRICULTURE AND FOOD SECURITY: ACHIEVING FOOD SECURITY IN THE FACE OF CLIMATE CHANGE 49 (2012), https://cgspace.cgiar.org/bitstream/handle/10568/35589/climate_food_commission-final-mar2012.pdf.

provided disaster relief to farmers in the amount of \$70 billion.³⁰⁷ Most of that total went directly to farmers to compensate for low commodity prices or crop failures.³⁰⁸ Disaster relief can be an effective means of providing resilience and helping communities bounce back from disasters. Providing disaster relief in the wake of natural disasters receives broad political support as well.³⁰⁹ But ad hoc disaster relief presents several problems. First, the knowledge that governments will provide disaster funding may dissuade farmers from becoming more resilient (by adjusting their practices or purchasing crop insurance, for example).³¹⁰ This, in turn, makes farmers more dependent on disaster relief. Second, it is hard for governments to anticipate when disaster funding will be needed, creating a strain on budgets and financial planning.³¹¹

These challenges combine to make ad hoc disaster funding unappealing in many contexts, including the agriculture industry, and have prompted Congress to pursue a second resilience mechanism: crop insurance. In 1938, Congress established the Federal Crop Insurance Program to support and regulate crop insurance.³¹² Subsequent legislation has been enacted with the goal of making crop insurance the primary risk management tool for the agriculture industry.³¹³ Today, the Federal Crop Insurance Corporation (FCIC) identifies eligible crops, sets premium rates, subsidizes premiums, and insures insurers.³¹⁴ As of 2014, 1.2 million crop insurance policies cover 130 crops, 294 million acres, and \$110 billion in loss coverage.³¹⁵ Because the government subsidizes premiums (62%, on average) and covers administrative expenses,³¹⁶ the crop insurance program is one of the most costly components of federal agricultural policy.³¹⁷ Nonetheless, crop insurance and disaster relief

307. RALPH M. CHITE, CONG. RESEARCH SERV., EMERGENCY FUNDING FOR AGRICULTURE: A BRIEF HISTORY OF SUPPLEMENTAL APPROPRIATIONS, FY1989-FY2012, at 12 (2012).

308. *Id.* at summary.

309. Erwann Michel-Kerjan & Jacquelin Volkman-Wise, *The Risk of Ever-Growing Disaster Relief Expectations* 3–4 (Risk Mgmt. & Decision Processes Ctr., Wharton Sch., Univ. of Pa., Working Paper No. 2011-09, 2011).

310. *See* DARRELL L. HUETH & WILLIAM F. FURTAN, ECONOMICS OF AGRICULTURE CROP INSURANCE: THEORY AND EVIDENCE 350 (1994).

311. *See* Michel-Kerjan & Volkman-Wise, *supra* note 309, at 3.

312. Federal Crop Insurance Act, 7 U.S.C. § 1503 (2012).

313. H.R. REP. NO. 103-649 (1994); Johnson, *supra* note 305, at 507.

314. *See* Agricultural Act of 2014, Pub. L. No. 113-79, 128 Stat. 649 (to be codified in scattered sections of 7 U.S.C.).

315. DENNIS A. SHIELDS, CONG. RESEARCH SERV., FEDERAL CROP INSURANCE: BACKGROUND 2–3 (2015).

316. *Id.* at 2.

317. *Id.* at 16 (showing that costs peaked in 2012 at \$14.1 billion and declined in 2014 to \$8.7 billion).

payments comprise a major safety net to the agricultural industry.

Marijuana is not a crop eligible for crop insurance under the FCIC.³¹⁸ Nor have marijuana farmers ever received federal disaster relief. This is unsurprising, considering the federal marijuana prohibition established by the Controlled Substances Act.³¹⁹ But the federal prohibition has suppressed the emergence of marijuana crop insurance in the private sector as well, where most insurers are hesitant to become involved in an industry that remains illegal on the federal level.³²⁰

Without insurance or disaster relief, marijuana farmers are more vulnerable to extreme events than other farmers, such as droughts, floods, and, increasingly, wildfires. California's drought history is well-chronicled,³²¹ and wildfires are particularly threatening to marijuana crops in the American West, many of which are grown in the wildland-urban interface where fires are most prevalent.³²² Floods and fires can wipe out crops altogether, while droughts and smoke can damage crop quality.³²³ Catastrophic crop losses can lead to the same consequences (farm failures, job losses, business failures, and price increases) for marijuana just as easily as any other crop.

So far, states and private insurers have only tepidly explored the possibility of providing crop insurance to marijuana cultivators. Insurance for dispensaries has led the way, but crop insurance remains an undeveloped market tool.³²⁴ Courts have provided mixed support for marijuana farmers with these nascent insurance policies. In the 2012 case *Tracy v. USAA Casualty Insurance*,³²⁵ a federal court in Hawaii agreed with an insurer that loss of state-legal marijuana plants was not a

318. See Risk Mgmt. Agency, *County Crop Programs*, U.S. DEP'T AGRIC., <http://goo.gl/2z6GLi> (last visited Mar. 29, 2016) (illustrating the FCIC's omission of marijuana on the list of crops eligible for crop insurance).

319. 21 U.S.C. § 841(b)(vii) (2012).

320. See, e.g., Ed Leefeldt, *For Insurers, No Rush to Offer Pot Coverage*, CBS MONEY WATCH (Feb. 24, 2016, 5:15 AM), <http://www.cbsnews.com/news/for-insurers-no-rush-to-offer-pot-coverage>.

321. See, e.g., Paul Rogers, *California Drought: How Will We Know When It's Over?*, MERCURY NEWS (Jan. 9, 2016, 9:40 AM), <http://www.mercurynews.com/2016/01/09/california-drought-how-will-we-know-when-its-over>.

322. See Madeleine Thomas, *West Coast Weed Farms Are Lighting Up*, PAC. STANDARD (Aug. 31, 2015), <https://psmag.com/west-coast-weed-farms-are-lighting-up-d46a122fab3#.xyzpghjpm>.

