The Federal Seed Act, Plant Variety Protection, and the Politics of Seed Exchange in the United States

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Introduction

The diversity of edible plants that we know and enjoy today is a direct result of our ancestors saving, replanting, and sharing seeds within their communities over millennia. However, over the last century, food crop diversity has been declining at an alarming rate. The United Nations Food and Agriculture Organization estimates that at least 75 percent of food crop diversity has already been lost.[1] This has been attributed to a variety of interrelated trends, such as industrialized agricultural practices and the food system at large, urbanization, government policies, privatization of seed, and the breakdown of community seed exchange networks.

Varying initiatives have been established worldwide to protect the loss of food crop diversity. One type of response involves the (re)establishment of community seed exchange networks in which seed—particularly open-pollinated and heirloom varieties—can be freely utilized, shared, and circulated. Examples in the United States include Native American seed banks, seed libraries, and online seed exchange. Yet the political context of seed sharing in the United States has created numerous barriers, specifically The Federal Seed Act and the Plant Variety Protection Act, which limit both the physical and genetic movement of seed respectively. As such, community seed exchange networks tend to exist in a legal grey area and seed regulation can often be misconstrued by both law enforcement and the public. Within the last decade alternative legislation has been proposed to protect community seed exchange, but with mixed results.

The extensive loss of food crop diversity is a critical concern for our time. In their 2010 report, *State of the World's Plant Genetic Resources for Food and Agriculture*, the United Nations Food and Agriculture Organization (FAO) estimated that at least three-quarters of food crop diversity was lost in the 20th century.[2] Traditional food crops (also called heirloom, heritage, and/or open-pollinated varieties) contain a wealth of genetic diversity.[3] When traditional crops go extinct, so do our genetic options for the future development of heat, drought, insect, and disease-resistant crops, which will become increasingly important for the stability of the world's food systems in a rapidly changing climate. The United Nations has thus recognized crop genetic diversity as a "global public good," emphasizing the importance of traditional crop varieties to global food security.[4]

The loss of traditional food crops has been attributed to a host of interrelated trends, many of which relate to the industrialization of our food systems and coincide with Green Revolution policies.[5] Agricultural practices such as monocropping, centralized crop breeding, and investment in hybridization and genetically engineered (GE) crops have been endorsed around the world through U.S. government programs and legislation. This has resulted in a dangerous overreliance on a small number of crop species. Out of approximately 2,500 domesticated plant species in the world, only 150–200 species are utilized, with three-quarters of the world's food being generated from just twelve plant species. Furthermore, over half of global plant-sourced protein and calories come from just three plants: corn, rice, and wheat.[6] There is genetic uniformity within these species as well. For example, half of the wheat crop in the U.S. is planted in just nine varieties.[7] To provide some perspective, there are an estimated 30,000 wheat varieties.[8] Figure 1 from the U.S. Department of Agriculture shows GE corn, cotton, and soybean adoption rates in the U.S. between the years

Table 878. Adoption of Genetically Engineered Crops: 2000 to 2023

[As percent of all crops planted. As of June. Based on June Agricultural Survey conducted by National Agricultural Statistical Services (NASS). Excludes conventionally bred herbicide tolerant varieties. Insect resistant varieties include only those containing bacillus thuringiensis (Bt). The Bt varieties include those that contain more than one gene that can resist different types of insects. Stacked gene varieties include only those varieties containing biotechnology traits for both herbicide tolerance and insect resistance]

Genetically engineered crop	2000	2010	2015	2016	2017	2018	2019	2020	2021	2022	2023
Corn	**25**	**86**	**92**	**92**	**92**	**92**	**92**	**92**	**93**	**93**	**93**
Insect resistant	18	16	4	3	3	2	3	3	3	3	3
Herbicide tolerant	6	23	12	13	12	10	9	10	9	9	9
Stacked gene	1	47	77	76	77	80	80	79	81	81	82
Cotton	**61**	**93**	**94**	**93**	**96**	**94**	**98**	**96**	**97**	**95**	**97**
Insect resistant	15	15	5	4	5	3	3	5	3	3	3
Herbicide tolerant	26	20	10	9	11	9	6	8	6	6	8
Stacked gene	20	58	79	80	80	82	89	83	88	86	86
Soybean	**54**	**93**	**94**	**94**	**94**	**94**	**94**	**94**	**95**	**95**	**95**
Insect resistant	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
Herbicide tolerant	54	93	94	94	94	94	94	94	95	95	95
Stacked gene	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)

X Not applicable.

