U.C.L.A. Law Review

"The Seed is the Law": Creating New Governance Frameworks for Indigenous Heirloom Seeds and Traditional Knowledge

Rebecca Tsosie & Michael Kotutwa Johnson

"We were told that the Seed is the Law: It is the Law of Life. It is the Law of Regeneration."
Oren Lyons (Faithkeeper for the Onondaga Nation)

ABSTRACT

The United Nations World Intellectual Property Organization (WIPO) held a diplomatic conference in May 2024 where participants adopted a historic new treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge. The treaty is intended to improve the patent system by preventing erroneous patents that are derived from genetic resources and associated knowledge belonging to Indigenous peoples or local communities. The treaty will require contracting parties to establish a new disclosure requirement for patent applicants whose inventions are based on genetic resources or associated traditional knowledge.

This Article focuses on the treaty's prospective effect on the protection of Indigenous heirloom seeds and traditional knowledge. Although the treaty is an important step forward, further policy changes will be needed to fully protect the rights of Indigenous peoples. In particular, Indigenous peoples possess human rights to their cultural heritage, both material and intangible, that may not be recognized under the current system of intellectual property law that governs innovations in agriculture and plant technology in an effort to enhance crop production and climate adaptation. In this Article, we examine current frameworks of international law and domestic U.S. law, and we also explore the different epistemologies represented by Western intellectual property law and Indigenous customary law. We argue for new governance frameworks that can better protect the cultural heritage values that are well-represented by Indigenous seed keepers in their current efforts for seed rematriation.

AUTHORS

Rebecca Tsosie, J.D., is a Regents Professor and Morris K. Udall Professor of Law at the University of Arizona, James E. Rogers College of Law; Michael Kotutwa Johnson, Ph.D., is an Assistant Professor in the School of Natural Resources and the Environment and also holds an appointment as a Specialist on Indigenous Resilience for Cooperative Extension.

TABLE OF CONTENTS


THE UNIVERSITY OF CALIFORNIA
UCLA
SCHOOL OF LAW

INTRODUCTION

The United Nations' World Intellectual Property Organization (WIPO) recently adopted a historic new treaty on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge[1] (hereinafter Treaty or WIPO Treaty). The Treaty will not enter force until three months after fifteen countries have ratified it. The Treaty was opened for signature on May 24, 2024, and thirty-one countries signed on, but it has not yet come into force.[2] As of May 23, 2025, the United States still has not signed on to the Treaty. The Treaty establishes new rules of governance for intellectual property rights derived from genetic resources and associated traditional knowledge. Contracting parties must add a new disclosure requirement for patent applicants whose inventions are based on genetic resources or associated traditional knowledge. This historic development represents the first time that WIPO's constituent members have been able to reach broad agreement on the need for such protections. WIPO's stated purpose is to lead "the development of a balanced and effective global intellectual property ecosystem to promote innovation and creativity for a better and more sustainable future."[3] Genetic resources and traditional knowledge are pivotal to that goal. Indigenous peoples' rights are directly affected by the Treaty, but they participated in the diplomatic conference as observers, and not as parties. Does the United States have an obligation to impose a disclosure requirement even though it has not signed onto the Treaty as a party? We argue that the United States has a moral and political obligation to do so. This Article examines how the Treaty can facilitate recognition of Indigenous peoples' rights to their genetic resources and associated traditional knowledge for the purposes of both U.S. law and international law.

The WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC) has been meeting in Geneva since 2001 to identify the interests of Indigenous peoples and local communities to their genetic resources, traditional knowledge, and traditional

1. *See* WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, May 24, 2024, GRATK/DC/7 [hereinafter WIPO Treaty]; *See* Press Release, WIPO, WIPO Member States Adopt Historic New Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, U.N. Press Release PR/2024/919 (May 24, 2024).
2. *See* WIPO, Diplomatic Conference to Conclude an International Legal Instrument Relating to Intellectual Property, Genetic Resources and Traditional Knowledge Associated with Genetic Resources, Memorandum by the Secretariat, GRATK/DC/10 (May 28, 2024).
3. *See About WIPO,* WIPO, https://www.wipo.int/about-wipo [https://perma.cc/9ST8-EH27].

cultural expressions[4] All of these categories are fundamental to the identities and cultures of Indigenous peoples and local communities. However, they are largely unprotected by the standard categories of Western intellectual property, such as the law of patent, trademark, copyright, and trade secret.[5] Prior to 2024, the 193 state parties to WIPO were unable to reach agreement on the relevant standards to protect genetic resources, traditional knowledge, and traditional cultural expressions.[6] The new Treaty covers a subset of issues that correlate to newer international policies governing biodiversity, plant varieties, and new technologies to enhance climate adaptation within the agricultural sector.[7] In these domains, corporations and governments seek to ensure that the existing patent structure remains enforceable, while acknowledging that Indigenous peoples and local communities may have equitable interests with respect to new patent applications based on their prior knowledge of the plant resource and its properties.

The new Treaty does not define the terms "Traditional Knowledge" or "Associated Traditional Knowledge," which means that different countries can use their own definitions. Traditional knowledge is an umbrella term, and the designation "Associated Traditional Knowledge" is used to designate specific knowledge about a distinctive resource, such as agricultural or medicinal knowledge. But there are multiple views on what should fit within each category, and the epistemic categories themselves are influenced by language and culture. The term "Genetic Resources" is defined in a way that is consistent with the Convention on Biological Diversity,[8] which is the primary international instrument using this term.

4. The WIPO General Assembly created the Intergovernmental Committee (IGC) in 2000 to explore the relationship between intellectual property and "genetic resources, traditional knowledge, and folklore." The term "folklore" was later changed to "traditional cultural expressions" to better reflect contemporary human rights norms surrounding cultural heritage. *See Intergovernmental Committee (IGC)*, WIPO, https://www.wipo.int/en/web/igc [https://perma.cc/R5EM-MZ9K].
5. *See* CHIDI OGUAMANAM, INTERNATIONAL LAW AND INDIGENOUS KNOWLEDGE: INTELLECTUAL PROPERTY, PLANT BIODIVERSITY, AND TRADITIONAL MEDICINE 59–60 (2006) (describing intellectual property protections as applying only to physical manifestations of ideas and for the purpose of generating commercial value or industrial applicability).
6. *See* Ruth L. Okediji, *Is the Public Domain Just?: Biblical Stewardship and Legal Protection for Traditional Knowledge Assets*, 45 COLUM. J.L. & ARTS 461, 478 (2022); Peter K. Yu, *WIPO Negotiations on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge* 1–2 (Tex. A & M Univ. Sch. of L., Legal Studies Research Paper Ser. No. 23–71, 2024).
7. *See infra* Part V and accompanying notes.
8. *See* WIPO Treaty, *supra* note 1, art. 2 (defining genetic resources (GRs) as genetic material of actual or potential value and specifying that it is intended to be consistent with the definitions in the Convention on Biological Diversity, which exclude human genetic resources).

Prior to the May 2024 WIPO diplomatic conference, the U.S. Patent and Trademark Office (USPTO) conducted consultations with federally recognized tribal governments and solicited written comments from tribal governments, other stakeholders, and the public at large.[9] These processes raised the question of whether Indigenous resources—including knowledge resources, genetic resources, and cultural resources—are protected by the federal government's trust responsibility to federally recognized tribal governments. The federal government is required to protect tribal trust assets, including tribal trust lands and associated water resources, forests, and fisheries.[10] Because tribal lands are important sources of biodiversity, tribal biodiversity (inclusive of genetic resources) arguably also constitutes a tribal trust asset.

We argue that the human rights of Indigenous peoples must be considered by U.S. policymakers, and we believe that this discussion is timely. An international treaty governing genetic resources and associated traditional knowledge is of extraordinary importance in an era in which the U.S. Supreme Court is narrowing the legal contours of the federal trust responsibility and questioning the scope of tribal treaty rights.[11] We will draw on the Supreme Court's recent case law to position the analysis of treaty rights and the federal trust responsibility in this Article.

While there are many types of genetic resources that might be examined, this Article focuses on one category—Indigenous heirloom seeds—to explore the implications of the new WIPO Treaty.

For many Native peoples, Indigenous heirloom seeds are the basis of life. They are treated with care, stewarded each year, and embody an ancestral legacy dating back to time immemorial. Heirloom seeds are a form of Indigenous cultural heritage because the seeds and knowledge are stewarded by a family or community over generations.[12] Dr. Melissa Nelson, a professor of Indigenous Sustainability at Arizona State University says:

9. *See* Formal Tribal Consultation on WIPO IGC Negotiations, 88 Fed. Reg. 73000 (Oct. 24, 2023) [hereinafter Formal Tribal Consultation]; *see also* WIPO IGC Negotiations on Genetic Resources and Associated Traditional Knowledge, 88 Fed. Reg. 73003 (Oct. 24, 2023) (requesting public comments on future IGC negotiations regarding genetic resources and associated traditional knowledge (ATK)) [hereinafter WIPO IGC Negotiations].

10. *See* United States v. Mitchell, 463 U.S. 206, 224–28 (1983) (describing the trust duty of the United States with respect to tribal lands and resources and explaining the various legal standards for enforceability in cases of breach).

11. *See* Arizona v. Navajo Nation, 599 U.S. 555 (2023).

12. *See* Lauren David, *Why Heirloom Seeds Matter*, FOODPRINT (Aug. 18, 2023), https://foodprint.org/blog/heirloom-seeds/ [https://perma.cc/JD8N-3UCT]. David describes heirloom seeds as having an intergenerational set of traits that makes the seed "true to type" in

> Heirloom seeds are deeply tied to cultural heritage [because the cultivars] produce seeds naturally that you can save and grow again for the next generation, and also share with friends and family . . . [Y]our ancestors relied on them, so you [want] to keep them going.[13]

Many Indigenous peoples associate a form of personhood with their seeds, often describing them as their "mother" or their "child[ren]."[14] The notion of "personhood" for seeds may seem perplexing to non-Native peoples, who routinely treat seeds as a commodity within the marketplace and also store them within institutional seed banks[15] The difference in worldviews is notable and forms the foundation for the normative question of how we ought to treat Indigenous heirloom seeds for purposes of Western law. Before engaging the normative question, however, it is important to explore how Indigenous peoples have treated their seeds for purposes of their own customary law. This was the starting place so many generations back, and so that is where this Article starts. There are 574 federally recognized Indian tribes in the United States, as well as many other Indigenous peoples and communities that currently lack federal recognition.[16] Each of these groups potentially has its own customary law regulating seeds and other traditional crops. This Article draws selectively on tribal customary law to highlight the distinctive values and knowledge frameworks that are applicable, but we acknowledge that a full account of tribal law would require further exploration.[17]

Part I of this Article describes the governance of Indigenous heirloom seeds under customary law as an aspect of Indigenous self-determination, as well as explains the historical intersections between Indigenous rights and environmental sustainability at the United Nations level. Part II discusses the structure of WIPO and the governance of intellectual property under international law, examining the key provisions of the new Treaty in terms of their

---

each successive generation. Typically, Indigenous peoples steward and preserve their seeds to ensure this quality.

13. *Id.*
14. *See* Dennis Wall & Virgil Masayesva, *People of the Corn: Teachings in Hopi Traditional Agriculture, Spirituality, and Sustainability*, 28 AM. INDIAN Q. (SPECIAL ISSUE) 435, 443 (2004).
15. *See* Marisa Agha, *Reviving Lost Relatives: Indigenous Farmers in the US Southwest Are Bringing Back Traditional Crop Varieties and Finding New Ways to Protect Them,* EARTH ISLAND JOURNAL (Winter 2025), https://www.earthisland.org/journal/index.php/magazine/entry/reviving-native-seeds-and-safeguarding-indigenous-knowledge [https://perma.cc/DPE2-BJ2J] (discussing the significance of seeds to Indigenous farmers and comparing the perspective of commercial plant breeders).
16. Angela R. Riley, *The Ascension of Indigenous Cultural Property Law*, 121 MICH. L. REV. 75 (2022).
17. *See id.* (discussing survey results analyzing tribal cultural preservation systems and tribal laws for all 574 federally recognized Indian tribes).

impact on Indigenous peoples. Part III discusses the implications of the Treaty for U.S. domestic law, highlighting the discussion of tribal treaty rights and the trust responsibility. Part IV concludes by examining the conceptual issues involved in formulating new structures of governance for Indigenous heirloom seeds, given the disparate knowledge systems. We identify the ways in which epistemic injustice is built into the existing intellectual property law framework, and we explore the possibility of reparative justice, as well as the potential of Indigenous data sovereignty frameworks to address existing deficiencies. Finally, in Part V, we explore the potential implications of emerging technologies on intellectual property rights and the governance of knowledge.

I. INDIGENOUS HEIRLOOM SEEDS AND INDIGENOUS SELF-DETERMINATION

Under contemporary principles of international human rights law, Indigenous peoples are recognized as having the right to self-determination—including self-governance over their members, resources, and territories.[18] Self-determination is an inherent right of Indigenous peoples, meaning that it has always existed, even though it was denied by European and settler-colonial nations for many generations.[19] For Indigenous peoples, the right to self-determination is closely tied to cultural survival.[20] Since the arrival of Europeans, Indigenous peoples have had their cultures marginalized as primitive and uncivilized, their material cultural heritage has been appropriated without their consent, and they have been subjected to forcible assimilation policies designed to acculturate them to Western language, religion, and cultural practices.[21] This historic context has interfered with the efforts of Indigenous leaders to receive recognition for the validity of their traditional knowledge, customary law, and cultural practices.[22] The current effort to define Indigenous peoples' interests in genetic resources and associated traditional knowledge is closely tied to the historic context and role of the United Nations in the governance of intellectual property and global trade.

18. *See* G.A. Res. 61/295, Declaration on the Rights of Indigenous Peoples, art. 3–4 (Sept. 13, 2007).
19. S. JAMES ANAYA, INDIGENOUS PEOPLES IN INTERNATIONAL LAW 97–115 (2nd ed. 2004) (describing the origin of the concept of self-determination and its application to Indigenous peoples).
20. *Id.* at 131–41.
21. *See generally* Rebecca Tsosie, *Reclaiming Native Stories: An Essay on Cultural Appropriation and Cultural Rights*, 34 ARIZ. ST. L.J. 299 (2002) (discussing the historical framework that undergirds modern instances of cultural appropriation from Native peoples).
22. *Id. See also* REBECCA TSOSIE, INTERNATIONAL TRADE IN INDIGENOUS CULTURAL HERITAGE: LEGAL AND POLICY ISSUES 221–45 (Christoph B. Graber et al. eds., 2012).

A. Indigenous Self-Determination and the United Nations Structure

In the modern era, self-determination has been the entry point for Indigenous peoples' resurgence as recognized holders of inherent rights within the United Nations system.[23]

Oren Lyons, an esteemed Onondaga Faithkeeper of the Haudenosaunee (Iroquois) Confederacy, has been a longstanding advocate of Indigenous self-determination within the United Nations framework. His advocacy has built upon a legacy of Iroquois leaders who asserted their nationhood within international systems, including the development of their own passport system. The "Six Nations" of the Iroquois Confederacy predated the United States government by centuries.[24] They held sacred covenants with each other under the "Great Law of Peace" that governed the Six Nations prior to the arrival of the Europeans.[25] After the Europeans arrived, the Six Nations continually asserted their right to self-determination upon their territories and under their laws, negotiating treaties with Great Britain and then the United States.[26] Today, the traditional territory of the Six Nations sits on top of the United States/Canada border, and the respective tribal governments of the Six Nations are now required to interface with Canadian provinces and U.S. states.[27]

On December 10, 1992, Oren Lyons addressed the delegates to the United Nations General Assembly as they met to usher in the "Year of Indigenous Peoples," which was 1993.[28] The Declaration the Rights of Indigenous Peoples did not exist until its adoption by the UN General Assembly in 2007, but there was a working group within the United Nations tasked with identifying a set of principles to clarify the rights of Indigenous peoples.[29] The UN officials also

23. *See* Kristen A. Carpenter & Angela R. Riley, *Indigenous Peoples and the Jurisgenerative Moment in Human Rights*, 102 CALIF. L. REV. 173, 188–92 (2014).
24. *See* TAIAIAKE ALFRED, PEACE, POWER, RIGHTEOUSNESS: AN INDIGENOUS MANIFESTO 157 n.124 (1999) (explaining the historical significance of the Six Nation's Confederacy and the Great Law of Peace that united these tribal nations, as well as the contemporary power of those traditional beliefs); ROBERT ODAWI PORTER, SOVEREIGNTY, COLONIALISM, AND THE INDIGENOUS NATIONS 713 (2005) (containing a series of essays on Indigenous sovereignty, with Chapter 3 of the volume devoted to the voices of the Haudenosaunee people); WILLIAM N. FENTON, THE GREAT LAW AND THE LONGHOUSE: A POLITICAL HISTORY OF THE IROQUOIS CONFEDERACY (1998) (describing the political history of the Iroquois Confederacy and the Great Law of Peace).
25. *See* FENTON, *supra* note 24, at 51.
26. *See id.*
27. *See id.*
28. *See* Oren Lyons, Speech to United Nations General Assembly (Dec. 10, 1992), *in* VOICE OF INDIGENOUS PEOPLES, 31–36 (Alexander Ewen ed., 1994).
29. *See* ANAYA, *supra* note 19, at 17–20.

requested research on the status of Indigenous human rights throughout the world, which culminated in a series of expert reports.[30]

Environmental issues were also of critical importance in 1993, and the United Nations was exploring the need to refine the concept of sustainable development to highlight the global need for environmental protection. In 1992, the United Nations held a Conference on Environment and Development in Rio de Janeiro, Brazil, which led to the Rio Declaration.[31] The Rio Declaration united global parties around twenty-seven central principles, including the need to conserve biological diversity, protect sustainable food production, and "equitably share" benefits arising from utilization of genetic resources.[32] Principle 22 of the Rio Declaration recognized that "Indigenous peoples and their communities, and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices," and counseled states to actively work with these communities to secure their participation in sustainable development.[33] These principles were also embedded in the Convention on Biological Diversity (CBD), which was opened for signature in 1992 and went into force in 1993.[34] Sustainable development was defined as an issue of social justice for developing countries, who argued that they should be able to develop their energy resources and enter global markets on a more equitable basis.[35]

This idea of common but differentiated responsibility became one of the pillars of global climate policy. The United Nations Framework Convention on Climate Change (UNFCCC)[36] came into force in 1994. By 1997, the Kyoto Protocol set emissions targets for industrialized nations in the Global North, while arguing for a more expansive definition of sustainable development to assist the

30. *See generally* ALEXANDRA XANTHAKI, INDIGENOUS RIGHTS AND UNITED NATIONS STANDARDS: SELF-DETERMINATION, CULTURE, AND LAND (2007) (describing this early procedural history and citing original documents as applicable).
31. *See* OGUAMANAM, *supra* note 5, at 79.
32. *See* U.N. Conference on Environment and Development, *Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I), annex I (Aug. 12, 1992).
33. OGUAMANAM, *supra* note 5, at 79–80 (emphasis omitted) (noting also that the provision on traditional knowledge accorded with Principle 21, which also resulted from the Rio Conference and articulated an international consensus on global environmental policy issues and sustainable development).
34. *See* Convention on Biological Diversity, *opened for signature* June 5, 1992, 1760 U.N.T.S. 79.
35. *See Intersections of Environmental Justice and Sustainable Development: Framing the Issues*, *in* THE CAMBRIDGE HANDBOOK OF SUSTAINABLE DEVELOPMENT 1, 3 (Sumudu A. Atapattu, Carmen G. Gonzales & Sara L. Seck eds., 2021).
36. United Nations Framework Convention for Climate Change, n.1, *opened for signature* June 4, 1992, S. Treaty Doc No. 102-38, 1771 U.N.T.S. 107, 165.

developing countries in the Global South.[37] Notably, although the United States is a party to the UNFCCC, it has steadfastly refused to sign onto any binding protocol[38] and it has not passed domestic legislation to curb greenhouse gas emissions, treating climate change as a global policy issue.

The place of Indigenous peoples within the politics of sustainable development and climate change was unclear at this time. The nation-states had the authority to sign onto the CBD and the UNFCCC as parties, but Indigenous peoples did not. They appeared in the negotiations as observers and their interests were largely represented by nongovernmental organizations (NGOs), such as the International Indian Treaty Council.[39] Ultimately, Indigenous peoples came together to create their own "Indigenous Caucus" for purposes of the annual U.N.-sponsored Conference of Parties for the CBD and also for the UNFCCC.[40] In that collective capacity, they argued against industrial exploitation of land and pollution of water, and they spoke about the failure of the state parties to adequately protect the integrity of Indigenous territories.[41]. Indigenous peoples from various continents and cultures united around shared ethical views favoring stewardship of land and resources.

