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Reform Federal Policies to Enable Native American Regenerative Agriculture

Centering the goals and knowledge of Native land stewards in federal data and definitions of “climate smart” agriculture could nourish communities while incentivizing carbon sequestration across millions of acres.

Over the last five years, the number of bison on the Great Plains has increased significantly. Today, more than 20,000 bison roam the ancestral homelands of 82 tribes in the United States. This is a small number compared to the 30 million or more that grazed these vast prairie ecosystems during the nineteenth century, before federal incentives and land settlement policies drove them to near extinction. The bison’s promising recovery is the direct result of continuous restorative efforts led by generations of tribal members.

The restoration of this keystone species has multiple documented benefits: bison graze in a way that improves the root structure of the grasses and soil health by, among other things, increasing the soil’s retention of rainwater. Their shaggy coats distribute seeds across the landscape, and the wet spots where they wallow support birds and other species. This knowledge is embedded in tribal historical relations, demonstrating the cultural as well as ecological significance of efforts to support the return of bison.

Tribal Nations across the United States have implemented other culturally significant regenerative agricultural practices on the land, including the use of fire and waterscaping, both of which improve soil health and encourage native species to flourish. While much of the world is wondering how to best sequester carbon as a response to climate change,

Native Peoples’ relational and integrative approach to land stewardship is just one example of their capacity to lead carbon-conscious land and agriculture management.

In an effort to mitigate carbon emissions, the federal government recently began incentivizing agricultural techniques that increase carbon content in soil, which is measured as soil organic carbon (SOC). The 2024 Farm Bill, for instance, includes \$3 billion in federal funds for what are called climate-smart practices on agricultural land. Future funding for carbon sequestration projects is likely to grow. But without deliberate changes in policy and awareness of the potential of Native land stewardship, it is likely that little of that money will support projects where the full range of Native regenerative agricultural practices are used—such as tribal-based bison recovery efforts.

Fully bringing the power of traditional native agricultural practices to bear on local and national climate goals requires addressing two significant barriers. The first barrier has its roots in over a century of federal data collection and governance that continues to prevent Indigenous communities from making informed decisions about their own land. A second barrier is that “climate smart” practices are currently defined in ways that overlook the full extent of Native land stewardship—in part by failing to fully recognize Native knowledge production as valid science. Addressing

both of these barriers will require investment in resources to increase tribal data sovereignty as well as a redefinition of what climate-smart processes mean.

As a collective of Indigenous and allied scholars interested in data and the environment of Indigenous Peoples' lands and climate research, we have gathered data to explore the potential role of Native-led agriculture in carbon sequestration. The 574 sovereign Tribal Nations in the United States steward 56.2 million acres of land (approximately the same size as Kansas), which is spread out over 703 territories in 35 states. Much of the natural resources within these jurisdictions and beyond would benefit from the revitalization of Indigenous knowledge in land planning.

However, today the US government defines carbon sequestration according to a belief system that prioritizes conservation or focuses on forestry management. This does not formally recognize the potential of Native-led efforts like bison restoration, fire, and waterscaping. We advocate that the government recognize (and fund) tribally supported data sovereignty efforts and integrate and acknowledge these data into non-Indigenous ways of quantifying conservation and the environment at the federal level. We also offer recommendations to support positive approaches to promote self-determination for Native agricultural practices.

Stolen land and missing data

Colonial land policies and a legacy of exploitative transactions have drastically altered Native Peoples' ownership and stewardship of land in the United States. In particular, the 1887 Dawes Act forcibly privatized a vast majority of Native lands by dividing reservations into individual allotments, ranging from 40 to 160 acres. Allotment, which President Theodore Roosevelt deemed "a mighty pulverizing engine to break up the tribal mass," has ultimately prevented many Native landowners from working their lands. Because land not assigned to an allottee was typically taken out of the hands of Native ownership, the process further dispossessed Native Peoples from their lawfully granted landbase. As a result, between 1890 and 1934, Native landownership dropped from 117 million acres to 34 million acres.