Source: U.S. Department of Agriculture, Economic Research Service, "Adoption of Genetically Engineered Crops in the U.S.," <www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-us.aspx>, accessed November 2023.

Figure 1. Adoption of GE corn, cotton, and soybean varieties in the US between 2000–2023. USDA—ERS, ProQuest Statistical Abstract of the U.S. 2024 Online Edition, Ed. ProQuest, 2023: ProQuest Statistical Abstract 05/24.

2000–2023. As the table illustrates, there was a drastic increase in all three, especially GE corn, which saw an increase of 272%.[9] Compounding this issue has been the growing trend by seed breeding companies to place intellectual property rights on plant germplasm, including a growing number of organic varieties, further limiting the public's ability to save and exchange seed.

A number of initiatives have been established over the past few decades to curb the loss of traditional crop varieties. One type of response focuses on the revitalization of community seed networks (CSN). CSNs promote the exchange of traditional, open-pollinated seed varieties between farmers, gardeners, and the public at large, typically through the promotion of no-cost, open access to seed. In doing so, CSNs seek to address the intersecting challenges of crop diversity loss and seed privatization. Examples in the U.S. include Native American seed banks, seed libraries, and online seed exchanges.

Native American Seed Banks

Native American seed banks are a type of community seed bank, broadly defined as a locally governed, informal seed saving and distribution institution.[10] Native American seed banks are part of an emerging movement in the U.S. to return traditional seeds to the indigenous communities that stewarded them for generations before being "lost" during colonialism. Therefore, seed exchange within these networks is generally reserved only for tribal members. Rowen White, a Mohawk seed keeper, explains the cultural significance behind saving seeds: "These foods and seeds figure prominently in our cosmology, our creation story and many of our cultural stories. Much of the importance of revitalizing our traditional foodways and bringing back these heritage varieties of seeds is that are a cornerstone to our cultural identity and our understanding of who we are."[11]

Seed Libraries

Seed libraries, as the name implies, are typically located within public libraries. They both store and "lend" seed to the public for free, with the idea that the seeds will be used for growing food, collected at the end of the growing season, and "returned" to the library, creating a local, cyclical seed network. The first seed library was established in 1999 in San Francisco, California. Since then, thousands of seed libraries have been established worldwide, with roughly 500–1,000 in the U.S. alone.[12]