Indigenous peoples' traditional knowledge often contains ethical norms about land use and is also an invaluable source of place-based, scientific knowledge about particular environments.[42] Many Indigenous peoples have lived on their territories for countless generations, and they have the best knowledge about the nature of the environment over time. Indigenous peoples across the globe have developed crops that are adapted to fit their environment.[43] This specialized knowledge is now becoming quite valuable in a time of climate change. Contemporary climate assessments and other scientific studies support the

37. *See* Kyoto Protocol to the United Nations Framework Convention on Climate Change, *opened for signature* Mar. 16, 1998, 2303 U.N.T.S. 162, 214.
38. *See* Rebecca Tsosie, *Climate Change, Sustainability, and Globalization: Charting the Future of Indigenous Environmental Self-Determination*, 4 ENV'T & ENERGY L. & POL'Y J. 188, 240–41 (2009).
39. *See* DINA GILIO-WHITAKER, AS LONG AS THE GRASS GROWS: THE INDIGENOUS FIGHT FOR ENVIRONMENTAL JUSTICE, FROM COLONIZATION TO STANDING ROCK 118–19 (2019) (describing the rise of Indigenous environmental activism, including the role of Indigenous women).
40. *International Indigenous Peoples' Forum on Climate Change*, INT'L INDIGENOUS PEOPLES' F. ON CLIMATE CHANGE, https://www.iipfcc.org [https://perma.cc/7FH7-WGMT] (noting that the group was established in 2008 as the Caucus for Indigenous Peoples' participation in UNFCCC Processes).
41. *See* GILIO-WHITAKER, *supra* note 39; *see also About the International Indigenous Peoples' Forum on Climate Change*, *supra* note 40.
42. *See* Rebecca Tsosie, *Indigenous Sustainability and Resilience to Climate Extremes: Traditional Knowledge and the Systems of Survival*, 51 CONN. L. REV. 1009 (2019).
43. *See* Agha, *supra* note 15.

relationship between Indigenous peoples and environmental sustainability. For example, one recent climate assessment documented that although Indigenous peoples comprise less than 5 percent of the global population and live on a small portion of the Earth's surface, those lands are also home to the majority percent of the world's biodiversity.[44]

In the United States, Indigenous peoples often lead the way on issues of environmental protection and conservation.[45] This was apparent from the national controversy in 2016 over the Dakota Access Pipeline, in which the Standing Rock Sioux Tribe attempted to block the construction of an oil pipeline under Lake Oahe, which was the Tribe's sole source of water.[46] This act of resistance sparked support from national and global constituents, igniting the #NoDAPL movement.[47] Indigenous peoples have collectively expressed concern over transboundary oil pipelines, such as the proposed United States/Canada Keystone XL Pipeline, which tend to disproportionately impact Indigenous lands and peoples, but are generally quite profitable for multinational oil companies. Private companies cannot be held liable for human rights violations.[48]. However,

44. *Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems,* IPCC (2019); *see* Latoya Abulu, Aimee Gabay & Sonam Lama Hyolmo, *Do Indigenous Peoples Really Conserve 80% of the World's Biodiversity?* MONGABAY (Sept. 26, 2024), https://news.mongabay.com/2024/09/do-indigenous-peoples-really-conserve-80-of-the-worlds-biodiversity [https://perma.cc/MG46-RKTU] (responding to a recent commentary in the scientific journal Nature where the authors argued that the "much cited claim that Indigenous peoples protect 80% of the world's diversity . . . is wrong," these three scholars questioned whether it is possible to quantify biodiversity and whether datasets even exist to qualify an empirical statement as "true" or "false").

45. Guilia C.S. Good Stefani, Indigenous Leaders at the Frontlines of Environmental Injustice and Solutions, NDRC (Oct. 11, 2021) https://www.nrdc.org/bio/giulia-cs-good-stefani/indigenous-leaders-frontlines-environmental-injustice-and-solutions [https://perma.cc/Y2FU-LZVT].

46. *See* Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs, 205 F. Supp. 3d 4 (D.D.C. 2016) (refusing to enjoin the construction of crude oil pipeline under Lake Oahe and adjacent to the Tribe's reservation on grounds that the Tribe had not shown likelihood of irreparable harm in its claims under the National Environmental Policy Act and the National Historic Preservation Act; the case has a complex subsequent history of appeals, most notably culminating in a 2021 opinion by the D.C. Circuit Court that affirmed the lower court judgment in part and reversed it in part). The social protests resulted in arrests and physical altercations that are now known as the "#NODAPL" and the "Water Protectors" movements.

47. *See* Talli Nauman, *Thousands Back Pipeline Resistance*, NATIVE SUN NEWS (Aug. 24, 2016), https://www.nativesunnews.today/articles/thousands-back-pipeline-resistance [https://perma.cc/DT74-GHY6].

48. *See generally* James W. Nickel, MAKING SENSE OF HUMAN RIGHTS 7–8 (2d ed. 2007) (describing international human rights as inherent rights that belong to all living persons but are expressed as normative precepts until a government chooses to implement them, for example, by signing onto international treaties and then incorporating the rights within the domestic law of the nation-state).

national governments have the duty to comply with human rights norms. But if they do not sign onto binding protocols, there is very little that can be done to protect human rights unless and until there is a tangible harm to natural resources—such as an oil spill—or a tort action for personal injury to individuals.[49] Although some activists and scholars have argued for recognition of the crime of ecocide,[50] it is still very difficult to gain recognition that the Earth and its component systems have a right to be free from harm. The prevailing Western legal concept of harm is processed as cognizable injuries to persons or their property.

Although there is a strong link between Indigenous peoples and environmental protection, some tribal governments continue to engage in oil and gas development, as well as other industrial and commercial uses of fossil fuels.[51] This is one of the paradoxical features of Indigenous self-determination because any normative constraints on Indigenous autonomy must come from within the group. Tribal governments are fully capable of leasing their lands for mineral development and this is a recognized component of their economic right to self-determination. External limitations on tribal decision making, whether imposed by the national government or others, are seen as antagonistic to Indigenous self-determination.[52] In some cases, tribal governments are limited by overriding principles of federal law, such as the Clean Air Act[53] or the Clean Water Act.[54] If they are not limited, they are understood to retain full autonomy.

That is not necessarily true within Indigenous customary law systems. Indigenous customary law often contains overriding moral principles that were set forth at a much earlier time, even at the moment of Creation, as the fundamental law or natural law that governs the people. In his 1992 remarks to U.N. diplomats, Oren Lyons recognized that Indigenous leaders, past and present, have been involved in the "quest for self-determination, justice, freedom, and peace in our

49. The Exxon Valdez oil spill is an example of this. In the United States, litigants can bring a cause of action for "natural resource damages," but cultural harms to Indigenous subsistence users were not held to be actionable. *See In re* Exxon Valdez, 1995 A.M.C. 1440 (D. Alaska 1994), *aff'd*, 104 F.3d 1196 (9th Cir. 1997).

50. On February 27, 2024, the European Parliament became the first international body to issue a directive on crimes against the environment ("ecocide"), enhancing the penalties for environmental crime across the twenty-seven member states of the EU. Mie Olsen, *EU Votes to Criminalize Ecocide*, COURTHOUSE NEWS SERVICE (Feb. 27, 2024), https://www.courthousenews.com/eu-votes-to-criminalize-ecocide/ [https://perma.cc/Y586-HATG].

51. *See* Tsosie, *supra* note 38, at 213–37 (discussing energy resources development on the Navajo Nation in the modern era, including coal, uranium, and oil and gas).)

52. *See id.* at 240–41 (explaining the external governance structures and internal tribal governance structures that affect mineral development and environmental protection in Indian country).

53. 42 U.S.C §§ 7401–7671q.

54. 33 U.S.C §§ 1251–1387.

homelands and our territories."[55] For the Haudenosaunee, this was a quest to return to the "Great Law of Peace" that governed the Six Nations prior to the arrival of the Europeans. The Great Law of Peace "instructed [the people] to create societies based upon the principles of peace, equity, justice, and the Power of 'Good Minds.'"[56] The relevant social values included "equal responsibilities for the men and the women."[57] Tribal leaders were instructed "to make every decision on behalf of the seventh generation to come, [and] to have compassion and love for those generations yet unborn."[58] People were told "to give thanks for all that sustains us."[59]

Most importantly on the issue of Indigenous heirloom seeds, Oren Lyons explained that:

> We were told that the seed is the Law. Indeed, it is the Law of Life. It is the Law of Regeneration. Within the seed is the mysterious and spiritual force of life and creation. Our mothers nurture and guard that seed, and we respect and love them for that, just as we love Ëtënöha, Mother Earth, for the same spiritual work and mystery.[60]

Oren Lyons tied this teaching to a prophecy that had been shared at a very early time in the history of the Haudenosaunee:

> We were told [that] there would come a time when the world would be covered with smoke . . . .
>
> We were told [that] there would come a time when we could not find clean water to wash ourselves, to cook our food, to make our medicines, or to drink . . . .
>
> We were told [that] there would come a time when tending our gardens we would pull up our plants and the vines would be empty. Our precious seed would begin to disappear.[61]

Oren Lyons said, "we are living in a time of prophesies, a time of definitions and decisions. We are the generation with the responsibility and option to choose the path of life with a future for our children—or the path that defies the laws of regeneration."[62]

55. Lyons, *supra* note 28, at 32.
56. *Id.* at 32–33.
57. *Id.* at 33.
58. *Id.*
59. *Id.*
60. *Id.*
61. Lyons, *supra* note 28, at 33–34.
62. *Id.* at 35.

By 1992, Oren Lyons identified various issues of concern, including nuclear and toxic waste dumps on tribal lands, treaty violations, incursions on religious freedom—particularly with respect to sacred sites—and appropriation of tribal intellectual property.[63] In 2025, these are still issues of concern, but the stakes are higher because we have continued down the road of harm. The most recent climate assessments tell us that species extinction is at an all-time high and the levels of greenhouse gas emissions continue to spiral out of control.[64] In his concluding remarks, Oren Lyons advised his audience to "join hands with the rest of creation," because "only as true partners can we survive."[65]

B. Indigenous Seed Keeping and Food Sovereignty

Throughout the United States and globally, Indigenous seed keepers are organizing within grassroots groups to protect Indigenous seeds.[66] This network of Indigenous seed keepers is part of an equally robust movement toward "Indigenous food sovereignty."[67] Indigenous food sovereignty advocates emphasize growing traditional crops to enhance Indigenous wellness and enable families and communities to create resilient and locally based food systems. Food sovereignty supports an ethic of Indigenous self-determination to overcome the problematic politics of food dependency,[68] wherein Indigenous families and communities rely on federal agencies to provide commodity foods. The legacy of commodity foods—such as white flour, sugar, and processed foods—is now blamed for the disproportionate rates of obesity, diabetes, and heart disease that

63. *Id.* at 34.
64. The Fourth and Fifth National Climate Assessments both contain troubling data on the impact of climate change on loss of biodiversity and also document the rates of species extinction. *See generally Fourth National Climate Assessment, Vol II, Impacts, Risks, and Adaptation in the United States* U.S. GLOBAL CHANGE RESEARCH PROGRAM (2018); *Fifth National Climate Assessment: Understanding Risks, Impacts, and Responses,* U.S. GLOBAL CHANGE RESEARCH PROGRAM (2023).
65. Lyons, *supra* note 28, at 36.
66. *See* ISKN USDA Seed Policy Recommendations Letter from Native American Food Sovereignty Alliance and Indigenous Seed Keepers Network, to Secretary Tom Vilsack, Secretary of Agriculture (Sept. 30, 2022) (stating that "the mission of the Indigenous Seed Keepers Network (ISKN) is to nourish and assist the growing Seed Sovereignty Movement across Turtle Island (North America)").
67. *See id.*; *see also* Mariaelena Huambachano, *Seeding a Movement: Indigenous Food Sovereignty*, 78 U MIA L. REV. 390, 406 n.107 (2024) (discussing the global context for Indigenous food sovereignty and citing the work of the Indigenous Seed Keepers Network in North America).
68. *See* Priscilla Settee, *Indigenous Food Sovereignty in Canada*, *in* TRADITIONAL ECOLOGICAL KNOWLEDGE: LEARNING FROM INDIGENOUS PRACS. FOR ENV'T SUSTAINABILITY 175 (Melissa K. Nelson & Dan Shilling eds., 2018).

many Native people suffer from.[69] This legacy also displaced many Indigenous food systems.[70]

The Indigenous food sovereignty movement endorses regenerative farming and other local forms of support for traditional food preparation, storage, and distribution practices. For example, Acoma Pueblo farmer Aaron Lowden, who "work[s] to restore traditional crops and farming practices" at Acoma Pueblo, also served "[a]s [a] program director for Ancestral Lands, a nonprofit that supports [Indigenous] land stewardship."[71] With access to a seed bank, Lowden reintroduced traditional crops—including Acoma blue corn, Acoma winter squash, and Hopi yellow beans—from "57 arid-adapted seeds native to the region."[72] Lowden says it is important to bring back the traditional seed diversity of the Pueblo Nations because the seeds are resilient in ways that Western monocrops are not. Journalist Samuel Gilbert states that "according to the United Nations, 75% of crop biodiversity has been lost over the past century" as farmers gave up their traditional crops in favor of high yield monoculture crops, which often do not adapt well to the new climate.[73]

Dr. Michael Kotutwa Johnson, a coauthor of this Article and a traditional Hopi farmer, speaks to the resilience of place-based traditional agriculture, including Hopi seeds that are adapted to the arid climate and practices such as dry-farming.[74] Dr. Johnson does not rely on the Western notion of "regenerative agriculture" to assess Indigenous farming practices. Western agricultural scientists define "regenerative agriculture" as a "holistic practice of managing an agricultural system to improve and preserve soil fertility."[75] Dr. Johnson believes that, for Native farmers, Indigenous value systems and cultural beliefs must be part of the definition. He defines "Indigenous regenerative agriculture" as "the process of incorporating Indigenous place-based ways of knowing and land use management schemes adapted for survival that are supported by culture, belief systems, and community, incorporated over a millennium."[76]

Dr. Johnson notes that Hopi farmers are following ancient instructions to be stewards of their Hopi land (*Tutsqua)* when they engage in the cycles of farming

69. *See id.* at 176–77.
70. *See id.* at 176.
71. Samuel Gilbert, *Blue Corn and Melons: Meet the Seed Keepers Reviving Ancient, Resilient Crops*, THE GUARDIAN (Apr. 18, 2022), https://www.theguardian.com/environment/2022/apr/18/seed-keeper-indigenous-farming-acoma [https://perma.cc/T2B3-2H2A].
72. *Id.*
73. *Id.*
74. *See, e.g.*, Michael Kotutwa Johnson, *Planting by Faith: A Hopi Farmer's Perspective*, 73 CROSSCURRENTS 391 (2023).
75. *Id.* at 393.
76. *Id.*

and growing that combine specific seeds and longstanding practices designed to capture moisture in the soil.[77] For the Hopi, there is a rich cultural fabric of ceremonial cycles and practices that also joins the people with their land and crops. Dr. Johnson observes that the agricultural system is "place-based" and "there is no separation between our spiritual system and our agricultural system. They are interdependent and rely on each other."[78]

The goal of Indigenous regenerative agriculture is to restore Indigenous food systems using the traditional "ecological knowledge" that Indigenous farmers have used since time immemorial.[79] Both Lowden and Johnson see farming as the basis of tribal culture and its survival over time. Within this world, the seeds and the knowledge go together. They are not separated into "genetic resources" and "associated traditional knowledge."

Dr. Michael Kotutwa Johnson explains that his grandfather taught him that seeds are the spiritual essence of who the Hopi are as a people, which includes relational concepts, as well as values of humility, patience, and endurance.[80]

Corn is also considered vital to the health of the people. Santa Clara Pueblo seed keeper and sculptor Roxanne Swentzell describes the connection between culture, health, and traditional foods. Swentzell notes that "Native food systems have been disrupted since the arrival of European peoples," and today, much of Indian country in the American Southwest is in a food desert because tribal members living on the reservation must often travel an hour or more to access a grocery store with fresh produce.[81] Swentzell states that amaranth was a traditional crop until the Spanish arrived in what is now Northern New Mexico, banning the

77. *Id.* at 392–93.
78. *Id.* at 391–92.
79. *See* Agha, *supra* note 15.
80. Dr. Johnson's views are cited in several recent news articles, including Agha, *supra* note 15. *See also* Matt Jaffe, *Michael Kotutwa Johnson*, ARIZONA HIGHWAYS, Feb. 2025, at 10–11; *What 800-Year-Old Seeds and a Hopi Dryland Farmer Teach Us About Adaptation & Hope*, UNIV. OF ARIZONA NATIVE AM. ADVANCEMENT, INITIATIVES & RSCH. (October 24, 2024), https://naair.arizona.edu/news/what-800-year-old-seeds-hopi-dryland-farmer-teach-us-about-adaptation-hope [https://perma.cc/Y3AJ-GTPF]. Hopi cultural views about corn have also been described in academic literature. *See, e.g.*, Mary E. Black, *Maidens and Mothers: An Analysis of Hopi Corn Metaphors*, 23 ETHNOLOGY 279 (1984) (recounting the author's conversations with Dr. Emory Sekaquaptewa, a distinguished Hopi scholar who was also a member the University of Arizona faculty). This longstanding set of relationships is also documented in Walter Hough, *The Hopi in Relation to their Plant Environment*, 10 AM. ANTHROPOLOGIST 33, 35 (1897) ("If the Sun is the father of the Hopi, then corn is their mother.").
81. ROXANNE SWENTZELL & PATRICIA M. PEREA, THE PUEBLO FOOD EXPERIENCE COOKBOOK: WHOLE FOOD OF OUR ANCESTORS (2024) (recounting the history of Anglo-American displacement of traditional Indigenous diets and including essays by the participants in the Pueblo Food Experience, designed to reclaim health through ancestral foods and practices).

crop and forcing Indigenous farmers to grow wheat.[82] Now, most Pueblos do not have a memory of amaranth.

Pueblo farmers continue to have a close relationship to corn, but Lowden says that Acoma Pueblo, like other communities, saw a need to bring the farming practices back. He states that, as of 2011, only about fifteen traditional Acoma farmers were planting, most of whom were older than forty.[83] The community drew on the Ancestral Lands Farm Corporation to teach Acoma youth "traditional farming methods, seed selection and saving, and food preparation."[84] Since 2020, there are now more than sixty-five traditional farmers at Acoma Pueblo.[85]

The process of restoring traditional Indigenous farming practices may require contemporary community members to access traditional heirloom seeds that were taken from their communities during earlier eras and placed within institutional seed banks. Today, the concept of seed "rematriation" is powerful for proponents of Indigenous food sovereignty. The terminology is intentional, recognizing the role of Indigenous women in seed keeping among many Native peoples, and rejecting the notion of "repatriation" that dominates discussions of rights to cultural property.[86] Proponents of rematriation claim that when "a seed is rematriated, it enters into a reciprocal relationship with that community."[87]

Lowden describes the process of rematriating blue corn to Acoma farmers as a similar feeling to a "relative coming home."[88] He relates his uncle's instruction that "those [seeds] are your children. Once you put them in the ground, you created that life, so you got to take responsibility."[89]

The Indigenous Seed Keepers Network describes this view holistically, stating that:

> Many Tribal Nations believe seeds are relatives and view seeds as kin representing a life source. Seeds are relatives with whom our Tribal Nations have established symbiotic and mutualistic relationships; we cannot live without them, and they need our guiding hands and knowledge to exist. Countless Tribal origin and migration stories are intricately woven with seeds, including instructions on stewardship.[90]

82. *See* Gilbert, *supra* note 71.
83. *See id.*
84. *Id.*
85. *See id.*
86. *See* NATIVE AM. FOOD SOVEREIGNTY ALL., IMPACT REPORT 2022, 17 (2023) (noting that "the Seed Rematriation movement is led by Indigenous women, who in many Tribal Nations traditionally act as the caretakers of seeds").
87. ISKN USDA Seed Policy Recommendations Letter, *supra* note 67, at 3.
88. Gilbert, *supra* note 71.
89. *Id.*
90. ISKN USDA Seed Policy Recommendations Letter, *supra* note 67, at 2.

The Hopi Tribal Cultural Preservation Office participated in a research partnership with the Crow Canyon Archaeological Center to undertake a genetic study on several varieties of Hopi Corn, which aligned with tribal narratives of clan migrations.[91] Michael Kotutwa Johnson speaks to the continuing significance of Hopi corn varieties for contemporary Hopi farmers and communities:

> As Hopi we do not regard plants and the products we produce as mere commodities; they are like our children and thus nurtured throughout their life cycle. There is no economic return on the investment of Hopi agriculture; the only returns are our survival . . . .[92]

The Hopi people have a well-documented oral history of their relationship with seeds.[93] Hopi stories and ceremonies support that relationship, and Hopi seeds are inseparably linked to aspects of Hopi cultural identity. This cultural knowledge encompasses an intergenerational set of practices that have enabled the Hopi to farm for millennia in an arid environment that averages 6–10 inches of rainfall per year, with a system of 'dry-farming' that does not rely upon irrigation systems.[94] Michael Johnson describes aspects of this traditional practice, including technologies that assist in deep planting and managing wind, pests, snow pack, and rainfall. He also says that, at Hopi, the corn has been adapted "to fit the environment" over many generations, and traditionally there were at least fifteen different types of Hopi corn.[95] The diversity of seeds assisted Hopi farmers in managing the changing environmental cycles that have occurred over many generations.