323. *Id.*

324. See, e.g., Michael Roberts, *Medical Marijuana Crop Insurance: Putting Your Weed in Good Hands*, WESTWORD (Feb. 10, 2010, 9:10 AM), <http://www.westword.com/news/medical-marijuana-crop-insurance-putting-your-weed-in-good-hands-5864728> (noting that early crop insurance policies cover only indoor growing operations).

325. No. 11-00487 LEK-KSC, 2012 WL 928186 (D. Haw. Mar. 16, 2012).

compensable claim under the insurance policy.³²⁶ While the court found that state-legal marijuana plants are an insurable interest,³²⁷ the federal marijuana prohibition preempts state marijuana law and makes the insurance policy (which purportedly covered the marijuana plants) an unenforceable contract contrary to public policy.³²⁸

In 2016, however, a federal court in Colorado pushed back on that view in *Green Earth Wellness Center v. Atain Specialty Insurance*,³²⁹ upholding the validity of an insurance policy's coverage of loss from wildfire smoke damage to marijuana plants and products.³³⁰ Living plants were excluded from the policy in this instance, but the court nevertheless rejected the idea that covered losses are not compensable because the federal prohibition makes insurance claims on marijuana a violation of federal law and public policy.³³¹ "[I]n light of several additional years evidencing a continued erosion of any clear and consistent federal public policy in this area," the court declined to follow *Tracy*, instead finding valid contractual claims in which both parties intended to cover marijuana products as insurable commodities.³³²

The *Tracy* and *Green Earth* decisions conflict, and it remains to be seen how other courts address the validity of insurance policies covering marijuana, particularly marijuana crops. The *Green Earth* decision paves the way for marijuana farmers to obtain and enforce private crop insurance,³³³ though courts might be more willing to find preemption concerns since crop insurance is extensively regulated on the federal level.

In any case, without agricultural support programs like disaster relief or crop insurance, marijuana farmers and marijuana farming communities will remain vulnerable to extreme events. This lack of support may dissuade existing farmers of insured crops from incorporating marijuana into their crop portfolios, as well, suppressing the normalization of marijuana cultivation. Intrepid private insurers may be able to provide some relief in response to market demands, but the validity of marijuana insurance, and marijuana crop insurance, remains unsettled as a matter of law. As a consequence, the marijuana industry will not have at its disposal a primary tool for agricultural risk management for the foreseeable future.

326. *Id.* at *13.

327. *Id.* at *10.

328. *Id.* at *13.

329. No. 13-cv-03452-MSK-NYW, 2016 WL 632357 (D. Colo. Feb. 17, 2016).

330. *Id.* at *10.

331. *Id.*

332. *Id.*

333. *Id.*

IV. WHERE TO REGULATE? LOCAL ORDINANCES VS. STATE REGULATIONS

This Article has explored the major legal and policy challenges that marijuana agriculture will impose on regulatory frameworks. The final question to address is: Who should have regulatory authority over marijuana agriculture? The question raises an issue mostly of policy rather than law, but there are legal components to power distribution as well. In short, states have a choice between regulating marijuana agriculture on the state level, in a centralized and top-down approach, or decentralizing regulatory authority to counties or municipalities, allowing each local government to develop its own rules and regulations for marijuana cultivation. If states retain power for themselves, they can concentrate that power in a single marijuana regulation agency, or coordinate responsibilities across existing agencies. If states decentralize and allow local governments to take a leading role, ordinances governing marijuana cultivation will be the primary regulatory tool. This Section concludes with a case study of Humboldt County, California.³³⁴ Arguably the county most intimately familiar with marijuana agriculture, Humboldt County passed the first-of-its-kind marijuana cultivation ordinance in January 2016.³³⁵ The ordinance provides a model for replication throughout California and the United States.

A. *Marijuana Regulation and Subsidiarity*

Whether states choose to keep regulatory authority over marijuana agriculture at the state level, transfer those powers to local governments, or adopt a hybrid approach that spreads roles and responsibilities around government units, there will inevitably be trade-offs. Several states have embraced a decentralized approach, which certainly has benefits. Distributing power between local agencies engages those agencies in the regulatory process. In doing so, the regulatory framework capitalizes on the localized expertise, heightened awareness of changing conditions (ecological or economic, for example), and existing relationships between local stakeholders that collectively form a promising recipe for good governance.³³⁶ Simply put, local actors are knowledgeable about their community and provide legitimacy to local regulations. Conversely, top-down policies that do not reflect local realities often meet with resistance that can manifest itself in noncompliance with regulatory

334. See *infra* Section IV.C.

335. See Humboldt, Cal., Ordinance 2544, § 55.4.11(a) (Jan. 16, 2016).

336. See Ryan Stoa, *Subsidiarity in Principle: Decentralization of Water Resources Management*, 10 *UTRECHT L. REV.* 31, 34 (2014).

requirements.³³⁷ Finally, by allowing local agencies to create their own policies or manage their own natural resources, the collective whole develops resilience by experimenting with different approaches, some of which might fail while others foster successful innovations that other jurisdictions can replicate.³³⁸

These general benefits of decentralization are particularly applicable to regulating marijuana agriculture. Marijuana remains a controversial political issue, the liberalization of which benefits from allowing legalization opponents to enact policies they are more comfortable with.³³⁹ In regions like northern California, where a large cultivation community exists in a remote and unique social setting, local officials are better suited to engage an introverted industry than are state or federal officials. They are also more likely to develop regulations that reflect the realities of marijuana cultivation, on the one hand, and the ecological or economic conditions of the region, on the other hand. The North Coast Water Quality Control Board, for example, has put forth a water quality regulation program for marijuana cultivation that was modified based on feedback from marijuana farmers in the north coast region.³⁴⁰ The Central Valley Water Quality Control Board did the same in the Central Valley.³⁴¹ Both programs are integrated into an inter-agency, statewide

337. In *Democracy in America*, Alexis de Tocqueville remarked, in his comparison of early America with France under Louis XIV, that

administrative centralization is suitable only to enervate the peoples who submit to it, because it constantly tends to diminish the spirit of citizenship in them. Administrative centralization, it is true, succeeds in gathering at a given time and in a certain place all the available forces of a nation, but it is harmful to the multiplication of those forces. It brings the nation victory on the day of battle and over time reduces its power. So it can work admirably toward the passing greatness of a man, not toward the lasting prosperity of a people.

