

Healing Grounds

Climate, Justice, and the Deep Roots of Regenerative Farming

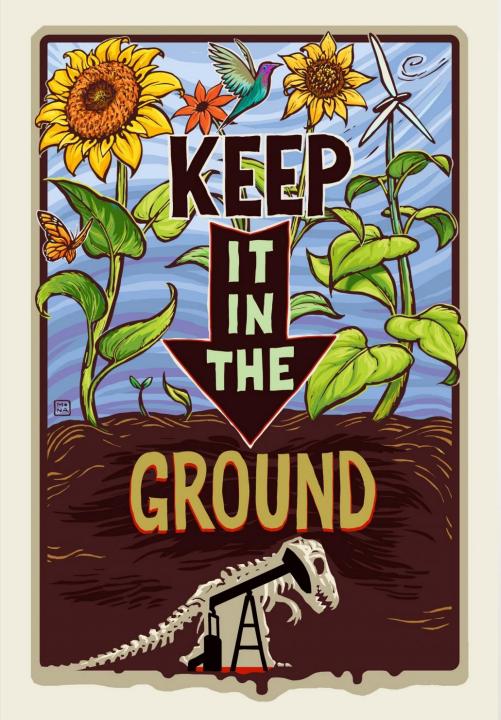
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UC Santa Barbara

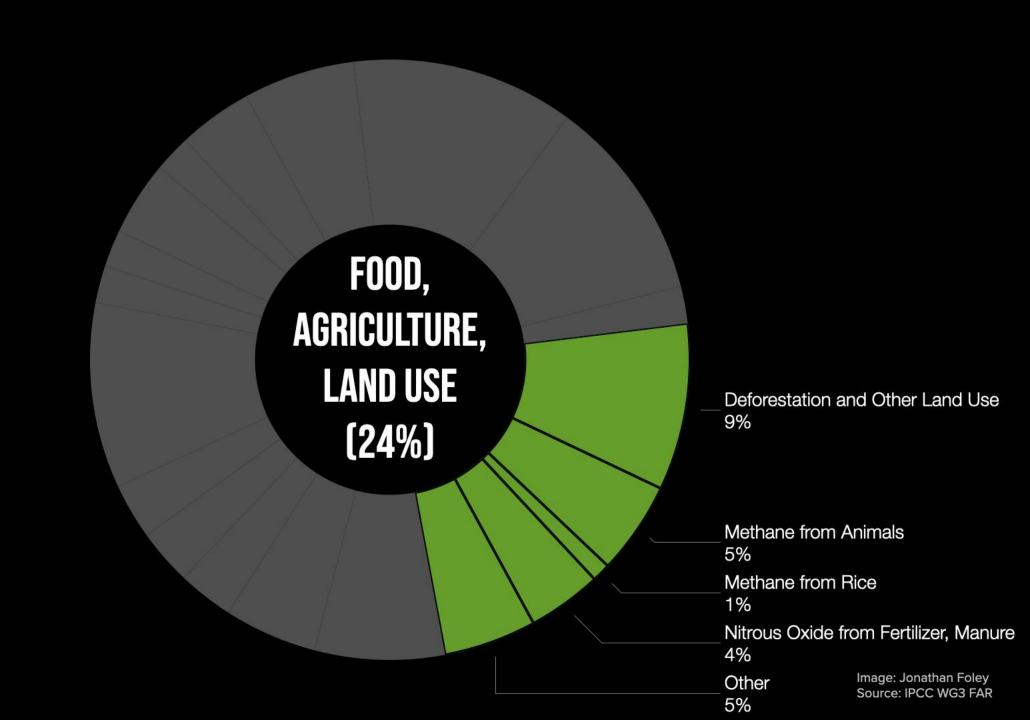


Can Soil Really Save Us?