The Southwest United States is currently in the midst of a twenty-year drought that is described by climate scientists as the region's most severe drought in 1,200 years.[96] The drought is apparent in the diminishing flows of the Colorado River. This water shortage jeopardized the energy infrastructure of the Glen

91. *See* Mark D. Varien, Shirley Powell & Leigh J. Kuwanwisiwma, *The Genetic Diversity of Hopi Corn*, *in* FOOTPRINTS OF HOPI HISTORY: HOPIHINIWTIPUT KUKVENI'AT (Leigh J. Kuwanwisiwma, T.J. Ferguson & Chip Colwell eds., 2018).
92. Kotutwa Johnson, *supra* note 74, at 392.
93. *See generally* Gregson Schachner, Joel Nicholas, R.J. Sinensky & R. Kyle Bocinsky, *The Sustainability of Hopi Agriculture*, *in* BECOMING HOPI: A HISTORY (Wesley Bernardini, Stewart B. Koyiyumptewa, Gregson Schachner, & Leigh J. Kuwanwisiwma eds., 2021) (referencing the Hopi cultural connection to short blue corn and analyzing farming practices).
94. Kotutwa Johnson, *supra* note 74, at 392.
95. *Id.*
96. Shannon Mullane, *Western States To Release Competing Colorado River Proposals After Tense Negotiations Stalled*, COLO. SUN (Mar. 6, 2024), https://coloradosun.com/2024/03/06/colorado-water-experts-colorado-river-future-state-negotiations [https://perma.cc/D5WV-WZHE].

Canyon dam, as well as the water supply of the seven western states and thirty tribal governments that hold rights to the river.[97] The Hopi People have no intention of leaving their ancestral villages on the high desert mesas of Northern Arizona. They continue to farm in place as they have for over 250 generations, and their knowledge is a vital repository of resilience and survival in a highly arid climate.

C. Are Indigenous Seeds "Relatives" or "Resources"?

To Indigenous peoples, seeds are relatives who have been critical to the physical and cultural survival of the people. The Indigenous Seed Keepers Network states that "[w]hile Indigenous communities have diverse and different ways of referring to seeds—as relatives, ancestors, kin, or otherwise—the belief that these seeds are alive and intimately linked with their own lives is a common cultural thread, which is fundamentally opposed to how Western culture views seeds."[98] For many tribes, seeds are understood to have a form of personhood and require duties of care and stewardship.[99] Today, however, Indigenous heirloom seeds exist not only in the fields of Indigenous farmers, but also in the collections of natural history museums and biobanks, as well as in archaeological contexts. Indigenous seeds, and potentially the genetic sequence information that can be derived from them, have tremendous value to external entities because of their genetic diversity and adaptive features. They are valuable to farmers seeking to develop new varieties of crops that can withstand climate change. For example, the Anasazi bean is currently being grown by non-Indigenous farmers in Colorado who found the original seeds in an archaeological site comprising the material culture of the ancestral Puebloan People of the region; these farmers later obtained a trademark for the Anasazi bean in 1989.[100] To Western peoples, seeds are resources that carry economic value. Heirloom seeds may possess unique characteristics derived through centuries of adaptive practice within challenging environments. This makes them valuable to corporations who are developing

97. *See id.*

98. ISKN USDA Seed Policy Recommendations Letter, *supra* note 67, at 2. Elena Valeriote, *The Importance of Restoring Ancestral Seeds to Indigenous Communities,* PBS SOCAL (June 16, 2021), https://www.pbssocal.org/shows/the-migrant-kitchen/seed-rematriation [https://perma.cc/G246-22K8].

99. *See* Wall & Masayesva, *supra* note 14, at 436–37 (noting that Indigenous cultures associate seeds with a form of personhood).

100. *See* Kelly Bastone, *Why Are Colorado Beans So Delicious?*, 5280 (Dec. 2021), https://www.5280.com/why-are-colorado-beans-so-delicious [https://perma.cc/5YJS-9XHK] (detailing the story of the Dove Creek farming community in Colorado that produces the Anasazi bean). Thanks to University of Arizona Associate Professor of Anthropology Matthew Rowe for calling this case to our attention.

commercial genetically modified seeds that have the ability to withstand climate change. We should ask: Is this process defensible or does it violate deeper norms of cultural survival located within Indigenous communities? Is there a legal or moral basis for the claim that Indigenous seeds in the hands of third parties should be rematriated to their communities of origin?

The clash in practice and in knowledge systems has never been more apparent, and it is directly implicated by the WIPO Treaty. Part II of this Article analyzes the Treaty on "Genetic Resources and Associated Traditional Knowledge," exploring the many issues at stake and making recommendations designed to ensure that Indigenous peoples' human rights are respected.

II. INDIGENOUS PEOPLES AND THE WIPO TREATY: GOVERNANCE OF "INTELLECTUAL PROPERTY"

The WIPO Treaty presents an interesting problem for the governance of Indigenous seeds because it must operate at both the domestic and global levels. Indigenous peoples are considered to be citizens of the nation-states that now control their territories and are therefore subject to the respective laws of those governments.[101] Within the United States, federally recognized tribal governments and their members enjoy *sui generis* rights under federal law due to the unique political relationship that exists between the United States and Native nations.[102] In some cases, this political relationship is documented in treaties between the United States and the Native nations,[103] so these treaties are another potential source of rights.

To date, the federal laws protecting Indigenous cultural heritage have focused on material cultural items, including ancestral human remains, funerary objects, objects of cultural patrimony, and sacred objects.[104] There is no federal

101. *See generally* Rebecca Tsosie, *The Politics of Inclusion: Indigenous Peoples and U.S. Citizenship,* 63 UCLA L. REV. 1692 (2016) (discussing the five different frames of "citizenship" that have impacted the inclusion of Native Americans into the United States).

102. *See id.* at 1726 (discussing the political relationship between the United States and Native nations and how this impacts the construction of their legal rights).

103. *See generally* FRANCIS P. PRUCHA, DOCUMENTS OF UNITED STATES INDIAN POLICY (Univ. Neb. Press. 2d ed. 1990) (noting that treaties were the predominant mode of political accord between the United States and Native nations during the first ninety-five years of the United States' existence); *see also* Indian Appropriation Act of March 3, 1871, 16 Stat. 544, 566 (codified at 25 U.S.C. § 71) (ending treaty-making with Native nations through a rider to the annual Indian Appropriations Bill but not invalidating any existing Indian treaties).

104. *See* Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001–3013 (1990); *see also* Archaeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa–470mm (1979); Safeguard Tribal Objects of Patrimony Act of 2021, 25 U.S.C. §§ 3071–3079.

statute that secures the rights of tribal governments to their intangible cultural heritage, such as tribal traditional knowledge, songs, or ceremonies. In 2019, U.S. Senator Heinrich introduced the Native American Seeds Protection Act, which would have initiated a study on the protection of Native American seeds and traditional foods, while specifically protecting the confidentiality of sensitive information procured as part of the study.[105] This bill never passed, but we will come back to its provisions in Part III of this Article when we examine the construction of federal duties to safeguard tribal cultural heritage.

Intellectual property law generally confers rights upon individuals and corporations but not collective cultural groups. Today, individual Native Americans enjoy all the rights afforded to American citizens, including the right to apply for a patent, trademark, or copyright under the applicable standards of U.S. intellectual property law. In some instances, tribal governments can use domestic intellectual property law to protect their collective rights, for example by securing a trademark in their name or by enforcing their rights under the Indian Arts and Crafts Act to protect the integrity of the market for authentic Indian art.[106] Outside of those limited examples, there is no broader legal right to protect intangible cultural heritage belonging to Native nations as a whole.

At the global level, Indigenous peoples are understood to have a unique set of human rights, such as the right to self-determination described within the various provisions of the United Nations Declaration on the Rights of Indigenous Peoples.[107] The declaration secures the collective human rights of Indigenous peoples, as well as the right of tribal members to have equal access to the rights of citizenship within the nation-state where their tribe's lands are situated. The declaration's provisions operate as a prescriptive set of norms to guide the domestic government in its interactions with the Indigenous peoples located within the national borders of the nation-state.[108]

As this Article demonstrates, the declaration has several provisions that secure the rights of Indigenous peoples to their cultural heritage, both material and intangible.[109] This means that the rights of Indigenous peoples to their traditional knowledge, genetic resources, and seeds must be understood within both international and domestic law contexts.

105. *See* Native American Seeds Protection Act of 2019, S. 2241, 116th Cong. (2019).
106. *See* Indian Arts and Crafts Act of 1990, 25 U.S.C. § 305.
107. G.A. Res. 61/295, annex, Declaration on the Rights of Indigenous Peoples (Sept. 13, 2007).
108. *See id.*
109. *See, e.g.*, G.A. Res. 61/295, *supra* note 107, art. 31(right to cultural heritage); art. 11 (right to practice cultural traditions); art. 13 (right to revitalize and transmit culture); art. 24 (right to traditional medicines and health practices).

In the following Subpart, we analyze the WIPO Treaty, as well as other international treaties and agreements covering intellectual property rights and rights to seeds and genetic resources. Although the United States has not signed onto the treaty as a party, we indicate what U.S. policymakers should understand about the treaty and its interface with other relevant instruments of international law.

A. WIPO and the USPTO: The Intersection of Global and National Intellectual Property Regimes and Governance Structures

The United States Patent and Trademark Office (USPTO) took the lead in the WIPO IGC negotiations, pursuant to authority delegated to the USPTO by the U.S. State Department.[110] If the United States signs onto the treaty as a party, U.S. Congress must implement the treaty through domestic law. This would require amendments to the Patent Act[111] and perhaps additional domestic legislation recognizing a *sui generis* set of tribal rights, similar to the model within Native American Graves Protection and Repatriation Act (NAGPRA). Prior to the WIPO Diplomatic Conference, the USPTO engaged in a consultation with federally recognized tribal governments about the topics within the treaty, as required by U.S. law.[112] The USPTO also broadly solicited comments from stakeholders and the general public about the potential impact of the WIPO Treaty on the patent process.[113] The notice and comment process used by federal agencies to gauge public opinion is separate from the consultation process with tribal governments. In this case, however, the USPTO attempted to assess the interests of each group, and the information received is likely to influence the federal government's future decisions. Based on the comments that were posted in the public process, many organizations and corporations associated with the American public have perspectives that are radically different from those of tribal

110. WIPO IGC Negotiations, *supra* note 9, at 73004.
111. 35 U.S.C. §§ 1–376.
112. *See* Exec. Order No. 13175, 65 Fed. Reg. 67249 (2000); *Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships*, WHITE HOUSE (Jan. 26, 2021), https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/26/memorandum-on-tribal-consultation-and-strengthening-nation-to-nation-relationships [https://perma.cc/TG2A-8DR7]. The consultation process is used by any federal agency making decisions that would have a policy impact on U.S. federally recognized tribal governments, and only those governments are included in the process.
113. *See* WIPO IGC Negotiations, *supra* note 9.

governments.[114] Given this ongoing disparity, we must ask: How will the USPTO and Congress respond?

It is important for U.S. representatives to understand that the WIPO Treaty purports to address a longstanding injustice within the domestic and international legal systems. Indigenous peoples and local communities have long accused Western nations and multinational corporations of "biopiracy," an act of appropriating Indigenous peoples' use of plants to identify active therapeutic compounds.[115] Once a company isolates the compound, it can bioengineer a drug or therapeutic process that is patentable, allowing companies to reap significant financial gains.[116] In his 2006 book, *International Law and Indigenous Knowledge*, Professor Oguamanam documented that pharmaceutical companies that used traditional medicinal knowledge in association with the use of 1000 plant samples were three and a half times more likely to develop at least one marketable drug.[117] He also observed that "using traditional knowledge, the efficacy of screening plants for medicinal properties increased by more than 400 percent."[118] Clearly, biopiracy is profitable. Under existing principles of intellectual property law, there is no way for Indigenous peoples to obtain a patent on wild plants in nature, nor is their traditional and longstanding knowledge about plants and their properties considered protectable under patent law, which focuses on *new* discoveries and inventions.

Until recently, Indigenous knowledge about plant medicines was generally considered to be a type of folklore rather than an innovative scientific process meriting protection. The WIPO Treaty responds to this gap in protection by defining "genetic resources" in relation to "associated traditional knowledge" and by developing protocols to assess whether Indigenous knowledge or genetic resources were the source of the invention.[119] Parties to the WIPO Treaty must require patent applicants to disclose the source of genetic resources and associated

114. *See* Comments on WIPO IGC Negotiations on Genetic Resources and Associated Traditional Knowledge (Jan. 22, 2024), https://www.regulations.gov/document/PTO-C-2023-0019-0001/comment [https://perma.cc/TC6T-V9LL] (rejecting the call for additional disclosure requirements, citing costs and harms to research and development).

115. *See* OGUAMANAM,, *supra* note 5, at 176–79.

116. *See* Cleo-Symone Scott, *Biopiracy: Using New Laws and Databases to Protect Indigenous Communities*, 30 RICH. J.L. & TECH. 434 (2024) (providing examples of biopiracy and an explanation of the gaps in legal protection for Indigenous communities).

117. *See* OGUAMANAM,, *supra* note 5, at 5.

118. *Id.*

119. *See* WIPO Treaty, *supra* note 1, art. 2 (defining "genetic resources" and the requirement that genetic resources and/or traditional knowledge associated with the resources were "necessary for the claimed invention"); WIPO IGC Negotiations, *supra* note 9, at 73004–05 (giving examples of potential content that must be disclosed as well as "triggers" for disclosure).

traditional knowledge. It is possible that the disclosure process will be enhanced by the development of informational databases from which to determine the state of the "prior art."[120] Some countries, such as India have developed a similar process under their domestic patent law.[121] The United States has long opposed additional legal requirements on patent applications and tends to favor a "soft law" (prescriptive) regime to recognize the equitable or moral interests of Indigenous and local communities.[122]

U.S. representatives should also acknowledge the contemporary intersections between international trade and intellectual property law. Historically, each regime was separate, as indicated by the separate governance structures of the World Trade Organization (WTO) and the World Intellectual Property Organization (WIPO).[123] That changed in 1995, when the WTO's Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS)[124] came into effect. The TRIPS agreement sets forth minimum standards for the protection of several categories of intellectual property rights, and all member states must adhere to these standards as they recognize and protect intellectual property rights.[125] Member states may enact more protective regimes, but they may not undercut the TRIPS standards. Notably, the United States, Japan, and European countries drove the development of TRIPS, ensuring that Western

120. *See* Scott, *supra* note 116, at 446 n.75 (discussing the patent requirement that the invention must be "new" and "non-obvious" and noting that a patent will not be granted if there is "prior art," which is evidence that the invention is already known"). *See also* WIPO Treaty, *supra* note 1, art. 7.1 n.4 (suggesting that "Contracting Parties" create databases or other information systems of genetic resources and associated traditional knowledge in consultation with Indigenous peoples). *See also* OGUAMANAM,, *supra* note 5, at 151 (noting that the 2000 WIPO Forum resolved to create a "Traditional Knowledge Digital Library").

121. *See* OGUAMANAM, *supra* note 5, at 151 (discussing India's approach).

122. *See* Scott, *supra* note 116, at 450–52 (discussing the Convention on Biological Diversity in relation to biopiracy and noting that patents have been granted even where there is clear evidence that the "invention" was derived from Indigenous plants and medicinal knowledge, and also noting that the United States refused to ratify the CBD because it disagreed with the Convention's approach to intellectual property and benefit-sharing, and also the requirements for domestic conservation). Without legal barriers to biopiracy, there is only a "moral" issue. *See* Okediji, *supra* note 6, at 468–71 (discussing the "moral problem of traditional knowledge).

123. The World Trade Organization oversees the rules for international trade and mediates trade disputes between its member states. As of 2024, 164 of the world's 195 nations are members of the WTO. *The WTO,* WTO, https://www.wto.org/english/thewto_e/the wto_e.htm [https://perma.cc/MRP6-724P]. WIPO provides global services to protect intellectual property across borders and to resolve disputes; WIPO provides its own process for patent registration, enabling the patent to be enforced in member countries. As of 2024, WIPO has 193 member states.

124. Agreement on Trade-Related Aspects of Intellectual Property Rights, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299.

125. *See* OGUAMANAM, *supra* note 5, at 7–8.

intellectual property categories and standards would dominate the international space, including the conditions for patentability.[126] The globalization of the Western intellectual property law regime prioritizes the economic interests at the heart of a property system, diminishing the authority of other countries to dissent from Western norms in this area.[127] This agreement enhances the ability of corporations to protect useful innovations within international trade.[128] However, the TRIPS agreement has been challenged by Indigenous peoples and local communities who claim that the agreement discounts their interests and cultural heritage values.[129]

The clash between those disparate value systems is occurring in Mexico, which made it illegal to grow genetically modified (GMO) corn on Mexican soil. Relevant to this Article, Mexico is a party to the WIPO Treaty.[130] The Mexican government acted in response to a grassroots movement among small farmers, Indigenous peoples, and women to protect Mexican corn by banning import of GMO corn.[131] The Presidential decree banned all GMO corn intended for human consumption, including imports, as of January 31, 2024.[132] Mexico's action was an assertion of its sovereign power to protect the ancestral biodiversity of Mexican corn and the rights of small farmers to sustain themselves as they have for generations. The stated goals of the law are to protect Mexico's "food security, its rural communities, its food heritage and the health of its people."[133] Mexico has

126. *See id.* at 164.
127. See *id. passim*.
128. *See id.* at 164.
129. *See No to Patenting of Life! Indigenous Peoples' Statement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the WTO Agreement,* INST. FOR AGRIC. & TRADE POL'Y (July 29, 1999), https://www.iatp.org/sites/default/files/Indigenous_Peoples_Stateme nt_on_TRIPs_of_the_W.htm [https://perma.cc/U65L-ZQKN] (asserting that Article 27.3b of the TRIPS agreement undermines Indigenous peoples' rights to their cultural and intellectual heritage, as well as their genetic resources, and discriminates against Indigenous ways of thinking).
130. WIPO, *Contracting Parties or Signatories to Treaties Administered by WIPO*, WIPO 2 (2019).
131. The grassroots movement in Mexico was the catalyst for a 2013 lawsuit filed by Colectividad del Maíz that resulted in a court order to the Mexican government to stop issuing commercial permits for genetically modified (GMO) corn. *See* Ernesto Hernández-López, *GMO Corn, México, and Coloniality*, 22 VAND. J. ENT. & TECH. L. 725, 725 (2020); *Food Sovereignty, Trade and Mexico's GMO Corn Policies*, INST. FOR AGRIC. & TRADE POL'Y, https://www.iatp.org/food-sovereignty-trade-and-mexicos-gmo-corn-policies# #usmca-dispute-resources [https://perma.cc/QF3W-U559].
132. Natalie Alcoba, *Why Is Mexico Standing up to Bigger Neighbours US, Canada on Corn?,* ALJAZEERA (Sept. 22, 2023), https://aje.io/n2yr7c [https://perma.cc/SQ96-LHY6]. *See* Decree Establishing Various Actions Regarding Glyphosate and Genetically Modified Corn, Diario Oficial de la Federación [DOF] 12-02-2023 (Mex.) [hereinafter Decree on Glyphosate and Genetically Modified Corn] (effectuating the 2020 decree with specific and enforceable terms).
133. Alcoba, *supra* note 132.

more than fifty-five strains of ancestral corn and the government has stated the need to preserve this rich and robust "biocultural heritage."[134]

The United States contested the law, arguing that it violates the terms of the United States-Mexico-Canada Agreement (USMCA) on free trade[135]. The United States is the leading producer of industrially farmed GMO corn (90 percent of the corn grown in the United States is GMO),[136] and much of this crop is intended for export to other countries. The United States stands to lose significant economic revenue if Mexico and other countries ban import of GMO corn and so it invoked the mandatory dispute resolution procedure under the USMCA, stating that Mexico's refusal to import GMO corn for human consumption will unnecessarily disrupt trade in the North American market.[137] Mexico contended that GMO corn contains glyphosate, a chemical application used in U.S. industrial farms, and Mexico sought to impose strict limits on the import, distribution, and use of glyphosate.[138] This controversial chemical weed killer, originally manufactured by Monsanto corporation (now "Bayer"), has been linked to cancer, and Bayer has been sued as a defendant in multiple tort lawsuits.[139]

U.S. Secretary of Agriculture Tom Vilsack maintained that Mexico's position on the potential dangers of biotechnology was not scientifically supported. Secretary Vilsack claims that "[i]nnovations in agricultural biotechnology play a key role in advancing solutions to our shared global challenges, including food and

134. *Id.*

135. Leah Douglas, *US-Mexico GM Corn Dispute to Be Resolved This Year -Chief Agricultural Negotiator,* REUTERS (Feb. 7, 2024, 9:46 AM), https://www.reuters.com/markets/commodities/us-mexico-gm-corn-dispute-be-resolved-this-year-chief-agricultural-negotiator-2024-02-07 [https://perma.cc/QK5U-ZS3C].

