**Headline:** How Indigenous Land Management Practices Are a Blueprint for Climate-Resilient Agriculture

**Teaser:** As a rapidly warming world strains at the shortcomings in industrial farming, key lessons can be taken from Indigenous practices.

by Daniel Ross

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**[Article Body:]**

Several Hollywood action films center around an impending apocalypse in the form of an asteroid on a collision course with Earth—a glaring metaphor for the real-world implications of a rapidly accelerating climate crisis.

As this crisis unfolds before our very eyes, however, rather than look up to the atmosphere to see what can and should be done to curtail some of the worst effects of a rapidly warming world, maybe our gazes should also be trained downward at the soil beneath our feet, while pondering this question: If aggressive commercial agriculture [exacerbates the climate crisis](https://insideclimatenews.org/news/25012019/climate-change-agriculture-farming-consolidation-corn-soybeans-meat-crop-subsidies/), are there key lessons to be learned from Indigenous land management practices that can help to restore environmental balance?

“I’m going to borrow from the founder of the [Slow Food movement](https://www.slowfood.com/), Carlo Petrini,” said Enrique Salmón, head of the American Indian Studies Program at Cal State University–East Bay, when asked this same question.

“In a conference, someone asked him, ‘What is the most important thing that Americans can do to help solve this food and climate change crisis?’ And he said, not missing a beat, ‘if everyone got rid of their refrigerators,’” Salmón said, relaying Petrini’s response not so much to decry the refrigerator as a [greenhouse gas emitter](https://www.bbc.com/future/article/20201204-climate-change-how-chemicals-in-your-fridge-warm-the-planet), but to signify its role at the heart of a system that has removed the average consumer from a direct connection to the natural world as a food source.

“We focus so much on the negative impacts from big agribusiness, and rightfully so. And it seems that, to the average American, there’s not much they can do about it. But in reality, they can,” Salmón said.

**Soil Erosion and Climate Change**

From the stripping of [valuable rainforests](https://www.washingtonpost.com/climate-solutions/2022/03/09/amazon-rainforest-deforestation-beef/) to pave the way for crops and cattle grazing to the mismanagement of carbon-storing [grasslands](https://www.ipcc.ch/sr15/chapter/spm/), the link between heavily commercialized agriculture and climate change has been well established—as has its association with exacerbating the impacts *from* climate change.

Take [soil erosion](https://www.nrdc.org/stories/soil-erosion-101), which can be caused by the ritual plowing of farmland before and after growing seasons, along with the overgrazing of cattle. As layers of fertile topsoils are lost, this can lead to a host of damaging consequences, including a [reduced ability](https://bit.ly/3LS4dnV) for the remaining soil to retain moisture, [depleted biodiversity](https://www.recare-hub.eu/soil-threats/soil-biodiversity) within the soil itself, and [increased rainwater runoff](https://www.nrdc.org/stories/soil-erosion-101), which can contaminate and clog local waterways. Soil erosion isn’t a small problem, either.

[A 2021 study](https://www.pnas.org/doi/10.1073/pnas.1922375118) found that the stretch of land constituting the [U.S. Corn Belt](https://www.ncei.noaa.gov/access/monitoring/reference-maps/corn-belt)—where 75 percent of the nation’s grain is cultivated—has completely lost one-third of its topsoils.

**Calls to Revise Global Farming Practices**

It’s no surprise then that the [Intergovernmental Panel on Climate Change](https://www.ipcc.ch/) (IPCC)—an organization of governments charged with routinely assessing the current state of climate change science—has [called for a revision to global farming practices](https://www.ipcc.ch/srccl/chapter/chapter-1/) in order to build a sustainable food supply as the planet warms and dries out.

Dwindling water supplies, for example, pose a major obstacle to growers on the U.S. west coast, which has been undergoing the [worst megadrought in 1,200 years](https://www.scientificamerican.com/article/western-megadrought-is-the-worst-in-1-200-years/) for more than two decades. [Record low levels](https://abcnews.go.com/US/colorado-river-basin-reservoir-levels-drop-record-lows/story?id=88456182) in the Colorado River have [hit farmers hard](https://www.nytimes.com/2021/08/16/climate/colorado-river-water-cuts.html).

**Indigenous Land Management Techniques**

As proponents of Indigenous land management techniques point out, the careful cultivation of naturally available resources can offer an alternate blueprint. Despite the fact that Tribes in the U.S. live on just [1 percent of their historical](https://www.science.org/content/article/native-tribes-have-lost-99-their-land-united-states) land base, many continue to successfully practice their ancestral farming techniques in areas often disproportionately impacted by climate change hazards.

A [2021 study](https://www.pnas.org/doi/10.1073/pnas.2105073118) found that while Indigenous peoples make up only 5 percent of the world’s population, their land stewardship protects approximately 85 percent of the world’s biodiversity.