1 ALEX DE TOCQUEVILLE, *DEMOCRACY IN AMERICA: HISTORICAL-CRITICAL EDITION* 147 (Eduardo Nolla ed., James T. Schleifer trans., 2010) (1835) (ebook), <http://oll.libertyfund.org/titles/2285>.

338. Stoa, *supra* note 336, at 34; see Graham R. Marshall, *Nesting, Subsidiarity, and Community-Based Environmental Governance Beyond the Local Level*, 2 *INT'L J. COMMONS* 75, 77 (2008); Elinor Ostrom, *Coping with Tragedies of the Commons*, 2 *ANN. REV. POL. SCI.* 493, 526 (1999).

339. For an example of a city ordinance that prohibits the indoor or outdoor cultivation of marijuana in Galt, California, see Jennifer Bonnett, *Galt's Medical Marijuana Rule Takes Effect*, *LODI NEWS-SENTINEL* (Mar. 5, 2015, 6:10 AM), http://www.lodinews.com/news/article_7173905e-c341-11e4-be9a-23987e765448.html.

340. REG'L WATER QUALITY CONTROL BD., EXECUTIVE OFFICER'S SUMMARY REPORT 1 (2015), http://www.waterboards.ca.gov/northcoast/board_info/board_meetings/08_2015/items/07/150728_Cannabis_WDR_EOSR.pdf (documenting that forty-seven comments were received from the public regarding feedback on the program).

341. General Order for Discharge of Waste Associated with Medical Cannabis Cultivation Activities, No. R5-2015-0113 (Oct. 2, 2015), <http://www.waterboards.ca.gov/centralvalley/>

strategy for marijuana irrigation regulation that should facilitate coherence across regions.³⁴² This type of regulatory structure is especially helpful when states are regulating an industry—like marijuana—that is new or unfamiliar, with few established blueprints for success.

A decentralization strategy, however, has certain vulnerabilities. Local agencies and jurisdictions may be authorized to develop and enforce their own regulations, but they may not have the institutional capacity to do so. Regulating marijuana agriculture may implicate complex tasks, like hydrological modeling or drug trafficking enforcement, that local agencies may be ill-equipped to handle.³⁴³ Even when they are, significant reforms may constitute a government taking requiring compensation, which local agencies may not be able to afford.³⁴⁴ Regulation requires investments in human, infrastructural, and technological resources that states may not be able to provide to local agencies, resulting in some jurisdictions with well-funded agency operations, and others with little to no regulatory capacities.

A corollary of the institutional capacity challenge is that local agencies may not be equipped to regulate on two dimensions simultaneously, as the marijuana-agriculture nexus requires. Colorado's Marijuana Enforcement Division, for example, is defined by its regulatory identification with marijuana, but not agriculture.³⁴⁵ The state's Department of Agriculture, conversely, is equipped to regulate traditional crops but has received little guidance on how to address marijuana cultivation.³⁴⁶ When the Department reached out to the federal EPA for guidance on which general crop group (e.g., herbs, spices,

water_issues/cannabis/general_order/r5-2015-0113.pdf (issuing a general order to reduce water quality impacts associated with cultivation of cannabis).

342. CAL. STATE WATER RES. CONTROL BD. ET AL., STRATEGY FOR REGULATION AND ENFORCEMENT OF UNAUTHORIZED DIVERSIONS; DISCHARGES OF WASTE TO SURFACE AND GROUNDWATER CAUSED BY MARIJUANA CULTIVATION (2014), http://www.waterboards.ca.gov/water_issues/programs/enforcement/docs/2014strategicplan_wbcdfw.PDF.

343. Emily Brady's chronicles of a Humboldt County Deputy Sheriff underline the solitary and seemingly futile efforts to enforce ambiguous marijuana laws in the region. EMILY BRADY, HUMBOLDT: LIFE ON AMERICA'S MARIJUANA FRONTIER 48 (2013).

344. See, e.g., *Koontz v. St. Johns River Water Mgmt. Dist.*, 568 U.S. 936 (2012).

345. See ENF'T DIV.—MARIJUANA, COLO. DEP'T OF REVENUE, ANNUAL UPDATE (2015), https://www.colorado.gov/pacific/sites/default/files/2014%20MED%20Annual%20Report_1.pdf.

346. See, e.g., COLO. DEP'T. OF AGRIC., FACTUAL AND POLICY ISSUES RELATED TO THE USE OF PESTICIDES ON CANNABIS (2016), <https://www.colorado.gov/pacific/sites/default/files/atoms/files/2-2016%20factual%20and%20Policy%20Issues%20Related%20to%20the%20Use%20of%20Pesticides%20on%20Cannabis.pdf> (receiving little guidance from the federal EPA regarding pesticide regulations); Letter from John W. Hickenlooper, Governor, Colo., to Tom Vilsack, Sec'y, U.S. Dep't. of Agric. (Feb. 20, 2014), <https://www.colorado.gov/pacific/sites/default/files/atoms/files/Letter%20to%20Secretary%20Vilsack.pdf> (requesting assistance from the FDA regarding industrial hemp cultivation).

vegetables) marijuana fits into for purposes of pesticide regulation, the EPA could only state that marijuana fits into none of these groups.³⁴⁷ Colorado's Marijuana Enforcement Division and Department of Agriculture are both state-level agencies that do not have sufficient interdisciplinary expertise at present. The challenge can be more pronounced at local levels where it can be difficult to establish regulatory capacity on one dimension, much less two.