136. *See id.*

137. On April 30, 2024, the U.S.-Mexico-Canada Agreement (USMCA) Secretariat published the U.S. rebuttal to Mexico's comments, which were published in March of that year and in response to the U.S. complaint, published in December 2023; the U.S. Rebuttal restates the arguments that Mexico has violated the agreement and has failed to offer scientific proof that GMO corn and glyphosate pose health and safety risks. *See* Karen Hansen-Kuhn, *Mexico GM Corn Case Update: U.S. Assertions Rebutted by Civil Society Experts*, INST. FOR AGRIC. & TRADE POL'Y (May 13, 2024), https://www.iatp.org/mexico-gm-corn-case-update [https://perma.cc/8GVD-FJP7]. According to Hansen-Kuhn's update, the studies produced by the U.S. were funded by the GMO seed and pesticide companies and concluded, not surprisingly, that the data does not support a finding of a health or safety risk. *See id.* The update also notes that the average Mexican citizen consumes ten times as much corn as the average U.S. citizen. *Id.*

138. *See* Decree on Glyphosate and Genetically Modified Corn, *supra* note 132.

139. *See* Hardeman v. Monsanto Co., 216 F. Supp. 3d 1037 (N.D. Cal. 2016), *aff'd,* 997 F.3d 941 (9th Cir. 2021), *cert. denied,* 142 S.Ct. 2834 (2022). *See also* Gabrielle Argimón-Cartaya, *'Rounding Up' Roundup: One Last Hope for Glyphosate Regulation*, 78 U. MIAMI L. REV. 615, 627–28 (2024) (explaining that Bayer, which acquired Monsanto in 2016, settled over 100,000 lawsuits in 2020 for over $10 billion).

nutrition insecurity, the climate crisis and the lingering effects of food price inflation."[140] The United States brought seven claims before the USMCA panel defending its rights under the agreement, and, on December 20, 2024, the USMCA panel ruled in favor of the United States on all of the claims, finding that "Mexico's measures are not based on science and undermine the market access that Mexico agreed to provide in the USMCA."[141]

The position of the United States is that agricultural biotechnology serves the "greater good" of the world and can be utilized to solve intractable global problems, such as hunger and the climate crisis.[142] Of course, the decision also benefits the economic interests of the United States, which exported $4.8 billion of corn to Mexico from January through October 2024.[143] The world benefits from agricultural biotechnology and the economic profit goes to multinational corporations and the United States.

With these justice and economic considerations in mind, we first discuss the WIPO structure for intellectual property law, and then separately address the treaty structure applicable to biodiversity and genetic resources. All of these treaty regimes are distinctive, but they overlap in the context of the WIPO Treaty and its potential impact on Indigenous peoples.

B. Summary of the WIPO Treaty

In 2000, WIPO created the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC), acknowledging that a separate process was needed to evaluate whether "Indigenous peoples and local communities" have unique rights or interests that should be protected within the Western-derived framework of intellectual property law that assigns copyrights to creative expression and patents to technical innovations and objects of utility.[144] This intellectual property structure has never protected the traditional cultural expression or traditional knowledge of Indigenous peoples, which are often quite ancient.

140. Alcoba, *supra* note 132.
141. Press Release, United States Prevails in USMCA Dispute on Biotech Corn: Biden-Harris Administration Secures Major Trade Enforcement Victory for U.S. Corn Growers, Processors, and Exporters (December 20, 2024) https://ustr.gov/about-us/policy-offices/press-office/press-releases/2024/december/united-states-prevails-usmca-dispute-biotech-corn [https://perma.cc/VN2E-YLQJ].
142. *See id.*
143. *See id.*
144. *See* WIPO IGC Negotiations, *supra* note 9, at 73003.

The WIPO Treaty intends to improve the efficacy of the current patent system with respect to "genetic resources and associated traditional knowledge" by preventing the patenting of "inventions" that are not "novel or inventive" because they have been directly derived from genetic resources and associated traditional knowledge.[145] The Treaty seeks to establish a disclosure requirement for Treaty parties, which will require applicants to disclose the country of origin of the genetic resources and the identity of the Indigenous peoples or local community that provided the associated traditional knowledge.[146] If the applicant does not know these facts, the applicant must at least disclose the source of the genetic resources.[147] It is important to acknowledge that the Treaty is prospective in scope. It is not intended to upset patents that have already been issued and aims only to prevent future erroneous grants of patents.

There are several important provisions within the Treaty: (1) the Treaty's objectives; (2) the proposed disclosure requirement; (3) the process for nation-states to qualify their endorsement through "exceptions and limitations;" (4) the possibility of developing a database or other "information system;" and (5) the relationship of this Treaty to other international agreements.[148] The next Part of our Article addresses each of those provisions, as detailed in the Treaty.[149]

1. Objectives

The purpose of this instrument is to "enhance the efficacy, transparency and quality of the patent system with regard to genetic resources and traditional knowledge associated with genetic resources."[150] This instrument does not attempt to change the standards for patentability. Rather, proponents hope to prevent patents from being granted erroneously because they were derived from genetic resources and associated traditional knowledge and are therefore not novel and inventive.[151] Significantly, this instrument will not apply retroactively to cancel patents that have already been issued—even if the patented invention was based on genetic resources and associated traditional knowledge belonging to Indigenous peoples or local communities.[152] Proponents of the Treaty seek to

145. WIPO Treaty, *supra* note 1, art. 1.
146. *Id.* art. 3.
147. *Id.* art. 3.
148. *See* Yu, *supra* note 6 (providing a helpful analysis of the 2022 version of the Draft Treaty).
149. WIPO Treaty, *supra* note 1, art. 1.
150. *Id.* art. 1.
151. *Id.* art. 1(b).
152. *Id.* art. 4.

support the patent system and believe a retroactive effect would destabilize the current system.

2. Definitions

The Treaty is intended to apply to patent applications where the claimed invention is based on genetic resources or associated traditional knowledge, or both.[153] An invention is "based on" genetic resources or traditional knowledge associated with genetic resources if it was "necessary for the claimed invention," and if the "claimed invention" depends on the specific properties of the genetic resources and/or on the traditional knowledge associated with genetic resources."[154]

The patent process could originate under the domestic law of a nation-state, or possibly where the applicant applies for an international patent under the 1970 Patent Cooperation Treaty (PCT).[155] The Patent Cooperation Treaty enables the holder of an international patent to receive protection in any country that is a party to the PCT.[156]

"Genetic resources" are defined as "genetic material of actual or potential value."[157] In turn, "genetic material" is defined as "any material of plant, animal, microbial or other origin containing functional units of heredity."[158] These definitions track the terminology of the Convention on Biological Diversity and the WIPO Treaty specifically requires the agreement to be implemented in a mutually supportive manner with other international agreements on the relevant subject matter.[159]

3. Disclosure

The most important function of the Treaty is to establish a mandatory disclosure requirement where the patent application is based on genetic resources.[160] In that case, the applicant must reveal the source of genetic resources, such as the country of origin of the genetic resources, an Indigenous peoples or

153. *Id.* art. 2.
154. *Id.* art. 2.
155. *Id.* art. 7 n.4 (citing an "agreed statement" by the Contracting Parties that further changes might be needed to the regulations covering patents that fall under the Patent Cooperation Treaty).
156. U.N. WIPO Patent Cooperation Treaty, June 19, 1970, 28 U.S.T. 7645; 1160 U.N.T.S. 231.
157. WIPO Treaty, *supra* note 1, art. 2.
158. *Id.* art. 3.
159. *Id.* art. 7.
160. *Id.* art. 3.

local community, or an alternative source, such as a research center, seed bank, or institutional depository for the International Treaty on Plant Genetic Resources for Food and Agriculture. If the invention is based on traditional knowledge associated with genetic resources, the applicant must disclose the Indigenous peoples or local community that provided the traditional knowledge, or an alternative source of the information, such as a publication, another patent application, or a publicly accessible database.[161] If the applicant does not know this information, the applicant must make a declaration to that effect.[162] Significantly, the patent office is not required to verify the authenticity of any disclosure or declaration.[163] Without a verification requirement, it might be very difficult to enforce the applicant's duty to disclose or declare.

4. Enforceability

The remedies for failure to disclose could include the cancellation of an erroneously-granted patent, particularly if there is an indication that the applicant acted with fraudulent intent.[164] Any sanctions would depend on other aspects of the patent-granting country's system.[165] Essentially, the contracting parties must put dispute resolution mechanisms in place to protect the public interest, as well as applicants' due process rights.[166] If countries maintain disparate standards for enforceability, this could lead patent applicants to select the most favorable option.

It is not clear that these Treaty provisions will adequately protect the interests of Indigenous peoples and local communities. The Treaty does not recognize Indigenous peoples as the owners of intellectual property. The Treaty will possibly protect the interests of the state parties in increasing the stability and reliability of the existing patent system, particularly where the genetic resources and associated knowledge are publicly available in databases or repositories. In some cases, companies might have an interest in working with Indigenous communities to share the benefits of the invention where the Indigenous peoples or local communities are the source of the genetic resources or associated knowledge.[167]

161. *Id.* art. 2, art. 3.
162. *Id.* art. 3.3.
163. *Id.* art. 3.5.
164. *Id.* art. 5.
165. *Id.* art. 5.1 (requiring contracting parties to create appropriate, effective, and proportionate legal, administrative, and policy measures to assist in enforcement).
166. *Id.* art. 5.4.
167. *See infra* Subpart II.C. for a discussion of the encouragement of equitable benefit-sharing with Indigenous peoples under the Convention on Biological Diversity framework.

This is consistent with the intent of the Convention on Biological Diversity to encourage "benefit-sharing" with Indigenous and local communities.[168]

5. Information Systems

To enhance implementation, state parties might choose to develop new databases or other information systems to house genetic resources and associated traditional knowledge. There are many existing databases and repositories within various countries,[169] but they are not necessarily linked together. Article 6 of the Treaty acknowledges that parties have the ability to develop new databases and that they should do so in consultation with Indigenous peoples and local communities.[170] The Treaty indicates that this type of information system could enable patent offices to appropriately search and examine patent applications, so long as there are appropriate safeguards to ensure that only patent officials or authorized users could access this information.[171] The contracting parties are advised to form one or more technical working groups to develop standards, guidelines, and principles of information sharing.[172]

C. Biodiversity, Genetic Resources, and Digital Sequence Information

The definitions of genetic resources and genetic material in the WIPO Treaty have always been intended to "mirror the definitions in the Convention on Biological Diversity (CBD)."[173] In that sense, the WIPO Treaty should be interpreted in a way that is consistent with the CBD. The Convention on Biological Diversity promotes conservation and sustainable use of biodiversity and places the primary duty upon nation-states to safeguard the biodiversity within their borders.[174] The CBD applies to plants, species, and other physical manifestations of biodiversity, calling upon states to establish protected areas for the preservation of biological diversity.[175] The CBD does not cover intellectual property rights. Article 8(j), however, acknowledges the value of the knowledge

168. The Convention on Biological Diversity is discussed below. *See infra* notes 174–176 and associated text.
169. *See* WIPO Treaty, *supra* note 1, art. 6.
170. *Id.* art. 6.
171. *Id.* art. 6.2.
172. *Id.* art. 6.3.
173. WIPO, EXECUTIVE SUMMARY: BASIC PROPOSAL FOR AN INTERNATIONAL LEGAL INSTRUMENT ON GENETIC RESOURCES AND ASSOCIATED TRADITIONAL KNOWLEDGE (2024).
174. Convention on Biological Diversity, *opened for signature* June 5, 1992, 1760 U.N.T.S. 79 (entered into force Dec. 29, 1993).
175. *Id.* art. 8.

that Indigenous and local communities hold with respect to biological diversity and that provision expressly calls for the "equitable sharing of the benefits arising from *utilization* of such knowledge, innovations, and practices."[176] This provision was intended to encourage companies to reach "Access and Benefit-Sharing" (ABS) agreements with Indigenous peoples about the use of biodiversity and associated traditional knowledge,[177] thereby mitigating the potential for exploitation and biopiracy.

The United States is not a Party to the CBD, and it participates merely as an observer at the Conference of Parties for the CBD. The provisions of the CBD are not enforceable under U.S. domestic law.[178]

In 2010, the state parties to the CBD agreed upon the Nagoya Protocol, which delineated a structure for equitable benefit-sharing with Indigenous peoples, and that document specifically references "genetic resources" as well as the "traditional knowledge associated with [those] resources."[179] Because the United States is not a Party to the CBD, the Nagoya Protocol is not enforceable in the United States.[180] If the United States decides to ratify the Treaty at some future time, it will accede to a document that references the CBD and uses the same definition of "genetic resources," but there is not a domestic law calling for equitable sharing of benefits from biodiversity that is under the stewardship of Indigenous peoples or local communities.

It is instructive to note that, in 2022, the parties to the CBD adopted the Kunming-Montreal Global Biodiversity Framework,[181] which set four goals for 2030. One of these goals is to fairly and equitably share with Indigenous peoples and local communities the economic and noneconomic benefits from the use of genetic resources, digital sequence information on genetic resources, and

176. *Id.* art. 8(j) (emphasis added); *see* OGUAMANAM, *supra* note 5, at 80–81.

177. *See* Rebecca Tsosie, *International Trade in Indigenous Cultural Heritage: An Argument for Indigenous Governance of Cultural Property, in* INTERNATIONAL TRADE IN INDIGENOUS CULTURAL HERITAGE: LEGAL AND POLICY ISSUES 221, 229 (Christoph B. Graber, Karolina Krupecht & Jessica C. Lai eds., 2012) (discussing Article 8(j) of the CBD and the use of access and benefit-sharing agreements with Indigenous peoples).

178. See Scott, *supra* note 116 at 463 (noting that the United States did not ratify the CBD and did not join the supplemental agreement governing benefit-sharing, which is the Nagoya Protocol).

179. Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising From Their Utilization to the Convention on Biological Diversity, *opened for signature* Oct. 29, 2010, 3008 U.N.T.S. 3.

180. See Scott, *supra* note 116 at 463.

181. This framework was adopted by 196 countries at the 15th Conference of the Parties to the Convention on Biological Diversity. Convention on Biological Diversity, Decision Adopted by the Conference of the Parties to the Convention on Biological Diversity, U.N. Doc. CBD/COP/DEC/15/4 (Dec. 19, 2022).

traditional knowledge associated with such resources.[182] This document is very important because it references digital sequence information in addition to the *physical* manifestations of biodiversity held within genetic material. The physical manifestations of biodiversity are covered by the CBD and countries are deemed to have ownership over biodiversity within their borders. Today, however, the digital information emerging from genetic sequencing is quite valuable within the emerging information commons that drives technology and adaptation.

Indigenous peoples' traditional knowledge can easily become part of the "digital record" and the Kunming-Montreal Global Biodiversity Framework illustrates the necessity for appropriate safeguards on data.[183] Currently, the core infrastructure used to store digital sequence data is the International Nucleotide Sequence Database Collaboration (INSDC) which was created by a partnership between American, European, and Japanese collaborators, and houses 228 million annotated sequences and is linked to 1200 databases and hundreds of thousands of publications.[184] Only 16 percent of the sequences in the INSDC have country of origin information associated with them, although in most cases this information was available to the researchers.[185]

Currently, many researchers claim that "open access to sequence data is a cornerstone of biology and biodiversity research," but they note that the CBD's Conference of Parties is still trying to reconcile tensions within the structure that currently governs benefit-sharing for genetic resources as they develop an appropriate framework for digital sequence information (DSI).[186] Specifically, the ability to decode and digitally archive DNA has revolutionized biodiversity research. These researchers claim that digital sequence information is key "to scientific advancement and technological innovation in fields as diverse as medicine, food security, green energy production, and biodiversity conservation."[187] While countries have the sovereign right to regulate biodiversity within their borders, the utility of DSI for scientific innovation depends on online open access databases. The more data that is available, the better it can be utilized by researchers for biotechnology and subsequent innovations driven by artificial intelligence (AI). Researchers argue that the bilateral system used in the context of

182. Press Release, Nations Adopt Four Goals, 23 Targets for 2030 in Landmark UN Biodiversity Agreement (Dec. 19, 2022), CONVENTION ON BIOLOGICAL DIVERSITY, https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022 [https://perma.cc/CG9W-22NF].
183. *See infra* section V (discussing Indigenous data sovereignty).
184. Amber Hartman Scholz et al., *Multilateral Benefit-sharing From Digital Sequence Information Will Support Both Science and Biodiversity Conservation*, 13 NATURE COMMC'NS 1, 2 (2022).
185. *See id.* at 3.
186. *Id.* at 1.
187. *Id.* at 1–2.

the CBD and Nagoya Protocol to facilitate access to genetic resources and benefit-sharing will not work for DSI, and instead propose a "multilateral framework for DSI" where every country provides and uses DSI, enabling them to share "fairly" in "non-monetary and monetary benefits."[188] The multilateral system would be open-access and governed by rules that promote biodiversity conservation and sustainable use, as directed by the CBD. Access to DSI would be decoupled from benefit-sharing agreements because the bilateral model is ineffective with respect to use of DSI. Under the multilateral system, the state parties will mutually benefit from shared goals and joint participation. Of course, "[t]here remain unanswered questions such as how to ensure fairness to [I]ndigenous people[s] and local communities in a multilateral system."[189] The authors of one article suggest "a new data tag for [I]ndigenous peoples and local communities," or perhaps a targeted redistribution of monetary funds.[190]

For now, it is worth noting that there is a burgeoning international structure for innovations in plant genetic resources and agriculture, and the United States is an enthusiastic participant. In 2017, the United States became a party to the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), which highlights the importance of genetic diversity in food plants as well as the need to incentivize the development of new crop varieties by plant breeders.[191] The WIPO Treaty specifically references the multilateral system of the ITPGRFA as having a "depository of genetic resources" associated with it, which may be a potential source of genetic resources for patent applicants.[192] Each nation-state that is a party to the ITPGRFA will operate its own national depository, but this multilateral treaty offers a mechanism for nation-states to link these resources together. If seeds constitute the "common heritage of all mankind,"[193] then international collaboration is needed to ensure the benefits of

188. *Id.* at 2.
189. *Id.* at 4.
190. Scholz et al., *supra* note 184, at 4.
191. International Treaty on Plant Genetic Resources for Food and Agriculture, *opened for signature* Nov. 3, 2001, T.I.A.S. 17-313, 2400 U.N.T.S. 303 [hereinafter ITPGRFA].
192. *See* WIPO Treaty, *supra* note 1, art. 2 (defining "Source of Genetic Resources").
193. *See* Agha, *supra* note 15 at 52 (quoting Irwin Goldman, a professor of horticulture at the University of Wisconsin-Madison, who stated that seeds have long been "viewed as the common heritage of all humans").

global biodiversity are available to all nations.[194] The treaty also highlights the need for benefit-sharing with local users.[195]

In the United States, the U.S. Department of Agriculture (USDA) maintains the National Seed Storage Laboratory in Fort Collins, Colorado in order to preserve seeds for research and conservation purposes.[196] The USDA also manages the Germplasm Resources Information Network (GRIN), which enables researchers to access the USDA seed bank and serves as a repository for information on seeds within the federal seed bank.[197] The USDA maintains that the seeds and associated information within its repositories are held as part of the "public domain."[198] Although the USDA-GRIN policy does not formally list Indigenous seed keepers as entitled to claim access rights to the federal seed banks, this was a topic of great concern to the Native American Food Sovereignty Alliance and Indigenous Seed Keepers Network. These organizations generated a very comprehensive document defining best practices and recommendations for the USDA.[199] Subsequently, the USDA created a "Black Box seed storage" option for tribal governments to store their seeds with the USDA in a way that does not enable public access and specifies that the seeds remain under tribal government control. The ARS-Tribal Program was scheduled to be initiated in January 2025 and the

194. *See* ITPGRFA, *supra* note 191, at 1–2, art. 1. *See also* N.L. Anglin, P. Wenzl, V. Azevedo, C. Lusty, D. Ellis, D. Gao, *Genotyping Genebank Collections: Strategic Approaches and Considerations for Optimal Collection Management*, 14 PLANTS 2 (2025) (noting that the "germplasm from genebank collections is shared around the world for research, training and breeding to virtually all countries under international treaties such as the International Treaty on Plant Genetic Resources for Food and Agriculture").