Online Seed Exchange

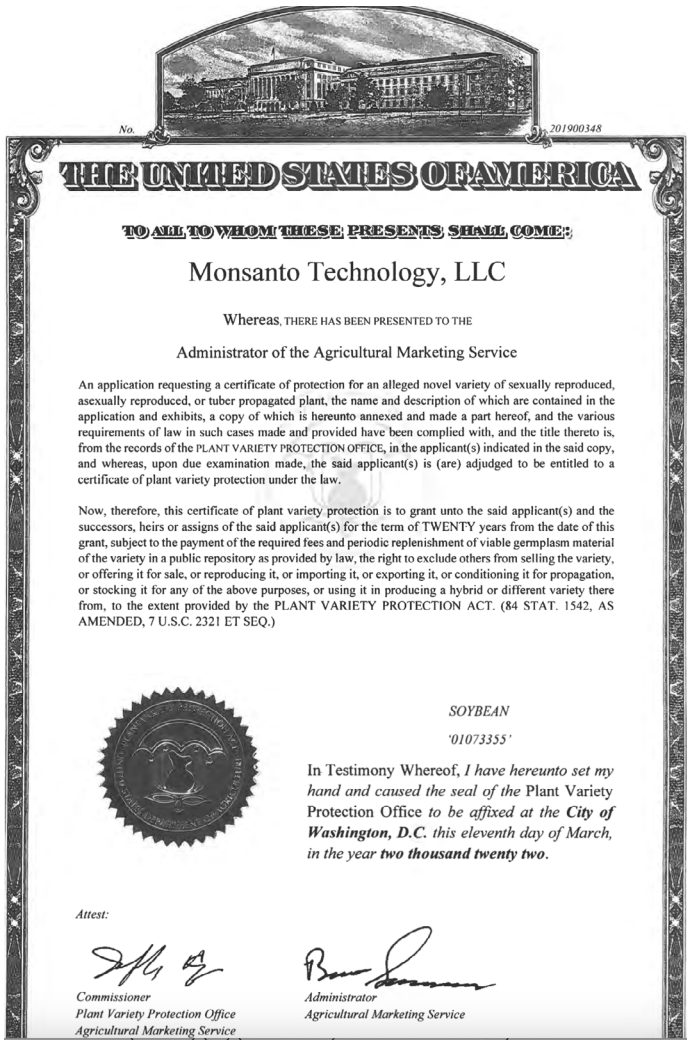
There are also online platforms that allow the public to exchange seeds across state and international borders. One of the largest organizations is Seed Savers Exchange (SSE). While commercial seed sales are a core feature of SSE, considerable effort is given to the open sharing of seeds through "The Exchange," a free, peer-to-peer seed exchange web-based platform.[13] Anyone can offer or request seeds through the platform, but only open-pollinated seeds are allowed to be listed; GE, hybrid, and patented varieties are strictly forbidden. Neither SSE nor the seed sharers collect fees for these transactions; however, all responsibility falls on seed requesters to know the seed importation laws of their state and/or country, of which there are many.

A Brief History of Seed Regulation in the United States

The Federal Seed Act

Over the past century, seeds have increasingly been placed within the domain of governmental regulation. The Federal Seed Act (FSA)[14] was enacted in 1939 to regulate interstate and foreign commerce in seed and was designed to protect farmers against defective and undesirable weed seeds. Known as a "truth-in-labeling-law," the FSA requires that seed meet certain quality standards and labeling requirements when moving across borders. The USDA Agricultural Marketing Service (AMS) oversees the FSA.[15] Their website summarizes the basics of how the FSA works, how it is enforced, and provides a direct link to the FSA in the *Code of Federal Regulations*.[16] It also outlines how the FSA is administered through state cooperative agreements via regulatory arrangements between State Departments of Agriculture and AMS. Because the FSA is carried out at the state level, seed laws can vary in both their language and coverage. Since these laws are generally geared toward commercial seed regulation, it can be difficult for the public to access and interpret this information. Many would not expect that the age-old act of sharing seeds would fall under federal and state regulation in the first place—and once made aware, there isn't always a clear path to accessing and interpreting the law for a CSN's purposes.

For example, in 2014, the Pennsylvania Department of Agriculture sent a notice to the Joseph T. Simpson Public Library that their seed library was violating the Pennsylvania Seed Act of 2004.[17] The library had contacted their county extension office before opening the seed library and was given the go-ahead. However, the Pennsylvania Department of Agriculture viewed the seed library through a different lens, stating that the library had to conduct stringent germination and purity analyses prior to distributing seed or they could threaten the local food supply through agriterrorism.[18] Seed libraries in Nebraska and Minnesota faced similar litigation in 2015. In the Pennsylvania case, the library had to modify its seed distribution policies or was at risk of closure. Ultimately, it decided to stop recirculating seed collected from the public and distribute only commercially packaged seed. While this may seem like a minor adjustment, it disrupted their overarching goals by obstructing their ability to be a community-based, self-sustaining entity, restricting the varieties of seed they can access and distribute (e.g., fewer local varieties), and creating a reliance on the private seed sector.