Salmón calls these lands “refugia” of resilience in an increasingly arid environment, using a term to describe surprisingly hardy habitats. “In other words, these are places that [can show us] how to adapt to what we’re witnessing,” said Salmón, during a presentation at the 2022 national [Soil Health Innovations Conference](https://www.ncat.org/soil-health-innovations-conference/).

During this presentation, Salmón ran through a snapshot of some of these techniques, such as the Hopi Tribe’s no-till practice of planting corn very deep in the ground using digging sticks, to leave undisturbed the vast array of [microbial life under the surface of the soil](https://eos.org/science-updates/life-teems-below-the-surface).

The Hopi also plant their corn and other crops on land at a low angle of repose. This helps the soil retain moisture, maximizes any potential water runoff from higher ground, and better regulates soil temperatures.

In contrast to parts of Nebraska and Iowa (where fields of corn can appear to stretch seamlessly off into the horizon), the Zuni Tribe in New Mexico breaks up the land into small one- or two-meter squares—a system known as “[waffle gardens](https://civileats.com/2021/10/26/resurgence-waffle-gardens-helping-indigenous-peoples-thrive-amid-droughts-grow-food-less-water/).” Along the edges of these square plots, the soil is raised up to six or eight inches, and the corn is planted inside.

“What happens is that just a small six- or eight-inch height of the wall keeps the winds from whisking away the moisture in the soil, and it helps create just enough of a shade to also keep the soil temperatures low,” Salmón said.

Artfully placed [check dams](https://megamanual.geosyntec.com/npsmanual/checkdams.aspx)—human-made constructs to help mitigate water runoff and soil erosion—can play a pivotal role in completely revitalizing a barren area of land within as quickly as ten years. What’s more, Indigenous farming practices eschew the need for harmful pesticides and herbicides, said Salmón.

“We really wouldn’t need [pesticides] if we altered our agricultural techniques,” Salmón explained. “We would stop poisoning ourselves and our pollinators and our water and the soil.” Others agree.

**Reconnecting Consumers With Nature**

“We’re now seeing an impact in our mammal populations,” said Kelsey Scott, director of programs for the [Intertribal Agriculture Council](https://www.indianag.org/) (IAC), an organization that connects and promotes Indigenous land uses, about some of the consequences of blanket applications of pesticides and herbicides, like neonicotinoids.

“Deer that have fed on fields planted with seeds treated with neonicotinoids, they’re now seeing a bottom jaw, lower jaw, half the size of what it should be at full maturity,” Scott added, pointing to [a 2019 study out of South Dakota State University](https://www.sdnewswatch.org/stories/sdsu-study-shows-worlds-most-common-pesticide-a-danger-to-deer/) that found a link between the pesticide and health defects in white-tailed deers that also includes reproductive problems and impaired thyroid function.

While the gulf between the everyday consumer and Indigenous farming techniques may seem wide, however, it’s not insurmountable, says Scott, who listed a series of practical suggestions for anyone interested in bridging that divide. One is to learn about nature at the local level, and see its intended functions “and patterns” not in isolation but as a harmonious whole, Scott said. Importantly for a warming world, these systems have built-in mechanisms that support climate resiliency.

As an example, Scott shared an anecdote from one of her colleagues who discovered that his trees stopped producing sap before a storm arrived. “He was able to correlate that with the fact that the tree had an awareness that there was a weather system coming in, and in order to withstand it, it needed to reserve all forms of energy that it could,” she said.

For most consumers, the connection to farming is rooted in the end product—“the food”—Scott said. Perhaps the most effective way to flesh out and learn about these natural systems and cycles, therefore, is to visit places where Indigenous land management practices are being applied.

“If they can go and experience some connection with the land or find a local farmer or rancher where they can do a day tag-along, helping with operations, absolutely take up that opportunity because it’s such a unique experience,” Scott said.

With a real-world grounding under one’s belt, it can be easier to understand how managing the climate crisis doesn’t require a complete reinvention of the wheel as much as it does an acknowledgment of how thoughtful Indigenous cultivation of biodiversity has thus far stood the test of time.

One example is happening at the [Onondaga Nation Farm](https://www.onondaganation.org/news/2019/thousands-of-historical-seeds-preserved-by-the-onondaga-nation-farm/) in Central New York, which has amassed a treasure trove of seeds linking the present to its ancestral past. This includes more than 1,100 varieties of corn seeds—some of which are around 4,000 years old—as well as 500-year-old squash seeds. The farm’s rich bank of seeds is exchanged within an intertribal farming network called [Braiding the Sacred](https://braidingthesacred.org).

“Without staples of Indigenous diets that have been very carefully stewarded in a symbiotic relationship over the evolution of time, societies wouldn’t have been able to make it through some of these [historic] natural disasters,” said Scott. “In fact, a lot of times, societies would have been healthier if they would have utilized or grown or harvested the crop in the same production style that the Indigenous community—who they more often than not stole the crop from—would have been doing.”