195. ITPGRFA, *supra* note 191, art. 10.

196. The National Plant Germplasm System (NPGS) is a genebank system containing an extensive collection of plant genetic resources, which are maintained at nineteen locations throughout the United States. *See* Patrick F. Byrne et al., *Sustaining the Future of Plant Breeding: The Critical Role of the USDA-ARS National Plant Germplasm System*, 58 CROP SCIENCE 451, 453 (2018); *see also* Victoria Sutton, *Can Seed Banks Save Us?*, UNINTENDED CONSEQUENCES (July 23, 2023), https://profvictoria.substack.com/p/can-seed-banks-save-us [https://perma.cc/5Q8M-T4FS].

197. *What is Grin?*, USDA-ARS GERMPLASM RES. INFO. NETWORK (GRIN), ars-grin.gov [https://perma.cc/UGS3-W68Z] [hereinafter GRIN].

198. Comments of Heather Dawn Thompson, Director of Office of Tribal Relations, USDA, at the USDA Agricultural Outlook Forum (Feb. 16, 2024) (handwritten notes from session on file with author). The USDA's Agricultural Research Service, Plant Genetic Resources Unit provides a public notice that: "The USDA National Germplasm System or NPGS, distributes plant germplasm (including seeds) to professional plant breeders and other career research scientists, but selectively processes other requests to ensure that the user's intended purpose is consistent with scientific interests." The seeds that are secured from the USDA are not patentable, but they may become the basis of a patentable innovation in the hands of plant breeders and research scientists.

199. ISKN USDA Seed Policy Recommendations Letter, *supra* note 67.

USDA formulated an "ARS-Tribal Secure Seed Storage Agreement" for federally recognized tribes.[200]

There are seed banks and national depositories in many nations, and there are also depositories under private control.[201] The takeaway message is that there are abundant institutional sources of genetic resources worldwide and there currently is no broad recognition of Indigenous peoples' rights to their heirloom seeds or any effort to broadly notify them about what seeds are within their holdings.

Genetic scientists and plant researchers are the winners in the context of plant breeders' rights, which are a form of intellectual property rights over plants and crops that are created by human beings to model a set of useful features. While wild plants in nature cannot be patented, plant breeders can obtain protection for their intellectual property rights to plants that they have created. Under the federal Plant Variety Protection Act, plant breeders can derive protection from the Plant Variety Protection Office for seeds, tubers, and asexually reproduced plants.[202] Plant breeders can also obtain plant patents for asexually reproduced plants through an application to the Patent and Trademark Office. If they are granted protection, plant breeders receive royalty payments each time that a patented plant is sold. They may also receive damages for patent infringement in cases where an unauthorized person sells the plant resource.

In summary, the CBD governs the tangible resources associated with biodiversity within the lands and territories governed by the nation-states. Much of the work on genetic modification and plant varieties, however, is emerging through genetic sequencing and digital data. There is currently not a workable framework for regulating access and benefit-sharing to DSI. The intellectual property structure that covers biotechnology and innovation has shifted rapidly to protect the economic interests of corporations that are creating new plant varieties that can adapt to climate change.[203] The potential of technology and innovation

200. If the program went into force, this information should now be available on the USDA Agricultural Research Service website. I have the initial documents based on an independent outreach to USDA-ARS National Laboratories in Fort Collins, CO.

201. *See Seed Banks – Community Based or Private?*, ASEED (Feb. 22, 2021), https://aseed.net/seed-banks-community-based-or-private/ [https://perma.cc/7A37-WWQ2].

202. Plant Variety Protection Act, 7 U.S.C. § 2402.

203. For example, DroughtGard Maize is a commercially available GMO corn variety developed by Monsanto (Bayer) to withstand drought conditions associated with climate variability. *See generally* Chanjuan Liang, *Genetically Modified Crops With Drought Tolerance: Achievements, Challenges, and Perspectives*, in 2 DROUGHT STRESS TOLERANCE IN PLANTS 531–47 (M.A. Hossain et al. eds., 2016) (providing an overview of the development of drought-tolerant GMO crops).

has outpaced the law, making it very difficult to protect the equitable interests of Indigenous peoples and local communities, let alone generate new legal categories.

Normally, rights to tangible genetic resources would be treated differently than rights to "associated traditional knowledge." The WIPO Treaty seeks to cojoin these categories within the patent disclosure process. What are the implications of this approach for Indigenous peoples?

D. International Human Rights Law: Article 31 of the UN Declaration

The relevant question is whether this Treaty can appropriately recognize Indigenous peoples' human rights to their genetic resources and associated traditional knowledge. According to the UN Declaration on the Rights of Indigenous Peoples, the right to self-determination includes the right to protect Indigenous cultural heritage, both tangible and intangible, and to participate in current global and national discussions that affect Indigenous peoples' rights.[204]

Article 31 of the UN Declaration specifically addresses Indigenous cultural heritage, inclusive of material cultural items and associated knowledge, stating that "Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as [their] sciences, technologies, and cultures, including . . . *genetic resources*, *seeds*, medicines, [and] knowledge of the properties of fauna and flora" and they also "have the right to . . . develop their *intellectual property* over such cultural heritage, *traditional knowledge*, and traditional cultural expressions."[205] Article 31 specifically requires nation-states to recognize and protect these rights under their laws.[206]

Does the WIPO Treaty commit to the goal of recognizing Indigenous peoples' rights to their seeds and genetic resources, as well as their intellectual property rights to their cultural heritage? Does the Treaty instead favor an equitable benefit-sharing approach consistent with the CBD and Nagoya Protocol?

The WIPO Treaty is important because it governs intellectual property rights and not rights to biodiversity. While the Treaty uses the same definition of "genetic resources" as the CBD, it does not define "traditional knowledge" or "associated traditional knowledge."[207] In that respect, the Treaty offers ample

204. *See* G.A. Res. 61/295, *supra* note 107, art. 31.
205. *Id.*
206. *See id.* art. 31 sec. 2 ("In conjunction with Indigenous peoples, States shall take effective measures to recognize and protect the exercise of these rights.").
207. *See* WIPO Treaty, *supra* note 1, art. 2.

latitude to nation-states to generate their own definitions. This could result in disparate definitions, or ultimately an encompassing international definition could emerge.

The Treaty emphasizes the importance of identifying the "source" of the genetic resources and the "source" of the associated traditional knowledge behind an invention.[208] However, if the source of the genetic resources is a depository or seed bank that allows researchers to access genetic resources and associated data, the interests of Indigenous peoples may not be recognized or affirmed in any structural manner. As we discuss in Part V of this Article, it is possible that some form of "context labeling" will assist in preventing wrongful appropriation of associated traditional knowledge.[209] Currently, however, the WIPO Treaty focuses on the commercial benefits of patentable inventions derived from genetic resources and associated traditional knowledge,[210] rather than the interests of Indigenous peoples in protecting their tangible and intangible cultural heritage. The next Part of this Article examines the interests of Indigenous peoples under U.S. domestic law to assess how existing categories of federal law could protect Indigenous heirloom seeds and traditional knowledge.

III. INDIGENOUS HEIRLOOM SEEDS AND DOMESTIC GOVERNANCE OF CULTURAL HERITAGE

The WIPO Treaty is an instrument governing intellectual property law, and the CBD is a treaty governing tangible genetic resources. Because the WIPO Treaty cojoins tangible genetic resources and intangible associated traditional knowledge, we argue that U.S. domestic law requires an integrated framework of governance and protection for both intangible and tangible cultural heritage, in alignment with Article 31 of the UN Declaration.

The U.S. Patent and Trademark Office secured important information in the context of the two Federal Register notices that were posted prior to the WIPO Diplomatic Conference.[211] The first notice (the Tribal Notice) asked for a "formal Tribal Consultation" on the "WIPO IGC Negotiations" and solicited comments from federally recognized tribal governments, as well as Native Hawaiians and "other" Indian tribes.[212] The second notice requested public comment on "the

208. *Id.* art. 2.
209. *See infra* Part V and note 348, at 7–8 (citing Jane Anderson's work on Local Context labels).
210. *See* WIPO Treaty, *supra* note 1, art. 1.
211. *See* Formal Tribal Consultation, *supra* note 9; WIPO IGC Negotiations, *supra* note 9.
212. Formal Tribal Consultation, *supra* note 9, at 73000.

negotiations on genetic resources and associated traditional knowledge."[213] Although the notices were published the same day and are on the same topic, they were directed at different groups with different needs. We briefly summarize the key points that U.S. policymakers should consider as they consider whether the United States should sign onto the new WIPO Treaty.

A. What is the Public Interest in Genetic Resources and Associated Traditional Knowledge?

From the perspective of the public, the WIPO Treaty would require the United States to add the requisite disclosure requirement when an invention is based on genetic resources or associated traditional knowledge. The public notice invited comment on the potential burdens of a mandatory disclosure requirement.[214]

There are many open questions to consider. What are the triggers for disclosure? Disclosure is only required if the genetic resources and associated traditional knowledge are the basis for the invention. What about instances in which there were prior steps in the development of a technology that distance the new invention from the genetic resources and associated traditional knowledge? What remedies will be available if an applicant fails to meet the disclosure requirement?

The USPTO was clearly concerned about placing additional burdens on businesses and asked whether a disclosure requirement would be a deterrent to applying for a patent in a given jurisdiction. Members of the public were asked to comment on their experience with similar types of disclosure requirements in other jurisdictions and estimate how difficult the disclosure requirement would be.[215] The public was invited to read the draft Treaty and weigh in on each section, making recommendations as to when the disclosure requirement should be triggered and what potential remedies could be imposed for nondisclosure.

The public was also invited to comment on the broader normative questions that have been under consideration in the WIPO IGC since 2001, but which were not addressed by the draft Treaty. Specifically, should there be sui generis exclusive rights to protect traditional knowledge and traditional expressions. Alternatively, should intellectual property laws protect those categories? Would it be preferable to have soft law methods to encourage protection of traditional knowledge and traditional cultural expressions, such as declarations, recommendations, best

213. WIPO IGC Negotiations, *supra* note 9, at 73003.
214. *See id.* at 73005.
215. *See id.*

practices, toolkits, and voluntary codes of conduct? Finally, how should "unauthorized uses" of traditional knowledge or traditional cultural expressions be handled?

While it might be beneficial to reform the patent process to mitigate the possibility of issuing erroneous patents, members of the public are unlikely to perceive a benefit from protecting Indigenous peoples' traditional knowledge and traditional cultural expressions more broadly. Many citizens think of Indigenous knowledge and cultural expression as being old and therefore already within the public domain. As members of a pluralistic democracy, Americans often feel entitled to borrow from other cultures, as long as there is not a clear legal barrier, such as fraudulent misrepresentation about the identity of a product in commercial activity. The idea that cultural property is part of global cultural heritage has facilitated the idea that there are broad public benefits in having open access to global heritage resources.[216]

In the United States, there is a domestic structure of sui generis rights for federally recognized tribal governments that is referred to as "federal Indian law." The unique political relationship between the United States and Native nations formed the foundation for a set of laws that currently protects the sovereignty of tribal governments. The duty to consult with tribal governments is also part of this political relationship and the next Part of this Article explores the implications of federal Indian law for the WIPO Treaty.

B. What are the Interests of Native Nations and Indigenous Peoples in the WIPO IGC Process?

Going forward, Indigenous peoples will have an observer status in the implementation of the WIPO Treaty by the Contracting Parties.[217] Indigenous peoples have a vital interest in the WIPO Treaty process because they alone can identify the categories of tangible and intangible cultural heritage that merit protection. The USPTO recognized this in the notice requesting tribal consultation, and tribal nations were asked to weigh in on what materials they believe are protected and what materials might be accessible to the public. The notice listed eighteen specific questions to guide the inquiry,[218] which can be separated into four main categories: (1) Who are the "rights holders"?; (2) What source of law regulates tribal rights or interests with respect to genetic resources,

216. *See* Tsosie, *supra* note 177, at 232.
217. *See* WIPO Treaty, *supra* note 1, art. 10.1(c) (providing for participation by Indigenous peoples and local communities as accredited observers).
218. Formal Tribal Consultation, *supra* note 9, at 73001–02.

traditional knowledge, and traditional cultural expressions?; (3) In which cases would the public also have an interest in these categories, either because it is part of the "public domain" or because the resource has been "broadly diffused" or is otherwise accessible by the public?; (4) Can third parties have "use" rights? Can use rights be transferred? Do the interests shift where the use is noncommercial, for example, where the third party is a researcher, library, or archive? What should happen in cases where the use is not unauthorized?

As the following analysis will demonstrate, this set of questions is closely related to the framework of intellectual property and reveals why there are existing gaps in protection.

1. Who are the holders of rights/interests to genetic resources, traditional knowledge, or traditional cultural expressions?

The Tribal Notice sought comments from tribal representatives, who are asked to identify themselves as members of federally recognized tribal nations, Native Hawaiians, state recognized tribes, or "other Tribes." In comparison, the federal government's trust responsibility is generally limited to federally recognized tribal governments, but the federal government can also recognize a duty based on a preexisting political relationship.[219] For example, the federal government has selectively included Native Hawaiians in some statutes serving tribal governments and has also recognized continuing duties to Native nations whose trust relationship has been terminated, but who are in a treaty relationship with the U.S. government.[220] The USPTO adopted an inclusive approach to soliciting comments from all tribal representatives, while also soliciting a formal consultation process with federally recognized tribes.

The USPTO's inclusive approach toward engagement with Indigenous peoples is consistent with the global nature of the WIPO Treaty, and it also

219. *See* Rebecca Tsosie, *Reconceptualizing Tribal Rights: Can Self-Determination Be Actualized Within the U.S. Constitutional Structure?*, 15 LEWIS & CLARK L. REV. 923, 936–37 (2012) (discussing the differences between the status of federally recognized tribes from those tribal groups that lack recognition, including restricting the trust duty to federally recognized tribes and interpreting the UN Declaration on the Rights of Indigenous Peoples to be consistent with the norms of federal Indian law).

220. The Protections of the Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001–13, for example, extend to Native Hawaiian organizations, as well as tribal governments. Tribal treaty rights can persist even after the formal trust relationship between a tribe and the United States is terminated. *See, e.g.*, Menominee Tribe of Indians v. United States, 391 U.S. 404, 412–13 (1968) (holding that termination of Menominee Tribe's trust status could not serve as an implicit abrogation of the Tribe's treaty rights and that Congress is required to expressly abrogate treaty rights and compensate the Tribe).

corresponds to the human rights norms of UN Declaration Article 31, which applies to all "Indigenous peoples."[221] On the other hand, the existing restrictions of the federal trust responsibility to Native nations could make a difference in the future when domestic laws are formulated to implement the WIPO Treaty. This is true of NAGPRA's most recent federal regulations, which clearly exclude unrecognized tribes from requesting repatriation of culturally affiliated items.[222]

2. How should we define genetic resources, traditional knowledge, or traditional cultural expressions?

WIPO has not come to any conclusions about how to define traditional knowledge or traditional expressions, so the USPTO asked tribes how they would define each category and what attributes each of those categories should have. These are very difficult questions for tribes to answer because the categories are generated by a Western mind based on Western conceptions of property, knowledge, and culture. The concepts of culture and knowledge look very different for most Indigenous peoples than for Western intellectual property experts, who would assert that cultures cannot own property.[223] Individuals, corporations, and—in some cases—governments, can own property or intellectual property, but cultures do not have this right. Similarly, Western intellectual property law considers knowledge to be a common resource, which can be used freely unless there is some reason to pay the holder of knowledge for sharing it. There are multitudes of books and classes about mathematics, physics, philosophy, or religion, for example, but no one person or group can own the field of knowledge encompassed by these categories. So, the category of "traditional knowledge" is potentially only relevant if it is associated with something that Western peoples want. Agricultural knowledge and medicinal knowledge can be useful, and in fact, that knowledge might be the key to the value of a plant or seed.

221. *See* G.A. Res. 61/295, *supra* note 107, art. 31 (stating that the provisions apply to all "Indigenous peoples" but not defining the term).
222. *See* 43 C.F.R. § 10.2.
223. *See, e.g.*, Michael F. Brown, Who Owns Native Culture? 1–10 (2003) (introducing Indigenous concepts of culture and knowledge and contrasting those concepts with Western intellectual property theory).

3. What source of law currently regulates genetic resources, traditional knowledge, or traditional cultural expressions? What source of law ought to regulate these categories?

The Tribal Notice explored the respective roles of tribal law and Western intellectual property law as possible sources to regulate these categories and invited tribal representatives to identify other possible sources of protection. Tribes were asked whether the United States should support an international treaty on genetic resources and associated traditional knowledge, and if so, what the essential conditions of such a treaty should be.

The Tribal Notice asked tribes to comment on how they "protect genetic resources, traditional knowledge, and/or traditional cultural expressions."[224] This open-ended question is an invitation to speak to the role of customary law or other provisions of tribal law. Customary law is often not codified, so existing modes of protection might relate to knowledge practices. For example, tribal regulation of cultural knowledge or religious knowledge might involve levels of restriction by subgroups within the tribe. Some forms of traditional knowledge might be restricted to specific clans or religious societies. Some forms of traditional knowledge might be restricted by gender. Some forms of knowledge might be regarded as potentially dangerous in the hands of those who do not know how to use it appropriately. For example, several years ago, draft federal legislation intended to protect Native sacred sites failed, in part because tribal nations were reluctant to reveal the precise location of these places.[225]

Tribes are then asked to comment on whether intellectual property law (including patents, trademarks, copyrights, or trade secrets) should be used to protect "genetic resources, traditional knowledge, and/or traditional cultural expressions."[226] Under the current law, these categories are unprotected for Indigenous peoples unless a country extends intellectual property rights beyond the current requirements. In Australia, for example, the High Court recognized that Aboriginal communities can license a community member to use a sacred design associated with a traditional story, but they also retained the equitable right to sue third parties for using that same design in textile manufacture.[227] The

224. Formal Tribal Consultation, *supra* note 9, at 73001.
225. *See* Native American Sacred Lands Act of 2003, H.R. 2419, 108th Cong. (1st Sess. 2003). The bill did not move forward.
226. Formal Tribal Consultation, *supra* note 9, at 73001.
227. *See* Tsosie, *supra* note 177, at 244 (discussing Bulun Bulun v. R & T Textiles Prop Ltd (1998)); *see also* Kathy Bowrey, *International Trade in Indigenous Cultural Heritage: An Australian Perspective*, *in* INTERNATIONAL TRADE IN INDIGENOUS CULTURAL HERITAGE: LEGAL AND POLICY ISSUES 396, 406–07 (Christoph B. Graber et al. eds., 2012).

"Bulun Bulun equity"[228] is a specific interest that recognizes Aboriginal customary rights. In the United States, only American Indian and Alaska Native artists can market their goods as "Indian made."[229] In that sense, the federal Indian Arts and Crafts Act confers a collective trademark upon federally recognized tribes and some state recognized tribes, encompassing the right of enrolled tribal members, and some certified descendants, to market their art as authentic "Indian" art. The Indian Arts and Crafts Act does not apply to Native Hawaiians or unrecognized tribes.

4. When would the public also have a right to access genetic resources, traditional knowledge, and traditional cultural expressions? Can we identify genetic resources, traditional knowledge, or traditional cultural expressions that are now in the public domain?

The USPTO identified the public domain as the fundamental concept "defining the boundary between the interests of holders of exclusive rights and the ability of others, including the public, to access and use the subject matter to be protected."[230] The notice stated that each category of intellectual property—patent, trade secret, trademark, and copyright—recognizes a form of public domain. However, to date, the WIPO IGC has not been able to reach agreement about what is within the public domain as a global matter, nor can the IGC differentiate the qualities that delineate "protected" from "unprotected" material.[231] Consequently, the IGC is not able to remove traditional knowledge or traditional cultural expressions from the "public domain," nor can it assert that they are not within the public domain.

The concept of the public domain imagines that there is a "commons" of ideas and human creative expression that belongs to everyone.[232] An individual can enclose part of this commons by securing "intellectual property rights" to creative expression (copyrights), technology and innovations (patents), or the right to sell products that hold the goodwill of the business (trademark). In special cases, trade secrets protect the components of formulas used in manufacture of commercial products, such as the original recipe for Coca Cola.[233]

228. *See* Tsosie, *supra* note 177, at 244; *see also* Bowrey, *supra* note 227, at 406–07.
229. *See* Indian Arts and Crafts Act, 25 U.S.C. §§ 305–05e.
230. Formal Tribal Consultation, *supra* note 9, at 73001.
231. *Id.* at 73001–02.
232. *See* Okediji, *supra* note 6, at 479–80.
233. The common law of trade secrets covers commercial information, including formulas, programs, and processes, that are created for commercial use and not known to others. The

Each category of intellectual property has a set of criteria to enable individuals to claim a copyright, secure a patent or trademark, or protect its business interests by asserting a trade secret. These criteria are developed by nation-states according to their views of what ought to be protected, and therefore, different standards might pertain. In France, for example, artists have moral rights to their creations, as well as economic rights, whereas the United States generally does not protect the moral interests of artists unless Congress provides a narrow exception.[234] This is also true of patent law.[235] In Canada, one cannot secure a patent on an invention that raises moral concerns, such as the famous "Onco-Mouse," a living hybrid mouse created for cancer tumor experimentation.[236] In the United States, hybrid organisms may be patented despite conflicting public views on morality, unless there is an overriding ethical concern related to human beings, as there was for the patent to create a human-chimpanzee chimera for purposes of growing organs to be transplanted into humans.[237]

An allegation that traditional knowledge is in the public domain because it is contained in a publication or public database would be a potential barrier to protection of GR, TK, and TCEs. Another potential barrier would be the finding that there has been wide "diffusion" of the knowledge to the public in other ways, which can occur, for example, when a design motif is widely shared among so many tribal nations that the "original" source is unknown.