Efforts to decentralize power away from a central government and toward local governments can also, if hastily or sloppily designed, look more like power abdication (in which governments shift an unwanted burden of regulation onto another jurisdiction) or power fragmentation (in which regulatory authorities are ambiguously spread between many different agencies). The former is a problem because while transferring power from state to local agencies has its benefits, the state retains an important role to play by supporting and coordinating local initiatives.³⁴⁸ Fragmentation can also be a problem when it leads to overlapping mandates, uncoordinated regulation, or counter-productive policies.³⁴⁹ If local agencies are authorized to develop regulations concerning marijuana cultivation, the authorizations should clearly articulate which agency has that responsibility, and what the relationship is between that agency, other agencies, and the state's broader regulatory framework.

B. State Agency Authority: Consolidation or Cooperation?

If states retain regulatory authority over marijuana agriculture at the state level, there is a second choice to make regarding power distribution. Authority can be placed in a single administrative agency responsible for regulating all aspects of the marijuana industry, or, alternatively, states can assign different roles and responsibilities to multiple agencies according to their institutional strengths, and hope the agencies coordinate well enough to make the overall regulatory framework coherent.

Colorado, Washington, and Oregon concentrate primary authority for marijuana regulation in a single state agency: the Colorado Marijuana

347. COLO. DEP'T. OF AGRIC., *supra* note 346, para. 4.

348. To take a broader view of this point, cooperative federalism frameworks between the federal and state governments (such as the regulatory structures for the Clean Water Act or Clean Air Act) have been effective at utilizing the federal government's funding streams and establishment of minimum standards to support state-level programs that remain relatively coherent from a national perspective. *See, e.g.*, Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179, 230–31 (2005); Ryan B. Stoa, *Cooperative Federalism in Biscayne National Park*, 56 NAT. RES. J. 81, 115 (2016); Douglas Williams, *Toward Regional Governance in Environmental Law*, 46 AKRON L. REV. 1047, 1086–90 (2013).

349. *See* Ryan B. Stoa, *Water Governance in Haiti: An Assessment of Laws and Institutional Capacities*, 29 TUL. ENVTL. L.J. 243 (2017).

Enforcement Division,³⁵⁰ the Washington Liquor and Cannabis Board,³⁵¹ and the Oregon Liquor Control Commission,³⁵² respectively. In all three cases, the agency has primary authority to develop rules and regulations for marijuana, including aspects of marijuana agriculture. In Colorado, the Marijuana Enforcement Division is responsible for licensing cultivators and promulgating “rules for the proper regulation and control of the cultivation” of marijuana.³⁵³ In Washington, legislation authorizes the “state liquor control board to regulate” marijuana.³⁵⁴ And in Oregon, the Liquor Control Commission’s functions include the power “to regulate the purchase, sale, production, processing, transportation, and delivery of marijuana items.”³⁵⁵

One of the benefits of centralized marijuana regulation is that it may provide clarity. The administrative agency assigned to (or created for the purposes of) marijuana regulation is aware of its broad mandate, other agencies are not confused by their rights and duties, and the private sector and other stakeholders can direct their attention to a single agency instead of navigating a complex web of agencies and rules.³⁵⁶ A second benefit is that states can more clearly invest human and financial resources in a single agency, whereas distributing those resources across a network of agencies requires a more nuanced understanding of existing agency capacities and needs, and investments can more easily become politically influenced.³⁵⁷ Third, because marijuana implicates a diversity of processes, including the regulation of cultivation, processing, distribution, retail sale, and consumption, as well as the agricultural, economic, and public health components of the marijuana industry, a single agency with authority over the industry as a whole is well-suited

350. *Marijuana Enforcement*, COLO. DEP’T REVENUE, <https://www.colorado.gov/pacific/enforcement/marijuanaenforcement> (last visited Jan. 30, 2017).

351. WASH. ST. LIQUOR & CANNABIS BOARD, <http://www.liq.wa.gov> (last visited Jan. 30, 2017).

352. *Oregon Liquor Control Commission*, ST. OR., <http://www.oregon.gov/olcc/marijuana/Pages/default.aspx> (last visited Jan. 29, 2017).

353. COLO. REV. STAT. ANN. § 12-43.4-202(2)(a)(b) (West 2016).

354. WASH. REV. CODE § 69.50.101 note (2015) (Initiative Measure No. 502, approved Nov. 6, 2012).

355. H.R. 3400, 78th Gen. Assemb., Reg. Sess. (Or. 2016) (alteration in original).

356. See Todd S. Aagaard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 237, 286–89 (2011) (discussing the problems with regulatory overlap, and the resultant duplicative regulation). *But see* Mark Holden, *FDA-EPA Public Health Guidance on Fish Consumption: A Case Study on Informal Interagency Cooperation in “Shared Regulatory Space,”* 70 FOOD & DRUG L.J. 101, 142 (2015) (concluding that joint guidance in certain public health realms can yield benefits contrary to current literature on agency overlap).

357. Dan Walters, *California’s Multiple Agencies Confusing*, SACRAMENTO BEE (Mar. 5, 2016, 7:15 AM), <http://www.sacbee.com/news/politics-government/politics-columns-blogs/dan-walters/article64266927.html>.

to coordinate regulatory activities and create a coherent legal framework as a whole.

Unfortunately, regulating marijuana agriculture has not been as neat as states like Colorado, Washington, and Oregon may have initially expected. Inevitably, perhaps, the expertise and traditional functions of other agencies have created exceptions to the centralized agency paradigm. In Colorado, the Department of Agriculture, pursuant to its duties under the Colorado Pesticide Applicator Act,³⁵⁸ has established rules for the use of pesticides in marijuana cultivation.³⁵⁹ Recognizing that pesticide regulations implicate public health, the state assigned an appropriate regulatory role for the Department of Health and Environment, as well.³⁶⁰ With this expansion of agency responsibilities, the Governor established the Office of Marijuana Coordination to foster collaboration and oversight, despite the relatively central role of the Marijuana Enforcement Division.³⁶¹ Washington's Department of Agriculture has also taken an increased role in marijuana cultivation, establishing rules for pesticide and fertilizer use, agricultural worker safety, and waste disposal.³⁶² The Washington Department of Ecology has also suggested that marijuana farmers will be subject to the usual environmental regulations the department oversees.³⁶³ Finally, the Oregon Department of Agriculture, while acknowledging that it is not the lead agency for marijuana, nonetheless has extensive rules and programs for marijuana cultivation.³⁶⁴

It would be misleading to suggest that these states intended to consolidate all marijuana regulatory authority into a single agency, but it is clear that despite a broad mandate for lead agencies to "regulate marijuana," the diverse and interdisciplinary components of the marijuana industry have forcibly fragmented regulatory authority to some extent. If an interagency approach is likely, then states may seek to

358. COLO. REV. STAT. ANN. §§ 35-10-101 to -128 (West 2016).

359. COLO. DEP'T OF AGRIC., PESTICIDE APPLICATORS' ACT RULES AND REGULATIONS § 17.02 (2016), <https://www.colorado.gov/pacific/sites/default/files/atoms/files/3-30-2016%20PAA%20Cannabis%20Rule%20WEB.pdf>.