Today, Native agriculture continues to be hampered by these colonial policies. As an example, on the Great Plains, land leases born from the policies of allotment are still primarily held by white farmers and ranchers, and the leases are typically negotiated by the Bureau of Indian Affairs (BIA). This further privileges resource extraction and the cash-crop industry on Native lands. Recognizing historical land mismanagement and racial discrimination, two historical court settlements—*Cobell v. Salazar* (2009) and *Keepseagle v. Vilsack* (2011)—have compelled the federal

government to pay more than \$4 billion to individual Native landowners, farmers, and ranchers, as well as Native organizations. But that (insufficient) reparation does little to repair generations of damage, including to Native Peoples' ability to farm sustainably.

A further legacy of colonialism is that most land-use data today are still produced and stored by non-Native institutions, particularly the BIA. Such data curation is limited by what Western agricultural worldviews consider important information. As a result, tribes and decisionmakers still lack access to relevant and accurate information about Native lands because some data are inaccessible and others are not collected at all.

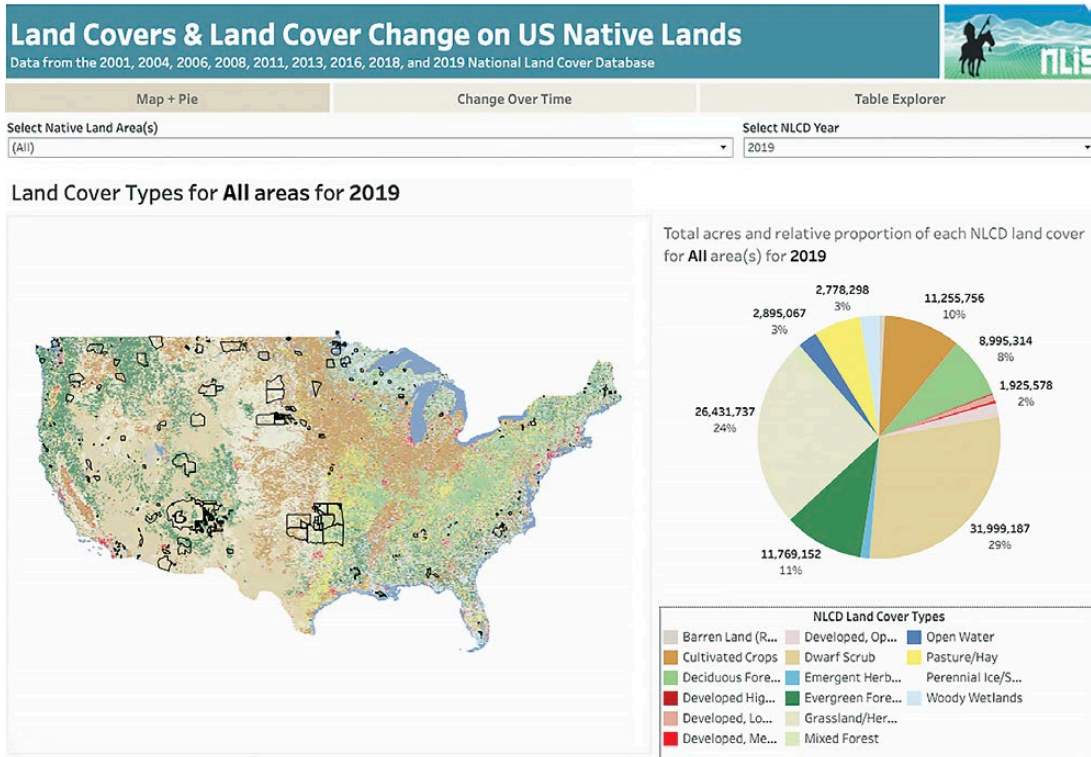
Lack of data puts Native land stewards at a disadvantage. For example, in the case of the Pine Ridge Reservation in South Dakota, land holdings of Native owners were checkerboarded, and much of the productive agricultural land is still leased out by the BIA. Today, tribal decisionmakers lack access to ownership data and leasing records. Without this knowledge, they cannot make long-term plans to engage in tribal climate management, such as carbon sequestration plans, nor be rewarded by federal incentive schemes. More generally, without access to data, tribal decisionmakers are unable to chart their own course in a rapidly changing environment.