---

information must have economic value to the creator that would be destroyed by disclosure. The common law standards have been formalized in the Uniform Trade Secrets Act (USTA), which was created by the Uniform Law Commission for states to consider. As of 2024, forty-eight states and the District Columbia have adopted the UTSA, and it has also been adopted by Puerto Rico and the U.S. Virgin Islands, so the law of trade secrets has become generally accepted as part of intellectual property law. *See Trade Secret*, CORNELL L. SCH. LEGAL INFO. INSTITUTE, https://www.law.cornell.edu/wex/tra
de_secret [https://perma.cc/PJY8-AJLL].

234. *See* JOSEPH WILLIAM SINGER, INTRODUCTION TO PROPERTY 769–70 (2001).

235. *See* Diamond v. Chakrabarty, 447 U.S. 303 (1980) (finding that a patent can be issued for a bioengineered bacterium which is not found in nature and is used to digest crude oil).

236. The Onco-Mouse was a genetically modified mouse produced by researchers at Harvard who combined genetic material to produce a mouse that was highly susceptible to cancer. The animal was patentable under U.S. law because it was a transgenic animal that did not exist in nature. The morality of the patent was questioned in other countries, such as Canada, which rejected the patent. *See Bioethics and Patent Law: The Case of the Oncomouse*, WIPO MAGAZINE (June 2006), https://www.wipo.int/en/web/wipo-magazine/articles/bioethics-and-patent-law-the-case-of-the-oncomouse-35278 [http
s://perma.cc/V3MW-EXQ4].

237. In 1997, Stuart Newman, a biologist working at New York Medical College, applied for a patent on a human-chimpanzee chimera. After seven years, the patent was rejected on the basis that the hybrid could be "too human." *See Hybrid Too Human to Patent*, 4 NATURE REVS. DRUG DISCOVERY 270 (2005) (noting that the U.S. patent office lacks any criterion to measure how human a genetically modified organism is).

Importantly, intellectual property rights are time-limited, meaning that other actors are excluded from commercial benefit for only the duration of the copyright, patent, or trademark.[238] After this, the item and associated knowledge goes into the public domain. Patent filings are made public,[239] so an inventor with a patent has exclusive rights during the term of the patent, but others may examine the design of the invention and draw on this knowledge to make a different product. A patent examiner will explore whether a new invention is based on the prior art. If so, the knowledge cannot be used until the patent has expired or use rights are purchased. Once the patent expires, individuals can use the knowledge, but they must make some substantial innovation in order to secure their own patent on an invention.[240] At this time, the preexisting knowledge is part of the public domain.

Tribal nations often seek perpetual protection and many would not accept the limited forms of protection and stringent criteria inherent in the U.S. intellectual property rights framework. Tribal nations should not be considered to have given up their rights to their knowledge and genetic resources merely because a third party has taken Indigenous seeds or other resources and inserted them into a public database. That is an act of appropriation and without free, prior, and informed consent from the tribal nations or Indigenous custodians of the seed or resource, no rights or interests should be deemed to transfer.

5. Use Rights

The final set of questions explores how and whether use rights to genetic resources, traditional knowledge or traditional cultural expressions could be transferred to third parties. There are many aspects to this question, including who is the holder of the rights and what entity has the authority to grant use rights or condition use rights. The USPTO is interested in hearing about real world examples where tribal nations have authorized third parties to engage in "commercial[] use" of traditional cultural expressions, genetic resources, or traditional knowledge.[241] This would potentially include international cases where Indigenous peoples entered an access and benefit-sharing agreement with a third party under the Nagoya Protocol. In the United States, it would include cases where tribal governments have granted third parties limited use rights to

238. *See* ARTHUR R. MILLER & MICHAEL H. DAVIS, INTELLECTUAL PROPERTY: PATENTS, TRADEMARKS AND COPYRIGHTS IN A NUTSHELL (2020).
239. *See id*. *See also* CRAIG ALLEN NARD, THE LAW OF PATENTS (6th ed. 2022).
240. *See* NARD, *supra* note 239.
241. Formal Tribal Consultation, *supra* note 9, at 73002.

protected categories. For example, the Seminole Nation granted Florida State University the right to use its tribal name for commercial purposes.[242] Some tribal artists have created designs for companies, such as Pendleton Woolen Mills, which produces wool blankets with Native American design themes. Although the artists are paid for their work and enter license agreements with the company, the Pendleton company does not pay royalties.[243]

In each of the above cases, the tribe or tribal member is licensing commercial use of a name or design. However, in some cases, third parties seek access to the resource for research purposes or for storage in a library or archive. Should the law distinguish between commercial and noncommercial use? Because the United States bases its intellectual property laws on economics, rather than moral rights, a lawsuit for copyright or patent infringement generally involves economic harm. The harm to Indigenous peoples stemming from cultural appropriation could involve economic harm, but it also could involve cultural or spiritual harm, and those categories are not protected under intellectual property law.

Finally, tribes are asked to identify the impacts of unauthorized use on tribes and offer thoughts on how to regulate unauthorized uses. A preliminary question might be what is an unauthorized use? Is it any unconsented use of genetic resources, traditional knowledge, or traditional cultural expressions or is it a use that confers an economic benefit on the third party to the exclusion of the Indigenous community? In short, can we expand the notion of harm beyond the economic harm principle that is at the heart of U.S. intellectual property law?

C. Summary and Final Thoughts

The WIPO Treaty carries different implications for Native nations and Indigenous peoples than it does for members of the public who are purely concerned about the U.S. patent system. In evaluating the respective comments, the USPTO will be forced to consider the role of the United States Constitution, which grants Congress the power to "promote the Progress of Science and useful

242. In 2005, the Seminole Tribe of Florida passed a resolution supporting the right of Florida State University to use the name "Seminole" and related imagery. Prior to this time, FSU used the name without the Seminole Tribe's permission. *See Path to Partnership*, FLA. ST. UNIV., https://www.fsu.edu/seminole-tribe/partnership.html [https://perma.cc/XV N2-3FKB].

243. *See* Maria C. Hunt, *The Pendleton Problem: When Does Cultural Appreciation Tip Into Appropriation?*, DWELL (Sept. 16, 2020), https://www.dwell.com/article/cultural-approp riation-home-decor-pendleton-60491a02 [https://perma.cc/Y4VV-XVJJ] (noting that Pendleton has been owned by the same family for many generations, but only began to hire Native American artists in the 1990s).

Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[244] Congress enacted the Patent Act to effectuate this authority and if the United States signs onto an international treaty that modifies the standards for issuing a patent, Congress must amend the Patent Act and the USPTO must formulate guidance for domestic applicants. The Supremacy Clause and the principle of federal preemption bar domestic acts of a state or tribal government that conflict with the U.S. Constitution or federal statutory authority.[245] This does not mean that state and tribal governments are precluded from enacting their own laws that supplement federal law or fill in the gaps, but this is a relevant consideration.

We might look to the text of the proposed Native American Seeds Protection Act of 2019, which sought to determine the extent to which federal law or oversight might "protect Native American seeds and traditional foods from infringement, or unlawful or unauthorized commercialization."[246] This bill explored the possibility of a sui generis law to protect authentic Native American seeds and traditional foods in the interest of ensuring preservation and availability for future generations.

There is nothing in the current federal law directed toward these purposes, but there is also nothing in federal intellectual property law that would preclude Congress—or a state—from enacting a statutory scheme to protect Native American seeds and traditional foods.[247] Some tribal governments have specifically enacted their own laws to promote food sovereignty and seed sovereignty, and many are growing crops on their own trust lands.[248] Thus, it is possible that a sui generis statutory scheme that treats Native American seeds and traditional foods as protected cultural heritage will be a better mechanism to protect tribal interests than U.S. intellectual property law. The next Part of this

244. U.S. CONST. art. I, § 8, cl. 8.

245. *See* U.S. CONST. art. VI, cl. 2 (providing that the U.S. Constitution, laws of the United States, and treaties made under the authority of the United States shall be the "supreme Law of the Land").

246. Native American Seeds Protection Act of 2019, S. 2241, 116th Cong. § 2 (1st Sess. 2019).

247. For example, in 2007, Rep. Ben Lujan of New Mexico introduced a bill into the state legislature that sought to recognize "the significance of Indigenous Agricultural practice and Native Seeds to New Mexico's cultural heritage and food security." H.R. Memorial 84, 48th Leg., 1st Sess. (N.M. 2007). Although this bill did not pass, it is an example of how a state can use its authority to protect Native seeds and agricultural practices.

248. Over a decade ago, the University of Arkansas School of Law developed an Indigenous Food and Agriculture Initiative to assist tribal nations in developing their own food and agriculture codes, and they secured grant funding for the work. Today, several tribal food and agriculture codes are housed at the University of Arkansas. *See Arkansas School of Law Receives Gifts for Native American Health*, CHEROKEE PHOENIX., Oct. 2015, at 13.

Article will examine that argument and will also probe the potential impact of emerging technologies on tribal cultural heritage.

IV. CONCEPTUALIZING INDIGENOUS CULTURAL HERITAGE: INDIGENOUS GOVERNANCE OF HEIRLOOM SEEDS AND THE PROBLEM OF EPISTEMIC INJUSTICE

The United Nations has historically delinked material culture from intangible expression, and this is also true of domestic law in the United States. Because the Treaty on Genetic Resources and Associated Traditional Knowledge involves both tangible and intangible forms of cultural heritage, its provisions must be assessed in light of Article 31 of the UN Declaration on the Rights of Indigenous Peoples. Article 31 associates the material cultural heritage of Indigenous peoples—including their seeds and genetic resources—with their intangible rights to traditional knowledge, and also recognizes their right to develop their intellectual property rights should they choose to do so. Article 31 further provides nation-states "shall take effective measures to recognize and protect the exercise of these rights."[249]

Given that there is no current statutory framework in the United States to protect Indigenous peoples' intangible cultural heritage, we argue that Indigenous heirloom seeds and associated traditional knowledge merit protection through an integrated legal and moral framework of domestic law. In particular, Indigenous peoples' inherent rights to food sovereignty and seed sovereignty merit protection within federal statutory law. Drawing on the domestic laws that protect tangible forms of Indigenous cultural heritage, we argue that Indigenous heirloom seeds are a trust asset that merits protection under federal law. If the United States signs onto the WIPO Treaty, Congress must amend the Patent Act, and it should also enact appropriate legislation on behalf of Native nations. Even if the United States chooses not to sign on to the Treaty, Congress should still enact protective legislation. In making this argument, we are framing Indigenous cultural heritage as a paramount value and we reject the notion that the United States owns Indigenous heirloom seeds as genetic resources, as well as the notion that Indigenous seeds or their derivatives can become part of the "global cultural heritage of mankind" without the "free, prior, and informed consent" of Indigenous peoples.[250]

249. G.A. Res. 61/295, *supra* note 107, at art. 31.

250. *See id.* art. 11(2) (providing that States shall provide redress in cases where Indigenous peoples' "cultural, intellectual, religious and spiritual property" is taken "without their free, prior and informed consent or in violation of their laws, traditions, and customs").

A. Who Defines "Cultural Heritage"? The Problem of Epistemic Injustice.

We recommend an integrated approach to Indigenous cultural heritage protection because—in addition to national and global claims to cultural heritage—existing categories of international and domestic law disadvantage Indigenous peoples by separating intangible and tangible forms of cultural heritage, distinguishing natural resources from cultural resources, and differentiating material objects from the *knowledge* that is associated with gives *meaning* to those objects. What is "cultural heritage" and who defines it? There is a conceptual problem at the heart of this inquiry, and there is a legal problem.[251]

Throughout history, the colonizing Western nations have used their epistemic categories to differentiate rights to land, natural resources, ancestral human remains, and cultural objects. Indigenous peoples' rights were often disregarded at the outset, and today, the United States and many other countries attempt to pass specific laws to rectify the most egregious forms of injustice, while also ensuring that the baseline for property rights and economic rights is not impaired.

Epistemic injustice continues to be a significant challenge for Native peoples. According to philosopher Miranda Fricker, epistemic injustice includes both "hermeneutical" and "testimonial" forms of injustice.[252] Hermeneutical injustice can occur when Indigenous peoples are not able to "co-create" the laws that control their relationship with the nation-state or generate definitions that align with their own understandings.[253] They are left completely unprotected by the law. An example of this would be the concept of an Indigenous sacred site on public land. The concept doesn't exist within standard constitutional law categories of property or religious freedom, so the question is whether Indigenous sacred sites are more like churches, which are buildings owned by corporations on private land, or more like a recreational use of public lands, which can be accommodated along with other uses, such as mining, hiking, or hunting. To date, case law has treated Native peoples as stakeholders who have religious preferences concerning the use of public lands that differ from other citizens. Sacred sites on public lands are not considered to be churches, nor are Native people recognized as owners of the land. To date, there has been no enforceable protection for Native American

251. *See* Rebecca Tsosie, *Who Controls Native Cultural Heritage?: "Art," "Artifacts," and the Right to Cultural Survival*, *in* CULTURAL HERITAGE ISSUES: THE LEGACY OF CONQUEST, COLONIZATION, AND COMMERCE 3 (James A.R. Nafziger & Ann M. Nicgorski eds., 2009) (discussing conceptual challenges to cultural heritage protection for Indigenous peoples).

252. *See* MIRANDA FRICKER, EPISTEMIC INJUSTICE: POWER AND THE ETHICS OF KNOWING 1 (2007).

253. *See* Rebecca Tsosie, *Indigenous Peoples and Epistemic Injustice: Science, Ethics, and Human Rights*, 87 WASH. L. REV. 1133, 1158 (2012).

sacred sites on public lands, although federal land managers are counseled to accommodate Native religious uses when they can.[254]

Epistemic injustice also arises when Indigenous peoples are excluded from public and legal proceedings as "knowers" because they are held to lack the credibility to testify effectively about what falls either "within" or "outside" a protected category of law.[255] Miranda Fricker describes this practice as "testimonial" injustice.[256] An example of this occurred during the Indian Claims Commission Act proceedings designed to determine the extent of Native American land rights. The statute, which passed in 1946, resulted in many decades of litigation where Native nations contested the ways in which the United States appropriated tribal lands.[257] If a court found that the United States had extinguished a tribe's "recognized" property interest for the benefit of the public, such as a reservation created by treaty, it would be held to pay "just compensation" within the meaning of the Fifth Amendment.[258] On the other hand, there was no constitutional duty to pay for takings of "aboriginal" title, which was the form of "Indian use and occupancy" that existed prior to European contact.[259] In *Tee-Hit-Ton Indians v. United States*,[260] the U.S. Supreme Court dismissed the testimony of Tlingit leaders who alleged that they held a preexisting property interest to the land and forests within the area that became the Tongass National Forest after the United States acquired Alaska from Russia.[261] The Court refused to find that a true property interest arose from Indian use of land, which seemed to revolve around moveable camps and hunting and fishing. The Court held that takings of aboriginal title raise "political" and not "justiciable" issues and opined that:

> Every American schoolboy knows that the savage tribes of this continent were deprived of their ancestral ranges by force and that, even when the Indians ceded millions of acres by treaty in return for blankets, food and trinkets, it was not a sale but the conquerors' will that deprived them of their land.[262]

254. *See, e.g.*, Apache Stronghold v. United States, 95 F.4th 608 (9th Cir.) (en banc), (refusing to enjoin transfer of federal public land to a mining company even though the massive open pit copper mine will completely destroy Oak Flat, a highly sacred site for Apache people that has been continuously used for religious ceremonies that cannot be performed elsewhere), *amended by* 101 F.4th 1036 (9th Cir. 2024).
255. *See* Tsosie, *supra* note 253, at 1154–56.
256. *See id.* at 1154 (citing FRICKER, *supra* 252, at 7).
257. *See id.* at 1156.
258. *See id.* at 1156–57.
259. *See id.*
260. 348 U.S. 272 (1955).
261. *See id.*
262. *Id.* at 289–90.

In the religious freedom cases, the Court refused to find that Indigenous sacred sites are the equivalent of a church building. In the aboriginal title case, the Court refused to find that Indian use and occupancy meets the standard for a true property ownership in land.[263] In both cases, Indigenous peoples are disabled by the definitions, the analogies to Western legal categories and social practices, and the pervasive tendency of Western courts to disregard the testimony of Indigenous leaders as "self-serving" and not "credible" without significant support from a Western "expert,"[264] such as an anthropologist.

In the United States, justice for Native nations depends upon recognition of sui generis rights because the standard legal categories that protect property rights, religious rights, intellectual property rights, or civil rights often do not protect Indigenous peoples' interests. As we demonstrate in the Subparts below, the ongoing process of epistemic injustice created by the existing categories of law excludes Indigenous peoples from recognition, necessitating sui generis rights to Indigenous cultural heritage.

B. Trust Lands and Natural Resources as Cultural Heritage

The very identity of Indigenous peoples is powerfully tied to their ancestral lands, so Indigenous territories are closely related to cultural heritage. In the United States, tribal governments are the beneficial owners of small portions of their ancestral territories, which are often held in trust as reservation lands.[265] The trust designation means that the federal government holds the legal title, and the tribal government holds full beneficial rights.

Tribal governments are separate sovereigns and they exercise jurisdiction over their trust lands, inclusive of all natural resources on those lands.[266] Tribal lands are rich repositories of genetic resources. To the extent that a researcher gathers genetic resources on tribal lands that form the basis for his or her invention, this would presumably trigger the disclosure requirement of the WIPO Treaty.

---

263. *See* Tsosie, *supra* note 253, at 1157 (citing *Tee-Hit-Ton*, 348 U.S. 272).
264. *See id.* at 1155.
265. There is a federal statutory definition of "Indian country" at 18 U.S.C. § 1151 that describes three types of land that are amenable to tribal and federal jurisdiction, rather than state jurisdiction: Indian reservations, dependent Indian communities, and individual Indian allotments still held in Indian title. There are complex rules that govern the federal government's decision to "take lands into trust" for an Indian tribe, so the category of "trust land" is not necessarily coextensive with "reservation" land. *See* 25 U.S.C. § 5108.
266. *See, e.g.*, Merrion v. Jicarilla Apache Tribe, 455 U.S. 130 (1982) (holding that a tribe can regulate natural resource extraction on the reservation, including taxing non-Indian mining companies, as an aspect of its inherent sovereignty and right to exclude).

Tribal governments also regulate research that occurs on the reservation or involves tribal members. In that way, many tribal governments already protect traditional knowledge and traditional expressions under tribal law. They may require researchers go through an application process with a tribal Institutional Review Board, and through this process the tribal government may negotiate ownership of any product that emerges from this research.[267]

In cases where the genetic resources come from a source outside the reservation, there will be additional questions and the definition of "genetic resources" will be important. The CBD maintains that nation-states have the right to control genetic resources within their borders, but U.S. federal Indian law recognizes that Native nations have the full beneficial rights to their trust lands and natural resources.[268] They also may have rights to resources off the reservation and within their ancestral territories, and as the next Subpart of this Article discusses, off-reservation genetic resources might be protected by the Treaty.

Presumably the WIPO Treaty would recognize the domestic structure for regulating tribal genetic resources. The Tribal Notice states that the term "Genetic Resources" has not been given an "agreed upon" definition for purposes of the WIPO IGC meeting,[269] indicating that more debate is possible. The Tribal Notice also specifies that "[d]efinitions of [traditional knowledge] and [traditional cultural expressions] are not the subject of international agreement and remain under discussion in the WIPO IGC."[270]

Specifically, the term traditional knowledge might include intergenerational knowledge linked to the "national or social identity" of Indigenous peoples and existing either in a "fixed" or "unfixed" form.[271] Traditional knowledge might also "include know-how, skills, innovations, practices, teachings, and learning."[272] These broad definitions of traditional knowledge are consistent with the soft law instruments that have emerged from, the United Nations' Educational, Scientific, and Cultural Organization (UNESCO), a specific agency within the United Nations that "contributes to peace and security by promoting international

267. The Navajo Nation is an example of a tribal government that has its own Institutional Review Board and governs research that takes place on the Navajo Nation or involves tribal members. *See* 13 N.N.C. §§ 3251–3271 (1994) (Navajo Nation Human Research Code).