360. Directing State Agencies to Address Threats to Public Safety Posed by Marijuana Contaminated by Pesticide, Colo. Exec. Order No. D 2015-015 (Nov. 12, 2015).

361. The Colorado Governor's Office of Marijuana Coordination did not have a website at the time of writing. *But see Marijuana*, COLORADO, <https://www.colorado.gov/pacific/marijuana/about-site> (last visited Jan. 30, 2017) (identifying the office and its role).

362. *Pesticide and Fertilizer Use on Marijuana in Washington*, WASH. ST. DEP'T. AGRIC., <http://agr.wa.gov/pestfert/pesticides/pesticideuseonmarijuana.aspx> (last visited Jan. 29, 2017).

363. *Marijuana Licensing and the Environment*, WASH. ST. DEP'T ECOLOGY, <http://www.ecy.wa.gov/topics/marijuana.html> (last visited Jan. 29, 2017).

364. *Cannabis (Marijuana)*, OR. DEP'T. AGRIC., <https://www.oregon.gov/ODA/agriculture/Pages/Cannabis.aspx> (last visited Jan. 29, 2017).

embrace fragmentation and focus on coordinating the various regulatory activities of different agencies. California has largely adopted this approach. In January 2016, twenty years after the Compassionate Use Act of 1996 legalized medical marijuana in the state, the Medical Marijuana Regulation and Safety Act (MMRSA) came into effect.³⁶⁵ One of the MMRSA's bills, AB 243, "would require the Department of Food and Agriculture, the Department of Pesticide Regulation, the State Department of Public Health, the Department of Fish and Wildlife, and the State Water Resources Control Board to promulgate regulations or standards relating to medical marijuana and its cultivation."³⁶⁶ In addition, AB 243 requires that cities, counties, and their enforcement agencies coordinate with state agencies to implement the law, creating a self-described "state-mandated local program."³⁶⁷ A companion bill, AB 266, creates the Bureau of Medical Marijuana Regulation,³⁶⁸ but its regulatory functions are narrowly tailored and do not consist of broad authority to "regulate marijuana."

The advantages of a regulatory framework that distributes roles for marijuana regulation to a variety of administrative agencies are numerous. By leaving intact the existing functions and dynamics of state agencies, a framework of this nature is less disruptive than one that consolidates broad responsibilities in a single agency. Agencies have developed subject matter expertise, and this approach takes advantage of that existing knowledge and may not require as many financial or human investments to build up institutional capacities. In addition, by embracing the status quo regulatory structure, states may take advantage of existing partnerships, stakeholder relationships, and interagency programs that enhance interdisciplinary regulation. It is more likely that this approach will normalize marijuana cultivation because a broad spectrum of agencies is responsible for incorporating the marijuana industry into their regulatory frameworks, increasing engagement with the industry and the likelihood that emerging issues will be addressed by appropriate officials.

There are, inevitably, drawbacks to this approach. The primary challenge is that interagency coordination is notoriously difficult.³⁶⁹ It is easy for the California legislature to ask a multitude of state agencies to create appropriate rules and regulations; it is not easy for those agencies to create them in an integrated, coordinated, and coherent way. It remains to be seen if these agencies will succeed in their mission. Compounding this coordination challenge is California's "state-mandated local

365. A.B. 243, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2015); A.B. 266, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2015); S. 643, 2015–16 Sess. (Cal. 2015).

366. A.B. 243.

367. *Id.*

368. A.B. 266.

369. Aagaard, *supra* note 356, at 288; *see* Stoa, *supra* note 349, at 115.

program,” requiring agencies to not only coordinate with each other on the horizontal governance axis, but to coordinate with local governments on the vertical governance axis as well. Prior to enactment of the MMRSA, the state’s water quality regulators were trying to convince marijuana farmers in northern California to buy into their water quality monitoring program at the same time that sheriff’s departments were conducting raids and making arrests.³⁷⁰

Aside from the coordination challenge, fragmentation of authority may create compliance problems for the marijuana industry. It will be more difficult for marijuana farmers to comply with state and local laws if each agency has extensive permitting or licensing procedures. Considering the marijuana industry’s black market history, if these procedures are too onerous, many farmers may be tempted to remain in the shadows. And while agencies have specialized expertise in their fields of practice, it is not clear that existing capacities will be sufficient to address the novel and burgeoning marijuana industry. It may be, instead, that investments will need to be made to understand the nuances of marijuana cultivation, and to make those investments for each agency may not be an efficient allocation of resources.

Regardless of approach, states will need to address the challenges of consolidation or cooperation. In making these distinctions, this Article does not suggest that the choice is black and white. Inevitably, states that prefer a consolidated approach will need to involve other state agencies to some extent, while states that prefer a coordinated approach will need to integrate efforts to create an efficient and coherent regulatory framework. States should not assume that a single agency can regulate all aspects of marijuana agriculture, nor should they assume that existing agencies can address regulatory challenges by applying traditional methods. An important factor for power distribution may be the characteristics and track record of a state’s administrative landscape: If a state has a strong track record of agency coordination, the coordinated approach makes sense. If it does not, consolidating authority into a single agency may be the best way to develop a regulatory framework in a timely and responsive manner.