A quiet revolution in data

The democratization of digital humanities is providing groups such as ourselves with tools—including geographic information system technology and data visualization dashboards—that allow new analyses. To take advantage of them, we need ways to format public data that fit tribal agendas. Federal support for such datasets could help remediate the historical lack of planning data available and promote better agriculture. To this end, the Native Lands Advocacy Project (NLAP) has developed new ways for tribes to access various soil, climate, land, and agricultural data from the public domain to help support sovereign land planning.

For example, the NLAP created an interactive dashboard from the US Geological Service National Land Cover Database (NLCD) that enables users to see general patterns across Native lands and filter by individual tribal geography. The dashboard reveals that tribal lands consist of 24% grasslands, 29% forests (deciduous and evergreen), 6.7% open water and wetlands, and 10% cultivated crops. Importantly, this tool can be used to monitor the evolution of land cover over time—particularly to assess deforestation, loss of natural cover to land development, and the long-term effectiveness of conservation policies. Viewed at the continental level, it also makes visible the untapped and undeniable potential for carbon sequestration in Native lands in the United States.

Figure 1. VISUALIZING THE POTENTIAL FOR CARBON SEQUESTRATION ACROSS ALL NATIVE LANDS



Using data from the US Geological Service National Land Cover Database (NLCD), the Native Lands Advocacy Project's dashboard enables users to see patterns across Native lands and filter by tribal geography.

The analyses enabled by the dashboard put some key questions in high relief: Are these lands valued for the benefit of Native Peoples? Who or what value system determines their potential?

The democratization of digital environmental humanities opens up opportunities to answer some of these questions. For example, using data from the Census of Agriculture for American Indian Reservations, researchers found that a striking 87% of the total agricultural revenue on Native land is still captured by white farmers and ranchers, even though 75% of these farmlands are managed by Native operators. Thus, the dashboard demonstrates quantitatively the long-term effects of allotment policies, giving more information on the distribution of resources in Indian Country.

Examining this contrast between revenue extraction and acreage of land farmed also reveals hidden possibilities. While most agricultural revenue is currently extracted by white farmers, the fact that the majority of the land on reservations is operated by Native farmers contributes to the argument that Native-led agriculture could address land-use issues in a substantial way.

The dashboard also demonstrates how excavating important details in data can shift perceptions and

possibilities. For example, using the dashboard, researchers uncovered a higher proportion of Native women operators leading agricultural practices, which may stem from culturally specific understandings of the land as shown in the story of Navajo/Diné agriculture. This suggests that Native agriculture could have the potential to synergistically address a wide variety of social and ecological issues, provided it is given the space to do so.

The data on ownership are important because today's incentive schemes for carbon mitigation are likely to reward large landowners due to the high cost of planning, auditing, and issuing carbon credits. For example, the majority of credits for voluntary forest carbon projects are issued to entities getting more than a million credits at a time. It will take a different lens to shift incentives to reward many diverse smallholders, better supporting local communities, preserving biodiversity, and encouraging culturally important practices.

Finally, while figures about income generation do demonstrate the propensity of Western-style farming to extract revenue from land, they reveal little about how to sustainably manage and steward land. And if stewardship is the true priority, then the information available might not be the information needed.

Exploring regenerative scenarios

Today, the Western-led conversation around carbon and land use in the United States is profoundly shaped by the assumption that humans are separate from nature. For example, soil organic carbon (SOC) is sometimes conceptualized as a “debt” incurred by long-term human use. According to this worldview, it is human activities—where “human” is used in a generic way—that have degraded lands and stripped soil of nutrients and organic carbon stocks. Accordingly, many SOC incentives aim to leave croplands fallow, encourage forest growth, and avoid human-led agriculture. This way of thinking is based on a discredited but still active model of fortress conservation, in which nature is “protected” by displacing human inhabitants.