268. *See* United States v. Shoshone Tribe of Indians, 304 U.S. 111 (1938) (explaining that the Shoshone Tribe's treaty with the United States secured the Tribe's full beneficial rights to the land and natural resources on the reservation, even though the United States held the legal title as trustee).

269. Formal Tribal Consultation, *supra* note 9, at 73001.

270. *Id.*

271. *Id.*

272. *Id.*

cooperation in education, sciences, culture, communication and information."[273] UNESCO generates data and information to assist countries in achieving these goals, and the soft law approach is designed to entice countries, such as the United States, which have an uneasy relationship with this organization at times due to differing foreign policy goals.

UNESCO has long expressed a moral regard for the cultural interests of ethnic and religious groups, as well as the human rights of Indigenous peoples and local communities. The organization, however, is not in a position to generate enforceable legal rights in the same way that WIPO and the WTO do for intellectual property rights and international trade. Consequently, the various soft law instruments that have emerged from UNESCO contain very broad definitions of "intangible cultural heritage" and "cultural expressions" that are not enforceable but encourage parties to be "sensitive" to the needs of "vulnerable groups" (including Indigenous peoples, minority groups and women) as they engage in international trade relations.[274] It is very likely that an enforceable legal instrument that covers genetic resources and associated traditional knowledge will require a definition of the latter term.

Scholars disagree about whether it is possible or advisable to define Indigenous knowledge and/or traditional knowledge, claiming that this is a Western epistemic approach that can "fragment concepts," or render them "abstract" in a way that does not align with Indigenous epistemologies.[275] Professor Oguamanam believes that it might be more fruitful to identify the distinctive characteristics of Indigenous knowledge systems which differentiate them from Western scientific knowledge systems.[276] For example, Indigenous knowledge is often oral, transmitted intergenerationally, holistic and integrative, and aligned with the group's moral understanding of the Universe (for example, as interdependent,

273. *UNESCO in Brief*, UNESCO, www.unesco.org/en/brief [https://perma.cc/K9CN-ET7T]. I discuss the soft law framework of the UNESCO conventions, *see* Tsosie, *supra* note 177, at 232–35.

274. *See, e.g.*, U.N. Educ., Sci. & Cultural Org., Convention for the Safeguarding of the Intangible Cultural Heritage, U.N. Doc. MISC/2003/CLT/CH/14 (2003) (counseling respect for creative diversity and local forms of creative expression, such as "folklore," and acknowledging that some societies "live their cultural traditions" and merit protection for their "intangible cultural heritage"); U.N. Educ, Sci. & Cultural Org., Convention on the Protection and Promotion of the Diversity of Cultural Expressions, U.N. Doc. CLT-2005/CONVENTION DIVERSITE-CULT REV.2 (2005) (encouraging dialogue among cultures to foster intercultural respect, recognizing the sovereignty of nation-states to foster diversity of cultural expressions within their territorial boundaries, and encouraging countries to recognize the link between culture and development and to work cooperatively).

275. *See* OGUAMANAM, *supra* note 5, at 15.

276. *See id.* at 16–17 (outlining twelve distinctive features of Indigenous knowledge).

alive, and related to distinctive features of the land or geography).[277] Similarly, Professor Leroy Little Bear and Professor Gregory Cajete are Indigenous scholars who have conceptualized "Native Science" as a distinctive "paradigm" within knowledge systems, based upon "interdependent" natural laws that govern the Universe.[278]

Is there an argument that genetic resources and associated traditional knowledge should be considered tribal trust assets requiring protection as a matter of the federal trust responsibility? There is an emerging template for this approach under federal law. Drawing on policy guidance from the U.S. Fish and Wildlife Service, the Environmental Protection Agency has offered a definition of Indigenous knowledge in its guidance for implementation of section 106 of the Clean Water Act stating, in relevant part, that:

> Indigenous knowledge is a body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes and Indigenous Peoples through direct contact and experience with the environment. It is applied to phenomena across biological, physical, social, cultural and spiritual systems . . . . Each Tribe or Indigenous community has its own place-based body of knowledge that may overlap with that of other Tribes.[279]

The Biden Administration elevated the traditional knowledge policy guidance to all federal agencies when it issued new guidelines requiring federal agencies to include Indigenous knowledge in research, policy and decision making, on the basis that Indigenous knowledge has equivalent value to scientific knowledge.[280] The federal policy guidance is now being used to promote collaborative management of public lands by the agencies that manage the lands along with the tribal nations that are culturally affiliated to these ancestral territories.[281] Integrating Indigenous knowledge with ancestral territories and

277. *See id.* at 16–17.

278. *See* Leroy Little Bear, *Foreword in* GREGORY CAJETE, NATIVE SCIENCE: NATURAL LAWS OF INTERDEPENDENCE (2000); *see generally* GREGORY CAJETE, NATIVE SCIENCE: NATURAL LAWS OF INTERDEPENDENCE (2000) (defining and explaining the "Native Science" concept).

279. EPA, CLEAN WATER ACT SECTION 106 TRIBAL GUIDANCE, 39 (2023).

280. *See* Memorandum from Arati Prabhakar, Assistant to the President & Dir., Off. of Sci. and Tech. Pol'y & Brenda Mallory, Chair, Council on Env't Quality, Guidance for Fed. Dep'ts & Agencies on Indigenous Knowledge (Nov. 30, 2022); Melanie Lenart, *Finding Common Ground: New Guidelines Require Federal Agencies to Include Indigenous Knowledge in Research, Policy and Decision Making*, NATIVE SCI. REP. (Feb. 22, 2023), https://nativescie encereport.org/2023/02/finding-common-ground-2 [https://perma.cc/FU9T-77VL].

281. The Bears Ears National Monument is the policy exemplar for this approach, which involves co-stewardship of five tribal governments with ancestral ties to the site. *See Bears Ears*

genetic resources allows the collaborative management of natural resources. Thus, there is a strong argument that genetic resources and associated traditional knowledge merit protection under a sui generis rights structure.

C. Treaty Rights: Genetic Resources and the Trust Responsibility

Tribal trust lands are rich repositories of biodiversity and it is very important to recognize the value of these natural resources and treat them as a trust asset. Indigenous heirloom seeds are stewarded by tribal members and some tribal governments maintain their own seed banks. The Convention on Biological Diversity recognizes the sovereignty of nation-states over biodiversity within their national borders.[282] On the other hand, the U.S. recognizes tribal trust lands as being under the beneficial ownership and control of tribal governments and their members, meaning that any taking of tangible natural resources requires compensation.[283]

There is a rich history of tribal governments reserving off-reservation hunting, fishing, and gathering rights. In the Pacific Northwest, the Stevens Treaties with Native nations in that region reserved off-reservation fishing rights in the salmon runs, ultimately resulting in the famous *Washington v. Washington State Commercial Passenger Fishing Vessel Association*[284] case upholding the district court's ruling that that the salmon resource ought to be equitably apportioned between tribal fishermen and non-Native fishermen. In the Midwest, Native nations also reserved off-reservation fishing rights, which led to a string of modern cases affirming that these rights continue to exist in the modern era, such as *Minnesota v. Mille Lacs Band of Chippewa Indians*.[285] The Native nations in that region also rely heavily on wild rice ("Mnoomin"), which grows in lakes and is considered a sacred relative and not a resource.[286] The need to protect Mnoomin is built into the White Earth Ojibwe Nation's legal code and formed the basis of a

National Monument Resource Management Plan, BUREAU OF LAND MGMT., https://eplanning.blm.gov/eplanning-ui/project/2020347/510 [https://perma.cc/5KBK-2NS3].

282. U.N. Env't Programme, Convention on Biological Diversity, art. 3, (1992).

283. United States v. Sioux Nation of Indians, 448 U.S. 371, 424 (1980) (holding that the United States must pay "just compensation" for a taking of treaty recognized title to reservation land).

284. 443 U.S. 658, 685 (1979).

285. 526 U.S. 172 (1999).

286. *See* Dan Gunderson, *Advocates Hope White Earth Wild Rice Case Will Boost 'Rights of Nature,'* MPR NEWS (Sept. 1, 2021, 5:43 AM), https://www.mprnews.org/story/2021/09/01/advocates-hope-white-earth-wild-rice-case-will-boost-rights-of-nature [https://perma.cc/6PMS-9MXT].

recent action to enjoin construction of an oil pipeline that threatened to pollute the rivers and waters that are home to Mnoomin.[287]

In each of these instances, tribal customary law informs the meaning of the genetic resource to the Native nation. Salmon, walleye pike, and wild rice are "First Foods"[288] and they are treated as relatives for the purposes of tribal customary law. Native nations have always had an interdependent relationship with these resources, which ensures that they have food to eat, and also that the species are stewarded with respect and appreciation. To the extent that tribal "genetic resources" are located off-reservation, there is a strong argument that the Native nation has a treaty-protected right to continue this relationship. The fishing, hunting, and gathering cases from the Pacific Northwest, Minnesota, and Michigan support the notion that the federal government's trust duty to protect tribal treaty rights and trust assets extends to off-reservation sites.

We assert that genetic resources associated with tribal biodiversity are protected by the federal government's trust responsibility. Treaty jurisprudence provides that Native nations maintain reserved rights to any resource or authority that they did not expressly cede in the Treaty. In *United States v. Winans*,[289] the Court held that tribal reserved rights to fish at "usual and accustomed places" off the reservation also encompassed an easement of access across the lands of private owners. The right to access traditional foods protected by treaty was expressly confirmed in the *Winans* case and should extend by analogy to allow Native nations to otherwise access their genetic resources even when they are in the custody of third parties, as Indigenous heirloom seeds might be.[290]

The most recent Supreme Court case to construct the reserved rights doctrine under treaty law and the trust doctrine is *Arizona v. Navajo Nation*.[291] In that case, the Navajo Nation brought an action against the U.S. Department of Interior, asserting that the federal government must consider the Navajo Nation's currently unquantified water rights in the Colorado River as it plans for the cutbacks in the Colorado River necessitated by the current drought in the

287. *See id.* (discussing White Earth's 2018 law protecting wild rice, as well as its subsequent action against the Minnesota Department of Natural Resources seeking to enjoin the water use permit issued to Enbridge corporation for its Energy Line 3 pipeline).

288. *See* Kyle Whyte, *What Do Indigenous Knowledges Do for Indigenous Peoples?, in* TRADITIONAL ECOLOGICAL KNOWLEDGE: LEARNING FROM INDIGENOUS PRACTICES FOR ENVIRONMENTAL SUSTAINABILITY 57, 57–81 (Melissa K. Nelson & Daniel Shilling eds., 2018) (discussing the Confederated Tribes of the Umatilla Reservation's "First Foods" framework and providing citations to other tribal nation's traditional knowledge practices and protection for ancestral foods).

289. 198 U.S. 371, 384 (1905).

290. *Id.*

291. 599 U.S. 555 (2023).

Southwest. The Navajo Nation's Treaty of 1868 carried reserved water rights which were never quantified due to the United States' decision to act as trustee for the Tribe, rather than allowing the Navajo Nation to intervene in an earlier phase of the Colorado River water adjudication and assert its rights directly.[292] Although the Supreme Court acknowledged that the Navajo Nation has reserved water rights under the 1868 Treaty and is in a trust relationship with the United States, the Court narrowed the trust doctrine, finding that unless the federal government had expressly assumed a duty to "secure [the] water for the tribe," there was no way to force the federal trustee to take affirmative steps to secure the Navajo Nation's water rights.[293]

The Navajo Nation case exemplifies the Supreme Court's recent approach, which is to find that the general "trust responsibilit[y]" of the federal government toward tribal governments is more of a "moral" or "political" doctrine, and that it does not represent a "conventional trust relationship" unless Congress specifically creates that relationship with respect to a "particular trust asset."[294] This more stringent test formerly pertained to tribal lawsuits for damages based on breach of fiduciary obligations, but it wasn't until the *Navajo Nation* case that the Court extended it to petitions for equitable relief. In doing so, the Court relied upon its 2011 ruling in *United States v. Jicarilla Apache Nation*,[295] which found that the United States is not subject to the fiduciary duties that would prevent a private trustee from withholding relevant information from its beneficiary in a legal claim for breach of trust. While the U.S. government can be sued for damages for breach of trust by its beneficiary, the tribal nation, it can still assert an attorney-client privilege and withhold relevant documents from the tribe during the discovery process. In that sense, the *Jicarilla* Court found that the United States is not a private trustee, subject to the common law standards that govern fiduciary relationships, although it may be liable for damages in a legal action for breach of a trust responsibility that it assumed.[296]

The Court in the Navajo Nation case stated that "[u]nder the Constitution's separation of powers, Congress and the President may update the law[s] to meet modern policy priorities and needs. To that end, Congress may enact—and often has enacted—legislation to address the modern water needs of Americans, including Navajos, in the West."[297]

292. *See id.* at 555.
293. *Id.* at 556, 567–69.
294. *Id.* at 566, 571.
295. *Id.*; United States v. Jicarilla Apache Nation, 564 U.S. 162, 182 (2011).
296. *Jicarilla,* 564 U.S. at 173–74, 203 n.8.
297. *Navajo Nation*, 599 U.S. at 566.

In comparison, the role of the judiciary is to "stay in their proper constitutional lane and interpret the law [here, the treaty] according to its text and history," leaving the political branches the responsibility to "update federal law as they see fit in light of the competing contemporary needs for water."[298]

This decisively political approach to reconciling tribal reserved rights with the modern needs of the American public comes with additional caveats based on collateral cases that are not "federal Indian law cases" but have significant implications for tribes.

In *Sackett v. Environmental Protection Agency*,[299] the Supreme Court narrowed the definition of "waters of the United States" within the Clean Water Act to cover only permanent bodies of water and wetlands with "a continuous surface connection" to "traditional interstate navigable waters." Consequently, the Clean Water Act (CWA)[300] does not apply to waters that have an underground connection to those lakes and rivers, or which are separated by humanmade barriers. Because tribal waters in the Southwest were altered by the federal dam projects built during the 1930–60s,[301] and because surface waters in the desert are often connected by elaborate channels of groundwater,[302] this is a difficult definition to apply. Tribal authority under the CWA will be constrained indirectly by this holding, whereas state authority over water resources will expand. Thinking back to the EPA's policy guidance on the Clean Water Act, we can see the gap between the judicial understanding of waters of the United States and the tribal understanding of water associated with the traditional territory of the Native nations in the desert Southwest. Indigenous knowledge is place-based and Native peoples understand the delicate interface between surface and groundwater in the desert. Groundwater often manifests in natural springs within otherwise arid lands, sustaining the people and their ancestral crops. To disrupt this balance can have catastrophic consequences.

Although federal agencies are now directed to consider Indigenous knowledge as they manage federal public lands and "waters of the United States," we see troubling implications in a set of cases recently decided by the U.S. Supreme

298. *Id.* at 567.
299. 598 U.S. 651, 678 (2023).
300. Clean Water Act, 33 U.S.C. §§ 1251–1389.
301. *See generally* Peter D. Rogers & Stephanie M. Edmiston, *The Gila River Indian Community Water Rights Settlement and its Impact* on *Water Resource Management*, 38 WATER INT'L 250 (2013) (discussing the Arizona Water Settlements Act of 2004 and the general historical background connecting the Gila River Indian Community to Arizona water rights, including dams).
302. *See* Rodney B. Lewis & John T. Hestand, *Federal Reserved Water Rights: Gila River Indian Community Settlement*, 133 J. CONTEMP. WATER RSCH. & EDUC. 34, 35 (2006) (discussing ways the complex relationship between groundwater and surface water affect tribal water rights).

Court. In *Loper Bright Enterprises v. Raimondo* and *Relentless, Inc. v. Department of Commerce*,[303] litigants succeeded in their challenge to the *Chevron* deference doctrine that long required federal courts to defer to a federal agency's interpretation of an ambiguous statute so long as the interpretation was reasonable. Many of the actions that federal agencies have taken on behalf of tribes were shielded from undue interference by third parties based on deference to the agency. The Supreme Court overturned *Chevron* and ruled that courts must make their own determination about whether the agency acted within its statutory authority. Will third parties and states now feel empowered to challenge agency actions designed to protect tribal interests? What will happen in cases where the statutory language is ambiguous? Federal Indian law has historically relied upon the canons of construction to interpret ambiguous treaty provisions and ambiguous statutory provisions. The Indian law canons of construction are based upon the historical recognition that tribal governments are not in an equal bargaining position and that the federal government has the dominant authority to control tribal lands and resources.

In the *Arizona v. Navajo Nation* case, Justice Thomas wrote a concurring opinion claiming that the trust relationship was amorphous and ungrounded when considered in historic context. Justice Thomas questioned whether there was any basis to apply the Indian law canons of construction to interpret federal statutes and override "the ordinary rules of statutory interpretation."[304] Justice Thomas also questioned why the trust relationship would be construed to provide additional power "not enumerated in the Constitution, to do all that is required to protect Indians."[305] Justice Thomas asserted that because an expansive notion of "federal plenary power" has been applied to *restrict* tribal sovereignty and eliminate tribal rights, it is a questionable basis for expanding federal power to *protect* tribal rights.[306] In the *Navajo Nation* case, the Supreme Court gives broad consideration to the interests of the states in regulating water resources to meet the demands of the current day. Thus, the natural resources that belong to Native nations are contested in part due to the demands of other natural resource users.

303. 603 U.S. 369 (2024).
304. *Navajo Nation*, 599 U.S. 555, 570–74 (Thomas, J., concurring).
305. *Id.* at 572 (quoting Morton v. Mancari, 417 U.S. 535, 552 (1974)).
306. *Id.* at 573–74.

D. Tangible Cultural Heritage

There is a strong argument that Indigenous heirloom seeds constitute a form of cultural patrimony meriting protection under the set of laws that currently regulates material objects of Native American cultural heritage.

In the United States, the Native American Graves Protection and Repatriation Act (NAGPRA) is widely acknowledged as being one of the only enforceable statutes to protect Native American cultural rights.[307] NAGPRA was passed in 1990 to protect four categories of cultural items: Native American human remains, funerary objects, objects of cultural patrimony, and sacred objects.[308] To the extent that these cultural items were held by federal agencies or federally funded museums in 1990, each of those entities had a duty to disclose the items in their possession and work to repatriate them to the culturally-affiliated tribal government or Native Hawaiian organization.[309] With respect to items discovered after 1990 on federal public lands or tribal lands, the statute recognizes the rights of Native American owners and identifies a process for the respectful disposition of these items.[310]

NAGPRA prohibits the commercial trafficking of protected Native American cultural items.[311] The criminal provisions preclude interstate trafficking of cultural items, but they were not successful in controlling the global black market for Indigenous cultural items.[312] In December 2022, Congress finally passed the Safeguard Tribal Objects of Patrimony Act (STOP Act), which bans the export of protected Native American cultural items.[313] Prior to 2022, Native American cultural patrimony was not protected on the same level as that of the nation-states under the 1970 UN Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property.[314] The STOP Act draws on the domestic cultural heritage statutes, such

307. 25 U.S.C. §§ 3001–13. Because the Indian Arts and Crafts Act protects economic rights, the American Indian Religious Freedom Act is not legally enforceable, and NAGPRA has enforceable duties. NAGPRA is the only truly protective statute for cultural rights.
308. 25 U.S.C. § 3001(3)(a–d) (defining categories of cultural items).
309. 25 U.S.C. § 3005.
310. 25 U.S.C. § 3002.
311. 18 U.S.C. § 1170 (prohibiting illegal trafficking in Native American human remains and cultural items).
312 *See Legislative Hearing to Receive Testimony on S.465 & S.1400 Before the S. Comm. On Indian Affs.*, 115th Congress (2017).
313. Safeguard Tribal Objects of Patrimony Act, 25 U.S.C. §§ 3071–3079.
314. Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, Nov. 17, 1970, 823 U.N.T.S. 231 (entered into force Apr. 24, 1972).

as NAGPRA and the Archaeological Resources Protection Act, to define protected items of Native American cultural heritage.

NAGPRA defines "sacred objects" as "specific ceremonial objects" needed by traditional Native American religious leaders for the practice of their traditional religions.[315] The statute defines objects of "cultural patrimony" as items having "ongoing historical, traditional or cultural importance central" to the Indian tribe or Native Hawaiian organization, and which could not be alienated from the Indigenous group by any individual member.[316] Both definitions rely upon tribal or Indigenous law to determine whether an item falls within the statutory definition. In this respect, NAGPRA is an important federal statute because Indigenous law, whether written or customary, determines the meaning of "sacred object" and "object of cultural patrimony" for purposes of federal law.