C. The Future of Marijuana Ordinances: Humboldt County, California, Leads the Way

As the California MMRSA demonstrates, local governments may play a strong role in regulating marijuana agriculture, regardless of whether states retain substantial regulatory powers. Granting counties and cities the power to adopt their own rules and regulations appears to be a common feature in the early legalization states, such as California and

370. Baumann, *supra* note 16; Media Release, Cal. Water Bds., *supra* note 254.

Colorado. The cause is likely multi-faceted. States may want to foster a multitude of regulatory approaches to experiment with and identify those rules and regulations that might work best on the state level. In addition, because legalization has thus far taken place primarily by ballot initiative, legislatures may be politically hesitant to embrace the marijuana industry, and providing a strong role for local governments may be an effective means of reducing political conflicts.

In any case, local governments are likely to use their power to make ordinances the primary legal mechanism to regulate marijuana agriculture. Ordinances have the force of law, and can regulate a variety of local issues, such as public health and safety, land use, and use of public spaces. State constitutions or state statutes grant counties or municipalities the power to enact ordinances. The California MMRSA, for example, authorizes local governments to enact local laws in accordance with the state statute.³⁷¹ Colorado grants extensive powers to city and county governments, allowing them to increase taxes or prohibit marijuana cultivation altogether.³⁷² Washington did not initially grant cities and counties the power to enact marijuana regulations, but many municipalities took it upon themselves to enact their own regulations anyway, a practice that was subsequently upheld in *Green Collar LLC v. Pierce County*.³⁷³

In many of these cases, local governments are using ordinances to prohibit marijuana cultivation, sale, or consumption.³⁷⁴ In other cases, ordinances have made relatively minor adjustments to state regulations.³⁷⁵ Thus far, local ordinances have not been a major tool for the regulation of marijuana agriculture. In that respect, Humboldt County, California, may be the first county in the United States to enact a comprehensive marijuana agriculture ordinance.

371. A.B. 266 (Section 19316(a) reads: “Pursuant to Section 7 of Article XI of the California Constitution, a . . . county may adopt ordinances that establish additional standards, requirements, and regulations for local licenses and permits for commercial cannabis activity.”).

372. COLO. CONST. art. XVIII, § 16(5)(b)(II)(f).

373. *Green Collar, LLC v. Pierce County*, No. 14-2-11323-0, 2014 WL 8187081 (Wash. Super. Ct. 2014); *see* 2014 Op. Att’y Gen. 2 (Wash.), 2014 WL 201832.

374. Seventy-five cities or counties in Washington have banned marijuana. *See Map of Zoning Ordinances, Marijuana Regulation in Washington State*, MRSC, <http://mrsc.org/Home/Explore-Topics/Legal/Regulation/Marijuana-Regulation-in-Washington-State.aspx> (last visited Jan. 29, 2017). As of December 2014, 165 municipalities had banned marijuana in Colorado. *See* John Aguilar & Jon Murray, *Colorado Cities and Towns Take Diverging Paths on Recreational Pot*, DENV. POST (Dec. 19, 2014, 1:05 PM), <http://www.denverpost.com/2014/12/19/colorado-cities-and-towns-take-diverging-paths-on-recreational-pot-2/>.

375. Richland, Wash., Ordinance 01-13 (Jan. 15, 2013).

When the MMRSA was signed into law in October 2015, an “inadvertent drafting error” in AB 243 appeared to require that local jurisdictions implement marijuana cultivation regulations by March 1, 2016; otherwise that power would return to the state Department of Food and Agriculture.³⁷⁶ The inadvertently narrow timeframe made it unrealistic for most cities and counties to develop a comprehensive marijuana agriculture regulation framework. An urgency statute was signed into law in February 2016,³⁷⁷ eliminating the March 1 deadline, but by that time many local governments had retained their authority by simply banning marijuana cultivation,³⁷⁸ an outcome that was not the intent of the statute.

Humboldt County, however, had been working diligently to create the most robust marijuana agriculture framework by the March 1 deadline, and the Commercial Medical Marijuana Land Use Ordinance (Marijuana Ordinance) was enacted in late January 2016.³⁷⁹ In part, Humboldt County was able to meet the deadline because it had been working on the Marijuana Ordinance for several years, in collaboration with marijuana industry groups and farming representatives.³⁸⁰ The close collaboration between local officials and industry representatives enabled the ordinance drafting process to move forward quickly and with political support, a dynamic that may prove equally helpful in other jurisdictions.

The Marijuana Ordinance itself is relatively comprehensive in scope, addressing farming styles (indoor, outdoor, and mixed), historical use protections and benefits for existing farms, tiered permitting requirements based on zoning classifications, total farm acreage and marijuana cultivation area, water quantity and quality protections, energy use, and farm labor standards. The ordinance addresses many of the issues explored in this Article, and the choices those issues present to local governments. The ordinance represents a clear attempt to regulate

376. See Letter from Jim Wood, Assemb. Member, 2d Dist., to Cty. & City Gov’t Officials (2016).

377. A.B. 21, 2015–16 Gen. Assemb., Reg. Sess. (Cal. 2016).

378. For a list of ordinances banning marijuana, see *Bans by County*, CAL. NORML, www.canorml.org/bansbycounty.xlsx (last visited Jan. 29, 2017).

379. Humboldt, Cal., Ordinance 2544, § 55.4.9 (Jan. 16, 2016).

380. The final ordinance was substantially based on a model marijuana agriculture ordinance developed by the California Cannabis Voice Humboldt, and transferred to the Humboldt County Board of Supervisors. See Interview with Anonymous Member of California Cannabis Voice Humboldt, *supra* note 177; Ryan Burns, *County Takes the Reins on Marijuana Regs as CCVH Steps Back*, LOCAL COAST OUTPOST (Sept. 15, 2015, 3:14 PM), <https://lostcoastoutpost.com/2015/sep/15/county-takes-reins-marijuana-regs/>; *Humboldt Supervisors to Use CCVH as Framework for Local Marijuana Regulations*, NEWS CHANNEL 3, <http://kiem-tv.com/video/humboldt-supervisors-use-ccvh-ordinance-framework-local-marijuana-regulations> (last visited Jan. 29, 2017).

marijuana agriculture in a tailored fashion; marijuana cultivation limits (no more than one acre) indicate a preference for small-scale farming and a rejection of large-scale consolidation models,³⁸¹ demonstration of sufficient water rights and water quality compliance permits are required,³⁸² and energy used in indoor farms must come from renewable sources or be offset with carbon credits.³⁸³ The ordinance even attempts to create a “Humboldt Artisanal Branding” certification program for small-scale, organic marijuana farms.³⁸⁴ The Marijuana Ordinance does not address crop insurance or disaster relief, but local governments are not well-suited to provide financial services of this nature.