In contrast, regenerative agriculture aims to maintain and restore soil and ecosystem health through a model of land use and management that includes long-term observation and deep care—concepts that have long informed Native land knowledge and stewardship. This premise shifts the conversation from blaming human-caused land use to supporting practices based on stewardship. Thus, land degradation is not inherent to soil use per se, but the result of misguided relations to soil. More broadly, many Native practices open possibilities for humans to foster a healthy and durable relationship with the land.

For diverse Native Peoples, food cultivation is part of a tightly woven relationship with the living universe that is tied to each tribal community’s very existence. These relationships have transformed over time into contemporary community-centered agricultural approaches where “successful” agriculture ideally focuses on humans’ interconnection with an entire ecosystem. Humans are seen as an important part of, but not central to, the complex micro- and macro-relationships of healthy ecosystems, including water health, predator-prey relationships, and soil health. Native knowledge often recognizes this interconnection, and it’s becoming more widely recognized by mainstream soil science.

Today, some food sovereignty initiatives led by Tribal Nations adhere to traditions of Native regenerative agriculture that maintain soil health. For example, the Oneida Nation of Wisconsin is now 20 years into its food sovereignty initiatives, which have been carried out in concert with exemplary water and soil quality programs funded and monitored by the tribe. Oneida’s large-scale investment in traditional food crops and food networks has resulted in a number of exciting, innovative, and culturally rooted projects. One example is the certified food handlers program, which uses innovative technology to welcome learners of all backgrounds to a comprehensive approach to Oneida foodways and community food safety. Oneida has been so successful with its food sovereignty strategy that it often provides free consultations to other tribes that are trying to start their own programs.

Incentives for regeneration

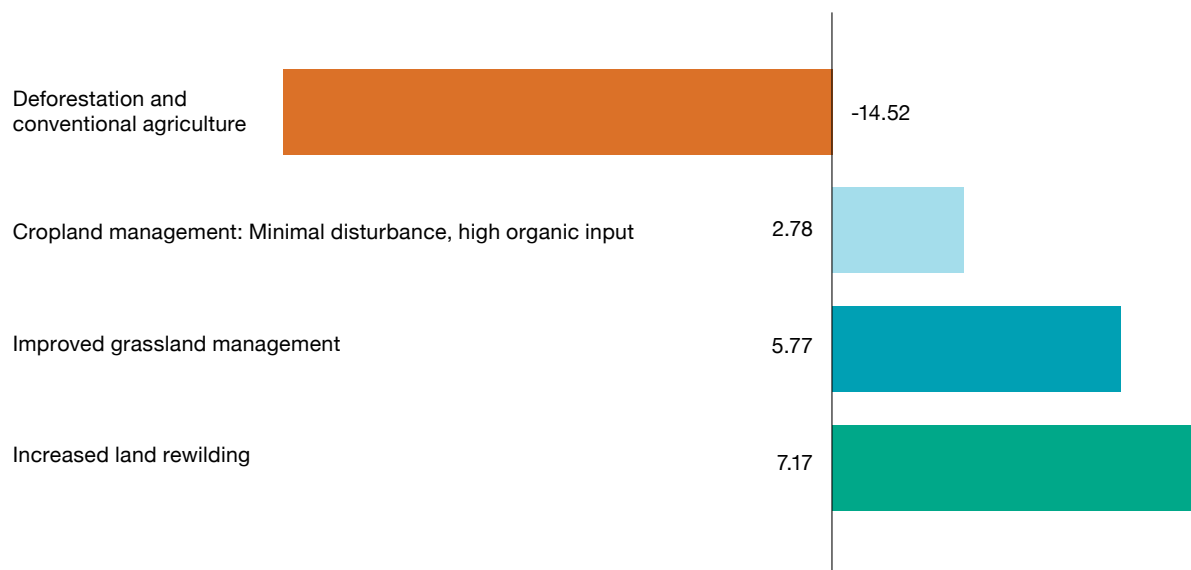
US colonial policies continue to have practical consequences for Native land stewards today. Climate-smart initiatives are structured to achieve national goals without acknowledging or furthering tribal goals, which may include establishing rights and sovereignty and centering Native knowledge. National goals around carbon, by contrast, often reflect ideology around fostering markets for carbon credits and offsets that may end up rewarding extractive industries and fossil fuel producers. Changing federal priorities for land practices is an important step in building a more just response to climate change.