No. 201900348

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Monsanto Technology, LLC

Whereas, THERE HAS BEEN PRESENTED TO THE

Administrator of the Agricultural Marketing Service

An application requesting a certificate of protection for an alleged novel variety of sexually reproduced, asexually reproduced, or tuber propagated plant, the name and description of which are contained in the application and exhibits, a copy of which is hereunto annexed and made a part hereof, and the various requirements of law in such cases made and provided have been complied with, and the title thereto is, from the records of the PLANT VARIETY PROTECTION OFFICE, in the applicant(s) indicated in the said copy, and whereas, upon due examination made, the said applicant(s) is (are) adjudged to be entitled to a certificate of plant variety protection under the law.

Now, therefore, this certificate of plant variety protection is to grant unto the said applicant(s) and the successors, heirs or assigns of the said applicant(s) for the term of TWENTY years from the date of this grant, subject to the payment of the required fees and periodic replenishment of viable germplasm material of the variety in a public repository as provided by law, the right to exclude others from selling the variety, or offering it for sale, or reproducing it, or importing it, or exporting it, or conditioning it for propagation, or stocking it for any of the above purposes, or using it in producing a hybrid or different variety there from, to the extent provided by the PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'01073355'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the* ***City of Washington, D.C.*** *this eleventh day of March, in the year* ***two thousand twenty two.***

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Administrator
Agricultural Marketing Service

Figure 2. Example of a PVP certificate issued to Monsanto Technology providing 20 years of intellectual property rights protections for a soybean variety. 2022 US Plant Variety Protection Certificate, Soybean Variety '01073355' PV Number: 201900348, U.S. Department of Agriculture, Agricultural Marketing Service, Science & Technology Program, Plant Variety Protection Office, p. 1, https://apps.ams.usda.gov/CMS/AdobeImages/201900348.pdf.

The Plant Variety Protection Act

Regulation of plant genetics began with the Plant Patent Act of 1930,[19] which allowed breeders to patent asexually reproducing plants but omitted protections for seeds and tubers. Enacted in 1970, the Plant Variety Protection Act (PVPA)[20] extended legal protections for breeders of sexually reproducing plant varieties. Currently, the PVPA (as amended in 2018) provides intellectual property rights protections for up to 25 years on new, distinct, uniform, and stable plant varieties. Plant variety protection (PVP) rights are acquired via an online application accessed through the Electronic Plant Variety Protection System.[21] Unlike the Plant Patent Act, the PVPA is not associated with the US Patent and Trademark Office but is administered through a distinct Plant Variety Protection Office (PVPO) under AMS. Issued PVP certificates can be searched

by the public through the USDA Agricultural Research Service's Germplasm Resources Information Network (GRIN) Database,[22] which archives the applicant, seed variety, expiration date, and accession number. According to a search of the GRIN database, within the past five years, a total of 2,060 PVP certificates have been issued, with the majority granted to large seed breeding companies such as Monsanto (Bayer), Seminis (Bayer), and Pioneer Hi-Bred International (Corteva). Between 2022–2023, of the 129 PVP certificates that were issued, two-thirds were granted to Monsanto and Pioneer Hi-Bred International.

The PVPA has been contentious since the beginning. While it has been promoted as a lucrative incentive for breeders to create new varieties, it has also raised concerns over patenting living organisms, causing heirloom varieties and their associated genetic diversity to go extinct, and creating a cycle of farmer indebtedness to seed companies. The Senate Committee Report notes there was opposition to the original bill.[23] Furthermore, a House floor discussion from 1980 to amend the PVPA to lengthen the protection period and expand it to include more crop types includes a comment from supporter Rep. John Burton (D-CA) who admitted he had received "a lot of phone calls in opposition to this bill" including from scientists.[24] There is an opposing argument given by Rep. Shirley Chisholm (D-NY) who discussed the negative trends of "genetic uniformity, market concentration, environmental impact, and nutrition" and the implications on subsistence farmers since the PVPA had been passed ten years prior, stating, "I fear that we could be contributing to future food disasters in an increasingly hungry world."[25]