The central tension local governments face when regulating marijuana agriculture, particularly in jurisdictions where marijuana is already a primary crop, is between the need to bring farmers out of the shadows and into the regulatory system, on the one hand, and the need to create and enforce regulations that have a meaningful impact on cultivation and the direction and impact of the industry, on the other hand. The Marijuana Ordinance addresses this tension by incentivizing existing farmers to register and participate with the county by providing benefits to those farmers who step forward within 180 days following passage of the Ordinance.³⁸⁵ Those benefits include a larger maximum cultivation area (43,560 square feet, as opposed to a maximum 10,000 square feet for new farms),³⁸⁶ as well as a certificate of good standing for purposes of priority processing of state permits.³⁸⁷ Additionally, the ordinance incentivizes the retirement and relocation of existing farms located in environmentally sensitive areas by allowing farmers to cultivate an area four times larger in environmentally resilient areas.³⁸⁸

It remains to be seen if the certificate of good standing will have meaningful value, but the cultivation area restrictions on new farms (which would include existing farms that chose not to register by the deadline) are significant, and may ultimately provide a pronounced advantage to existing farmers, who can cultivate an area over four times larger than new farmers. In my conversations with farmers in the county, “to legalize or not to legalize” has been a frequent topic of debate.³⁸⁹ Considering the isolationist nature of the marijuana farming industry in

381. Ordinance 2544, § 55.4.9.

382. *Id.* § 55.4.10(c)–(i).

383. *Id.* § 55.4.8.3.

384. *Id.* § 55.4.15.

385. *Id.* § 55.4.9.4.

386. *Id.* § 55.4.9.

387. *Id.* § 55.4.9.4.

388. *Id.* § 55.4.14.

389. Interview with Marijuana Farmers, in Willow Creek, Cal. (Mar. 15, 2016).

northern California, that debate is a promising sign for the county.

In other aspects, the Marijuana Ordinance is less well thought-out. It is logical to require that marijuana farmers have water rights (either riparian or by appropriation) sufficient to meet their agricultural needs,³⁹⁰ as well as water use plans and other documents certifying water use,³⁹¹ but the ordinance may require water rights holders to agree to forego any water diversions from May 15 to October 31.³⁹² Instead, marijuana farmers would be required to collect and store water during the rainy season in quantities sufficient for the dry season. While there is some evidence that water used for purposes of marijuana cultivation may have adverse effects on water resources during periods of low flow,³⁹³ the ordinance's prohibition on dry season water use as a general rule is unprecedented.³⁹⁴

The environmental impacts of this rule are unclear, as well. While wet season flows are high and waterways can likely support an increase in diversions, ecological processes may depend on these traditionally high flows, and widespread wet season diversions and water storage may disrupt the wet season environment.³⁹⁵ In addition, because irrigation demands are substantial during the dry season, the environmental impact of building large storage tanks on every marijuana farm, necessitating building materials, construction waste, and a storage footprint, may outweigh the benefits intended by the rule. Moreover, if marijuana

390. Ordinance 2544, §§ 55.4.10(e), 55.4.11(c).

391. *Id.* § 55.4.10(f)–(i).

392. *Id.* § 55.4.11(l).

Where surface water diversion provides any part of the water supply for irrigation of cannabis cultivation, the applicant shall either: 1) consent to forebear from any such diversion during the period from May 15th to October 31st of each year and establish on-site water storage for retention of wet season flows sufficient to provide adequate irrigation water for the size of the area to be cultivated, or 2) submit a water management plan prepared by a qualified person such as a licensed engineer, hydrologist, or similar qualified professional, that establishes minimum water storage and forbearance period, if required, based upon local site conditions, or 3) obtain approval from the RWQCB through enrollment pursuant to NCRWQB Order No.2015-0023 and/or preparation of a Water Resources Protection Plan.

Id.

393. *See* sources cited *supra* note 13.

394. There are, of course, instances in which water rights must be correlatively curtailed during unusually dry seasons, but it appears that no water regulation framework prohibits water rights holders growing certain crops from making use of their water resources on a seasonal basis.

395. *See, e.g.,* Charles Batchelor et al., *Do Water Saving Technologies Improve Environmental Flows*, 518 J. HYDROLOGY 140, 148 (2014) (arguing that water-saving methods may often have perverse results on water resources).

farmers find this rule unreasonable and infeasible, they may reject the ordinance and regulatory process as a whole.

Cognizant of its shortcomings and the hurried nature of its drafting, the authors of the Marijuana Ordinance included a flexibility provision that may reassure skeptical farmers that compliance is attainable. If, upon inspection, a marijuana farm does not comply with the requirements of the ordinance, a farmer may nonetheless be granted a provisional license, as well as a two-year window within which to cure the violation.³⁹⁶ The provision is not only generous with respect to the compliance grace period, but also may provide enough time for county officials and marijuana farming representatives to address problematic aspects of the ordinance and make amendments prior to enforcement of violations. It will take time for farmers to adjust to the dry season water use ban, if they adjust at all, but two years may be sufficient to devise wet-season storage infrastructure or develop an alternative water use plan with the county and state officials.

It is clear that marijuana ordinances are in their infancy. So far most local governments have only superficially addressed marijuana agriculture. Humboldt County, however, has capitalized on its economic and political ties with the marijuana farming community to develop a first-of-its-kind marijuana agriculture ordinance. It remains to be seen if the county's marijuana farmers buy into the regulatory framework, but initial signs are promising.³⁹⁷ As marijuana legalization and regulation moves forward, the Humboldt County Marijuana Ordinance may prove to be a model for local governments.