If climate-smart incentives were written to include these broader goals of Native regenerative agriculture, and if appropriate data were available to tribes, we believe that Native operators would be eager to assist in meeting national climate goals. To estimate the size of this opportunity, we used the Soils Revealed project, a dataset that provides estimates for SOC changes under various agricultural scenarios. Across the 703 tribal territories of the United States, we compared today’s business-as-usual practice of moving forestland to crops with regenerative schemes over a 15-year period. We selected three scenarios from the Soils Revealed database that most resembled Native land management practices: improved cropland management with high organic input and minimal disturbance, improved management of grassland, and increased land rewilding.

Our simulations suggested significant differences between these scenarios. Following the mainstream agricultural model where forest land is converted to crops, Native lands are predicted to suffer an additional loss of 14.52 tons of carbon per hectare. The three more regenerative scenarios show an increase in SOC from 2.78 tC/ha for rewilding to a peak 7.17 tC/ha for organic cropland management with minimal disturbance.

These results are consistent with other predictions demonstrating the positive impact of regenerative agriculture on soil health and its potential for efficiently sequestering carbon. They suggest that scenarios involving anthropogenic land use—particularly Indigenous stewardship practices—could be powerful and effective tools for sequestering carbon while nourishing communities. Such analysis also deepens the carbon conversation by recentering it around human relationships with the land, confirming a Native worldview that humans have a stewardship duty toward soil via the maintenance of kinship relations with it. Finally, this analysis shows how the historical marginalization of Indigenous knowledge and data can be challenged when digital humanities encompass data sovereignty and operate from Native worldviews.

Figure 2. COMPARING AGRICULTURAL SCENARIOS FOR SOIL ORGANIC CARBON CHANGE ACROSS NATIVE LANDS



The Soils Revealed project is a global dataset that offers both historic soil organic carbon estimates as well as future scenarios based on statistical models. To estimate the potential difference between business as usual and Native regenerative agriculture, we compared four different agricultural scenarios across the 703 tribal territories of the United States. Units are displayed in mean tC/ha.

How to support tribal regenerative agriculture

Effectively mitigating carbon emissions, righting historical injustices to Native communities, and stewarding land for the future will require a shift in federal worldviews and policies. Decisionmakers should ensure that Indigenous agriculture, whether practiced by individuals or Tribal Nations, is free from federal obstructions. The authority of Native farmers and land managers over their land should be recognized, both in data policies and in knowledge and practices. In particular, Native voices should be centered in policies that define and incentivize regenerative practices, such as the Farm Bill.

Unlocking the potential of Native stewardship requires changing the way data are gathered and handled by the federal government. The success of Native land planning depends on informed decisionmaking, which requires access to appropriate data. The US government should take into account tribal interests when collecting data and should support tribes' efforts to gather longitudinal data. Native communities should be empowered to gather the data they need to use for local decisionmaking and land stewardship.

Finally, the federal government needs to honor its trust responsibilities by defending Native Peoples' control over their lands. As carbon offsets generate more income, predatory practices could harm Native stewards if the federal government does not attend to environmental justice and

other power disparities. Policymakers should listen to Native voices on tribal land management to determine which policies are truly needed to enhance soil carbon and support Native communities.

Policies that place Native regenerative agriculture in a position to grow have the potential to transform not only Native lands and communities—a good end in itself—but to remodel ideas about land stewardship and carbon sequestration to build a better future for the planet. Bringing back the bison, as well as global efforts like #LandBack, could be the beginning of Native Peoples leading a shift toward non-harmful ways of inhabiting the earth.

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