Significantly, NAGPRA does not protect the intangible knowledge of Indigenous peoples, even though many objects carry associated ceremonial and cultural knowledge. The process of repatriation requires consultation with tribal representatives, and—absent a relevant withholding provision in the Freedom of Information Act—information secured from tribal communities that comes into the possession of federal agencies may become subject to mandatory disclosure upon public request.[317]

On December 13, 2023, the Department of Interior published its most recent set of regulations for NAGPRA,[318] which made several changes that are relevant to the arguments in this Article. First, the NAGPRA regulations now clearly specify that any museum or agency that has custody of Native American cultural items has a duty of care to ensure that the items are cared for appropriately.[319] The museum or agency must consult with the culturally-affiliated tribal nation and obtain the nation's "free, prior, and informed consent" for any action (such as public display) that could violate the requisite duty of care.[320] The regulations expressly state that

315. 25 U.S.C. § 3001.
316. *Id.*
317. *See, e.g.*, 25 U.S.C. § 3003 (requiring consultation with tribal governments and Native Hawaiian organizations prior to finalizing inventories of human remains and associated funerary objects) and 25 U.S.C. § 3005(d) (requiring museums and federal agencies to share relevant information in course of consultation).
318. Native American Graves Protection and Repatriation Act Systematic Processes for Disposition or Repatriation of Native American Human Remains, Funerary Objects, Sacred Objects, and Objects of Cultural Patrimony, 88 Fed. Reg. 86452 (Dec. 13, 2023) (to be codified at 43 C.F.R. pt.10).
319. *See id.* at pt.10.1 (d) (specifying that the regulations impose upon museums and federal agencies a "duty of care" with respect to cultural items that must be informed by consultation with the relevant Native individuals or groups on what is appropriate for "storage, treatment, or handling" of the remains or cultural items). 88 Fed. Reg. 86519.
320. 88 Fed. Reg. 86519.

museum and agency officials must recognize the important role of Indigenous traditional knowledge in assessing the status of an item as a protected cultural object, as well as identifying the duty of care that is applicable.[321]

We draw upon these regulations as we consider the meaning of "cultural patrimony" to Native peoples. Indigenous peoples have a longstanding cultural relationship with their seeds and recognize the seeds as having a distinctive personhood, requiring duties of care. In that respect, the relationship between Native peoples and their heirloom seeds is very similar to the cultural items that are currently protected by the concept of "cultural patrimony." However, NAGPRA's statutory definition requires that the tribal government itself is the owner of its "cultural patrimony" and that no tribal member can "alienate" the item from the tribe itself. That definition is not consistent with the ethical framework described by Indigenous seed keepers. Within that framework, Indigenous farmers and seed keepers have specific duties and responsibilities that are designed to maintain the ability of the seeds to feed the community and sustain life, through successive generations. Within this universe, it is perhaps more appropriate to think of a relational economy that is built upon sustaining life and community, rather than a commercial economy that is built upon principles of property "ownership" and the right to exclude others from use. In this sense, we argue that the Indigenous customary law that applies to Indigenous heirloom seeds would be the appropriate source of traditional law describing the appropriate duty of care when a museum, agency, or institution (such as a biobank or seed repository) comes into possession of Indigenous heirloom seeds.

The world envisioned by the corporations who create seeds that are genetically engineered to die at the end of their growing season and can be perpetuated only by additional payments and licensing is not consistent with the relational world of Indigenous seed keepers that allows life to continue. Seed keepers might share seeds with other Indigenous farmers and communities, just as contemporary tribal governments might share an ancestral relationship with genetic resources based upon territory and culture, rather than a formal political identity. This is true, for example, of the various Pueblo Indian nations that share an ancient history and set of connections within their ancestral territory, which is now under the political authority of New Mexico, Arizona, and Colorado. Based on his existing research on heirloom corn in the Southwest, Dr. Michael Kotutwa

321. *Id.*

Johnson suggests that cultural and territorial relationships could be a strong basis for identifying Indigenous rights to heirloom seeds.[322]

For the several Native nations that descend from the ancient Puebloan peoples of this region, heirloom seeds are their "cultural patrimony." They are rooted in the land that was tended by countless generations, and this ancestral memory lives on in their descendant communities. That living memory exists in the land, the seeds, and the songs, prayers, and ceremonies that allow for the seeds to be cultivated and preserved. It also exists in the contemporary knowledge and practices of traditional Native farmers and seed keepers.[323]

The rubric of cultural sovereignty might be a more appropriate context for the rights of Indigenous farmers and seed keepers than the political sovereignty that drives recognition of eligible tribal governments under NAGPRA.[324] Cultural sovereignty is a process-based account of Indigenous sovereignty that is tied to land, culture, and community. Cultural sovereignty allows Indigenous peoples to draw upon their own norms and values in structuring their collective futures.[325] It is not dependent upon political recognition, and in that sense cultural sovereignty is consistent with the inherent sovereignty of Indigenous peoples that predates the arrival of Europeans. In the case of Indigenous heirloom seeds, cultural sovereignty can allow Indigenous farmers and seed keepers to express the values and norms that should extend to the governance framework for Indigenous heirloom seeds. The participation of tribal governments and other Indigenous communities is vital to this goal and therefore the broader engagement process that the USPTO has invoked is in alignment with the need to recognize both cultural and political sovereignty.

322. Dr. Johnson was recently awarded a grant by the Rockefeller Foundation to probe this set of ancestral relationships between people and place in the Southwest. *See* Elena Lopez, *Revitalizing Indigenous Foodways: A Grant for Sustainable Growth*, UNIV. OF ARIZ. COLL. OF AGRIC., LIFE & ENV'T SCIS., (Jan. 18, 2024), https://cales.arizona.edu/news/revitalizing-indigenous-foodways-grant-sustainable-growth [https://perma.cc/37UW-KYP3].

323. *See* Agha, *supra* note 15, at 52–53 (describing the collaboration between Hopi farmers and New Mexico Pueblo farmers to identify traditional varieties of corn that reach back into the ancestral territories of these Pueblo nations).

324. Wallace Coffey & Rebecca Tsosie, *Rethinking the Tribal Sovereignty Doctrine: Cultural Sovereignty and the Collective Future of Indian Nations*, 12(2) STAN. L.& POL'Y REV. 191 (2001).

325. *Id.* at 196.

V. FUTURE CHALLENGES: INTELLECTUAL PROPERTY AND EMERGING TECHNOLOGIES

The WIPO Treaty was finalized and adopted amidst a complex and rapidly changing international and domestic policy environment. The question of whether patent applicants should be required to disclose the source of the genetic resources or associated traditional knowledge that led to their invention is only the tip of the iceberg. The real question is how to protect the human rights of Indigenous peoples regarding their genetic resources and traditional knowledge. In particular, should Indigenous heirloom seeds merit protection from commercial entities that seek to exploit their unique characteristics? Should institutions and repositories be required to "rematriate" Indigenous heirloom seeds that have come into their possession? Can we create equitable frameworks to govern biodiversity in an era where digital sequence information is arguably even more valuable for biotechnology than the actual genetic resources?

The WIPO Treaty does not engage with these issues. There is currently no U.S. domestic law protecting Indigenous heirloom seeds, nor is there any law recognizing the intellectual property rights of Indigenous peoples to their seeds and other genetic resources. We have argued that Indigenous seeds and associated traditional knowledge would be best protected by a sui generis federal statute that would expand the notion of Indigenous "cultural patrimony" to include heirloom seeds. We argue that Indigenous customary law could work in tandem with federal law, as it does with NAGPRA, to protect heirloom seeds in a way that is culturally aligned with Indigenous norms. Consultation with tribal leaders, Indigenous farmers, and Native seed keepers will be part of this process. The reality is that protecting the seeds will also require consideration of emerging technologies, including digital sequencing and artificial intelligence (AI) technologies. Below, we offer some perspectives that might be helpful to policymakers seeking to understand the broader context of the issues. We acknowledge that the technologies are emergent in some cases, and the law lags behind the technology in most cases, making it difficult to project with any level of certainty what will happen. Our analysis is intended to provoke discussion and thought, and we acknowledge the different communities and interest groups may well disagree.

A. Artificial Intelligence Technologies

Contracting parties must consider the potential effect of emerging technologies. Article 8 of the WIPO Treaty requires contracting parties to review the scope and contents of the instrument no later than four years after the instrument comes into force. The Treaty envisions the possibility that the

disclosure requirements will be extended "to other areas of intellectual property and to derivatives," and it also contemplates "other issues arising from new and emerging technologies that are relevant for the application of this [Treaty]."[326]

WIPO is active in the space of emerging technologies. In 2019, WIPO published a draft issues paper on intellectual property and artificial intelligence that identified several trends, including the fact that the neural networks of AI perform best when they are built upon massive open-access data sets.[327] The report documents that corporations in the United States, Japan, and China dominate the patent arena for AI, but many corporations are developing AI products and technologies in-house, which can protect them from disclosure under the doctrine of trade secrets. An AI expert quoted in the report predicts that "within the next five years . . . AI adoption across multiple industries . . . will drive massive global GDP growth."[328]

B. DNA Sequence Information and Derivatives

These AI trends will be supported by the open access frameworks proposed for genetic resources. As noted above, the United Nations is encouraging the "collection of DNA sequences for as many species and varieties as possible by 2030 as part of its Global Diversity Framework."[329] Referring to seeds as germplasm, the United Nations' report states that: "[i]n some cases, germplasm (seeds) developed by smallholder farmers has been the source material for important crop-saving and agronomic improvement technologies deployed by bioscience firms and redistributed to farmers worldwide."[330] The report describes this movement toward "collaborative innovations" as a basis for tracking "the provenance of seeds and genetic resources."[331] It is unclear whether the term "provenance" refers to a need to acknowledge the intellectual and creative contributions of Indigenous and local peoples to "source materials." It is noteworthy that universities often earn money by commercially patenting the inventions and discoveries of their employees.[332]

326. WIPO Treaty, *supra* note 1, art. 8.
327. *See* WIPO, WIPO TECHNOLOGY TRENDS 2019: ARTIFICIAL INTELLIGENCE (2019).
328. *Id.* at 104.
329. Melanie Lenart, *Whose DNA Is it Anyway?,* NATIVE SCI. REP. (Apr. 26, 2023), https://nativesciencereport.org/2023/04/whose-dna-is-it-anyway/ [https://perma.cc/EYH7-EBER].
330. *Id.*
331. *Id.*
332. *Id.* (noting that this is allowed even for federally-funded research by the Bayh/Dole Act).

The power of the economic framework that drives technology and innovation cannot be overestimated.[333] Pharmaceutical companies that use chemicals to manufacture new drug therapies can get an exclusive right to manufacture and distribute their drugs for five years.[334] In comparison, biotechnology companies that rely upon derivatives from living organisms to manufacture medicines and other therapeutics can obtain patent protection for twelve years.[335] Digital sequence information is a vital resource in this process. According to science journalist Melanie Lenart, the Indigenous knowledge responsible for heirloom seeds is embodied in their "internal genetic code."[336] Lenart quotes a former tribal policy analyst who stated that the digital sequence information is all that scientists need to gain the value from Indigenous heirloom seeds: "Once you have the sequence, you no longer need access to the DNA . . . think of it like 3D printing—you can reverse the process. You can use techniques to turn the information back into physical things."[337] Since 2012, scientists have had the ability to undertake "gene editing" to delete or alter specific sections of the genetic code, creating another living organism.[338] These genetically modified organisms (GMOs) are now touted as necessary to climate adaptation[339] and, as noted above, the United States is a leading global producer of GMOs.

C. Database Access and Benefit-Sharing Issues

The United States, European countries, and Japan have united to store digital data in a collective database.[340] The current collection contains more than 228 million sequences of genetic code from plants and mammals.[341] What are the restrictions on use of the database? There is pressure to make this an open access database, free of cost and restrictions and serving multinational corporations as well as scientists.[342] Not surprisingly, the issues reprise those of cultural heritage. Countries that are rich in biodiversity may share in the benefits of genetic

333. *See* Troy Segal, *Biotechnology vs. Pharmaceuticals: What's the Difference?*, INVESTOPEDIA (Apr. 19, 2023), https://www.investopedia.com/ask/answers/033115/what-difference-between-biotechnology-company-and-pharmaceutical-company.asp [https://perma.cc/4E76-F5Y4].
334. *Id.*
335. *Id.*
336. Lenart, *supra* note 329.
337. *Id.* (quoting Preston Hardison, retired policy analyst for the Tulalip Tribes of Washington).
338. *Id.*
339. *See* Lenart, *supra* note 329 (noting that climate goals are embedded within the Global Biodiversity Framework).
340. *Id.*
341. *Id.*
342. *Id.*

resources, according to the CBD and Nagoya Protocol.[343] However, they do not have the right to share in potential monetary gains from digital sequence information (DSI) that becomes part of a commercial product.[344] There is a movement to develop a framework for benefit-sharing of DSI, but researchers seem to agree that the bilateral model applicable to genetic resources under the CBD and the Nagoya Protocol is not appropriate for DSI.[345] If a multilateral system is created in which open access is delinked from benefit-sharing, what will control the potential exploitation of Indigenous peoples and local communities?

D. What are the Protections for Indigenous Peoples?

Currently, there is not a clear or coherent plan to protect Indigenous peoples and local communities from the many challenges posed by emerging technologies. Some scientists advocate "inclusion" of Indigenous peoples and local communities as "partners in genetic sequencing projects."[346] In this capacity, they would have a role in "research design and benefit-sharing ideas."[347]

Some scholars advocate application of an extended set of ethical principles (the CARE principles)[348] to control the challenges posed by open-access data systems (governed by the FAIR principles).[349] The FAIR principles support the notion that open data can be "freely used, modified and shared by anyone for any purpose."[350] FAIR stands for "findable, accessible, interoperable, reusable" systems of data, and these open systems are considered pivotal to innovation and equity among data users.[351] They do not control for the types of burdens and exploitation that Indigenous peoples experience. Consequently, proponents of Indigenous data sovereignty have advocated application of the CARE principles, asserting that modern data co-systems must support Indigenous self-determination and foster collective benefit, authority to control, responsibility,

343. Scholz et al., *supra* note 184, at 2.
344. *Id.*
345. *See supra* notes 174179 and accompanying text.
346. Lenart, *supra* note 320 (citing Ann. M. Mc Cartney et al., *Indigenous Peoples and Local Communities as Partners in the Sequencing of Global Eukaryotic Biodiversity*, 2 NPJ BIODIVERSITY 1 (2023).
347. *Id.*
348. Stephanie Russo Carroll et al., *The CARE Principles for Indigenous Data Governance*, 19 DATA SCI. J. 1, 7 (2020).
349. Dr Stephanie Russo Carroll is collaborating with Dr. Michael Kotutwa Johnson on his Rockefeller Foundation "Revitalizing Indigenous Foodways Project," and she is developing a data sovereignty protocol for the project. *See* Lopez, *supra* note 322.
350. *The Open Definition*, OPEN DEFINITION, https://opendefinition.org/ [https://perma.cc/X8FZ-XE5K].
351. Carroll et al., *supra* note 348.

and ethical use of data.[352] The CARE principles are designed to apply to all Indigenous peoples, across national borders and with or without the need for formal political recognition by any national government.[353] The primary requirement is to center the collective cultural values of Indigenous peoples in relation to their data, moving forward with respect and collaboration to identify their interests and create effective safeguards.

The safeguards suggested by the CARE principles could include engagement with Indigenous peoples through their representative forms of governance, such as tribal Institutional Review Boards. Formal research agreements between researchers and Indigenous governments or collectives can specify the conditions applicable to the collection and use of data, as well as the conditions of consent required for reuse of data. With respect to identification of tribal interests in existing data sets, scholars such as Jane Anderson, Maui Hudson, and Stephanie Carroll recommend context labeling or data tags that can tie data to specific Indigenous communities, territories, and resources.[354] This process of context labeling is now occurring in many museums and archives, as the museum professionals work with Indigenous peoples to identify items, as well as appropriate cultural restrictions.[355]

We believe that some form of labeling might be very productive for Indigenous heirloom seeds, and it is possible that territorial markers could be the most helpful first step, given the longstanding relationship of Indigenous peoples to corn and other heirloom seeds throughout North, Central, and South America. These labels could identify the source of genetic resources, which would also be very helpful if researchers have already genetically sequenced these plants and entered the data into the INSDC database. It is worth noting that the partnership between the United States, European Nations, and Japan serves the interests of all of these countries, who are leaders in biotechnology and patents.

352. *See id.* at 6.

353. Indigenous data sovereignty (IDS) and IDS agreements are new concepts. I know this from my practice and am in dialogue with the scholars who wrote in the initial book, but there is relatively little that summarizes any of this. *See generally* INDIGENOUS DATA SOVEREIGNTY AND POLICY (Maggie Walter, Tahu Kukutai, Stephanie Russo Carroll and Desi Rodriguez-Lonebear eds., 2021) (providing a global account of Indigenous data sovereignty).

354. *See* Carroll, *supra* note 348, at 7–8 (discussing the Cultural Institution Notices developed by Local Contexts for Indigenous collections at the Smithsonian and other institutions).

355. *Labels*, LOCAL CONTEXTS, https://localcontexts.org/labels/about-the-labels [https://perma.cc/GA79-WTY8]; *Blog: Labels in Use*, LOCAL CONTEXTS, https://localcontexts.org/blog/labels-in-use [https://perma.cc/46HS-8H89]; *Collections Care Notices*, LOCAL CONTEXTS, https://localcontexts.org/notices/cc-notices [https://perma.cc/GH3J-ZGMJ].

CONCLUSION

Rowen White, a Mohawk activist and seed keeper renowned for her leadership in the seed rematriation movement, describes the DSI initiatives as yet the latest effort of Western nations to "create a more productive and efficient industrial agricultural seed," serving the prevailing values of "uniformity . . . yield and productivity," as well as economic profits.[356] In comparison, Indigenous seed keepers foster "cultural and spiritual memory," producing diverse seeds that enable long-term survival and resilience.[357] In addition, Indigenous farmers often create reciprocal environments, such as planting "corn, beans and squash" together ("The Three Sisters"), which produces nutrient-rich crops and alleviates the need to rely on chemical additives in commercial fertilizers and pesticides.[358]

Although an additional patent disclosure requirement might enhance the equitable interests of Indigenous peoples in preventing blatant biopiracy of their traditional plants, seeds, and medicines, the WIPO Treaty may fall short of protecting what is most sacred to Indigenous peoples. We might return to Oren Lyons' instruction that "the Seed is the Law: It is the Law of Life. It is the Law of Regeneration." What animates life in a spiritual universe? Indigenous peoples throughout the world see themselves as connected across time and place, with a shared responsibility to act with a consciousness that fosters life. Under Indigenous customary law, the natural laws of the Universe foster life, and the health and resilience of our human bodies is comparable to the resilience of the Earth's waters and forests. The forests operate as the Earth's lungs, cleaning the air, and the rivers operate as blood vessels. We can see the way that natural systems regenerate by witnessing the rapid restoration of forests after a fire and the restoration of rivers and salmon runs after removal of a dam. Today, the original instructions that emerged at Creation have been disregarded by many human communities, displaced by the belief that human beings can conquer nature through technology, which is the ultimate hubris of a world committed to post-humanism.

We should also ask: What are the structural considerations of justice given our responsibility to future generations? The WIPO Treaty focuses on the economic interests of those who seek patents for biotechnology and innovation. While the Treaty marks an important first step in acknowledging the need to prevent patents that are based on unapproved use of genetic resources and associated traditional knowledge, there is a need for further development of the

356. Lenart, *supra* note 329.
357. *Id.*
358. *Id.*

protective framework. We must go beyond this narrow set of economic interests and adopt an intercultural and intergenerational frame for governance of biodiversity, inclusive of Indigenous cultural values. The "industrial agricultural seed" that Rowen White discusses is not capable of fostering life, nor is it aligned with the natural laws that have enabled human beings to survive into the present day. In comparison, Indigenous farmers and seed keepers are working very hard to enable survival. As Dr. Kotutwa Johnson says:

> [M]any of us are still fulfilling our obligations and honoring our covenant. We are reminded of this when we look at a small ear of Hopi blue corn, as it represents humility, patience, and endurance. All of these qualities are needed to ensure the prosperity of the next generation of Hopi people—if not humanity.[359]

Indigenous heirloom seeds embody the law that inspires life and continuity, and human beings must protect them through an appropriate set of laws and governance frameworks. Although the Treaty has not yet been adopted by the United States, the USPTO did undertake a listening session with tribal leaders on the Treaty and the ongoing WIPO negotiations on Indigenous traditional knowledge.[360] This is a positive first step toward the goal of developing an intercultural and intergenerational framework for the governance of Indigenous heirloom seeds and associated knowledge.

359. Kotutwa Johnson, *supra* note 74, at 394.

360. The listening session occurred at a meeting of the National Congress of American Indians in Las Vegas, Nevada on October 30, 2024. Professor Tsosie spoke at the meeting and heard the detailed comments that tribal leaders offered to the representatives of the USPTO.