CONCLUSIONS

Many continue to ignore the agricultural element of the marijuana industry, but there are signs that the regulatory blind-spot is starting to change. Every year California celebrates Agriculture Day outside the state capitol, welcoming agriculture industry representatives to display exhibits and meet with state lawmakers.³⁹⁸ Agriculture Day 2016 had a new flavor, however, as the marijuana industry, including farmers and lobbyists, came out in force.³⁹⁹ And Humboldt County has not been the only county to consider comprehensive agricultural reforms that address

396. Ordinance 2544, § 55.4.11(a).

397. *But see* Will Houston, *Marijuana Group Poised to Sue County*, EUREKA TIMES-STANDARD (Feb. 25, 2016, 4:13 PM), <http://www.times-standard.com/article/NJ/20160225/NEWS/160229929>.

398. *AG Day 2016*, CAL. DEP'T FOOD & AGRIC. (Mar. 30, 2016), <https://goo.gl/96k0Go>.

399. Jeremy B. White, *California Ag Day Attracts Budding Marijuana Industry*, SACRAMENTO BEE (Mar. 15, 2016, 11:00 PM), <http://www.sacbee.com/news/politics-government/capitol-alert/article66264227.html>.

marijuana cultivation. Mendocino County has proposed a regulatory framework that would acknowledge, if not address, many of the marijuana agriculture issues identified in this study. Drafts for the proposal call for cultivation-area size limits to prevent large-scale farms from dominating the market, compliance with environmental regulations, a residency requirement to protect local farmers, and consideration of an organic certification program or appellation system.⁴⁰⁰ Meanwhile, the public has raised concerns about whether the county has the regulatory capacity to enforce the program, as well as whether marijuana farmers would actually participate.⁴⁰¹

These are themes and issues that local and state governments will face as they legalize marijuana cultivation. And while recognizing that the marijuana industry has an agricultural component is a step in the right direction, awareness is not enough. States and local governments will need to develop, monitor, and enforce regulatory systems that address the most pressing agricultural challenges the marijuana industry poses. Especially during times of transition, the stakes are high. States will need to find the Goldilocks regulation that is “just right” for the marijuana industry and local environments. Failing to regulate marijuana agriculture, or regulating too loosely, will have consequences: the industry may evolve into a form that does not serve the public interest or existing marijuana farmers; the environmental impacts of unregulated marijuana cultivation will likely become more pronounced; marijuana farmers will have few incentives to cultivate using the most responsible or sustainable agricultural practices. On the other hand, onerous regulatory approaches will not serve the public or the marijuana industry, either: existing marijuana farmers may be reluctant to participate in legal systems and may therefore perpetuate a black market for marijuana; existing farmers growing other crops may similarly be dissuaded from incorporating marijuana into their crop portfolios;⁴⁰² if states or local governments lack the capacity to enforce rigorous regulatory programs, the law will be a regulation in name only.⁴⁰³

For these reasons, it is appropriate that governments work with the marijuana industry and adopt an incremental or gradual approach that remains flexible enough to respond to regulatory successes and failures. As each state or locality presents a unique economic, environmental, and

400. Jane Fitcher, *Ad Hoc-ing Mendo's Pot Rules*, ANDERSON VALLEY ADVERTISER (Mar. 23, 2016), <http://theava.com/archives/54206>.

401. *Id.*

402. See, e.g., Ezra David Romero, *Could Marijuana Become California's Next Big Ag Crop?*, KQED NEWS (Feb. 16, 2016), <https://ww2.kqed.org/news/2016/02/16/could-marijuana-become-californias-next-big-ag-crop>.

403. See White, *supra* note 27 (“If they set up too rigorous of a program then they will not get buy-in, and if they don’t get buy-in nothing has changed . . .”).

political context, no single regulatory approach to marijuana agriculture will suffice for adoption across the board. However, it is likely that as governments experiment with marijuana agriculture regulations, certain aspects or principles will emerge.

It seems likely, for example, that states or local governments will create certification programs for organic or sustainably grown marijuana that encourages particular farming practices and adds value to certain types of marijuana products. Given widespread fears that the marijuana industry will turn into a commoditized, consolidated Big Ag business dominated by conglomerates, limits on cultivation area may become a common regulatory feature. It remains to be seen, however, if this will push the industry toward adopting the appellation model favored by the wine industry.

Environmental regulations present some uncertainties. While existing environmental regulations that address agricultural practices could be applied to the marijuana industry, in some circumstances those regulations may be excessive for purposes of marijuana cultivation, while in other circumstances lawmakers may prefer to use marijuana legalization as an opportunity to impose more robust environmental regulations. Humboldt County's dry-season water-withdrawal prohibition or renewable energy requirement are prime examples of regulations tailored to the marijuana industry that go beyond what would normally be expected for agricultural cultivation.

Finally, state and local governments will need to decide where to place regulatory authority for marijuana agriculture. This is a particularly muddled issue because the federal government, traditionally heavily involved in agricultural policy, is not a participant in the emerging practice of marijuana agriculture regulation. States may consolidate authority into one state agency, delegate responsibilities to several agencies, or empower local governments to impose their own regulatory frameworks. Each approach has trade-offs and implications for marijuana agriculture.

This diversity of regulatory options may create an element of confusion for states and the marijuana industry, and this Article has attempted to clear up that confusion by identifying the most problematic regulatory issues, as well as the approaches that are best suited to address them. And while the way forward may lack consensus, regulatory experimentation may eventually catalyze the adoption of legal frameworks that are responsive to the realities of the marijuana industry, institutional capacities, and the natural environment. Regulation of marijuana agriculture is in its infancy, and in these early days it is inevitable that some regulations will create more problems than they solve. But with infancy comes the potential for tremendous growth, and regulatory challenges may provide an important opportunity for states

and the marijuana industry to collaboratively shape the future of marijuana agriculture.