Since the PVPA was passed, seed companies have continued to accumulate intellectual property rights under the PVPO as well as through agribusiness consolidation. As of 2022, four firms—Bayer, Corteva, Sinochem, and BASF—control over 60 percent of global proprietary seed sales.[26] Consolidation has historically led to fewer seed choices, higher prices, and more restrictions on seed use and exchange. It has also impacted plant breeding by restricting the use of plant genetics to public researchers, farmers, and independent breeders.

Proposed Alternative Seed Legislation

Native American Seeds Protection Act

Indigenous farmer coalitions and non-governmental organizations around the world have expressed their concerns over these developments, specifically how the PVPA relates to the appropriation of traditional plants and indigenous knowledge, the undermining of food security through the erosion of agricultural biodiversity, and the loss of access and control over their genetic and biological heritages. Within the U.S., Native American tribes have established CSNs through tribal seed banks, often in conjunction with integrated tribal rematriation[27] projects such as the Indigenous Seed Keepers Network.[28] In 2019, Rep. Lujan (D-NM) and five cosponsors introduced the bipartisan Native American Seeds Protection Act (H.R. 3916)[29] to help safeguard Native American seeds by giving them similar legal protections afforded to PVP seeds. The proposed legislation sought to direct the Government Accountability Office to study the viability of Native American seeds and the programs and laws that could protect them, as well as investigate fraudulent marketing of seeds sold as "traditional" or "produced by Native Americans." However, the bill stagnated after being referred to the Committee on Indian Affairs in 2019.

Seed Exchange Democracy Act

Starting in 2015, activists began working with the Sustainable Economies Law Center, a community advocacy group based in Oakland, CA, to draft new state seed laws in California, Minnesota, Nebraska, and Illinois. In 2016, California signed the Seed Exchange Democracy Act, protecting noncommercial seed sharing activities from legal barriers imposed by the state seed law. More recently, Alaska, North Carolina, and Alabama have added exemptions to their state seed laws. Furthermore, the Association of American Seed Control Officials, an organization of seed professionals in the U.S. and Canada, excluded noncommercial seed sharing from their guidelines, known as the Recommended Uniform State Seed Law, which serves as a model law for states.[30] However, if a CSN is operating in a state that does not distinguish between commercial and noncommercial seed distribution, it exists in a legal grey area and could be operating under the threat of litigation and/or closure. There are also concerns that agribusiness will push back on CSNs as the movement continues to expand.

Conclusion

Seed exchange, particularly in the U.S., is not the widespread activity that it once was. Many of the issues previously mentioned, such as the promotion and proliferation of modern crop varieties, intellectual property restrictions, and concentration within the seed industry, have isolated farmers and gardeners all over the world from the practice of freely saving and circulating seed within their communities. Governmental regulation has only reinforced and codified these processes over the past century. Yet, the increase of CSNs within the last few decades suggests that there is a growing awareness and concern around seed sovereignty issues among members of the public. How will the public versus private nature of seed exchange in the U.S. be

reconciled vis-à-vis these novel seed exchange initiatives? CSNs are essentially attempting to reclaim and defend seed as a common or public good. Reclaiming seed as a common good entails creating spaces beyond the state and market where the production and circulation of seed are governed by the participants' own governing mechanisms.[31] As Graham Dutfield, a Professor of International Governance at Leeds University School of Law explains, it is the idea that "plants belong to the communities that breed and maintain them, and should only be protected, if at all, by collective user rights defined by these communities, not by property rights that are privately held."[32] However, as I have attempted to outline above, the realities of seed exchange can be quite complex, and stealthily navigating the political context of seed exchange will be a necessary task for the movement to progress successfully.

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