Art: Mona Caron https://monacaron.com/studio/keep-it-ground





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FOOD, AGRICULTURE, LAND USE SOLUTIONS

Analysis, www.drawdown.org

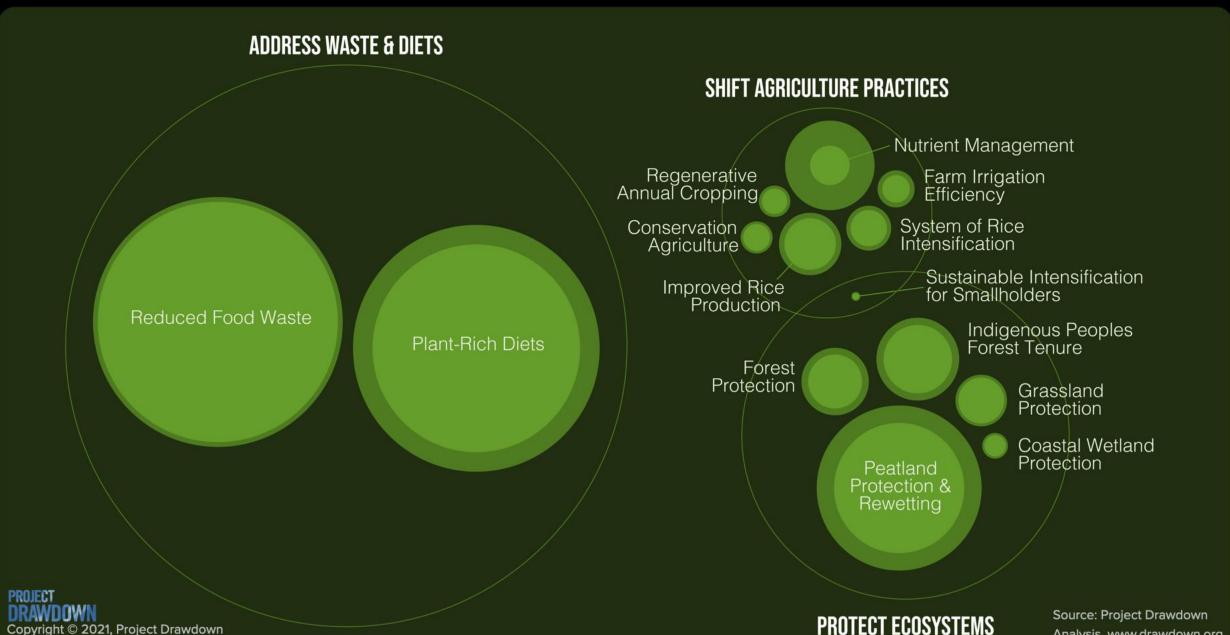




Image courtesy of Soul Fire Farm https://www.soulfirefarm.org

Can we transform agriculture from a climate problem to a climate solution?







Cover Crops

- Crop that is not harvested but used to "feed" the soil
- Build up soil carbon
- Improve resilience to drought and floods
- Reduce runoff and N20 emissions



Photo: Natural Resources Conservation Service

Crop Rotation



Photo: Aidee Guzman

- Add biodiversity
- Recycle nutrients
- Break up pest and disease cycles
- Farmers diversify their income

Minimizing Tillage

- Leave crop residue on the field rather than plowing
- Avoid disturbing soil microbial communities
- On a spectrum: from "zero tillage" to specialized plows that are less disruptive to soil



Photo: Natural Resources Conservation Service

Regenerative Grazing

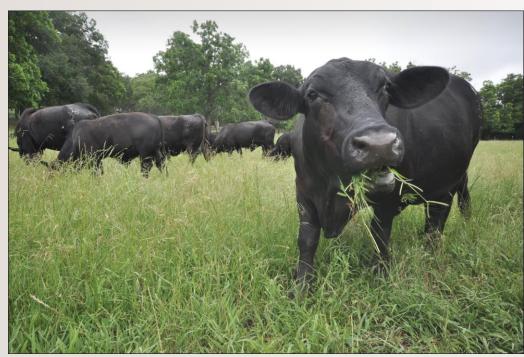
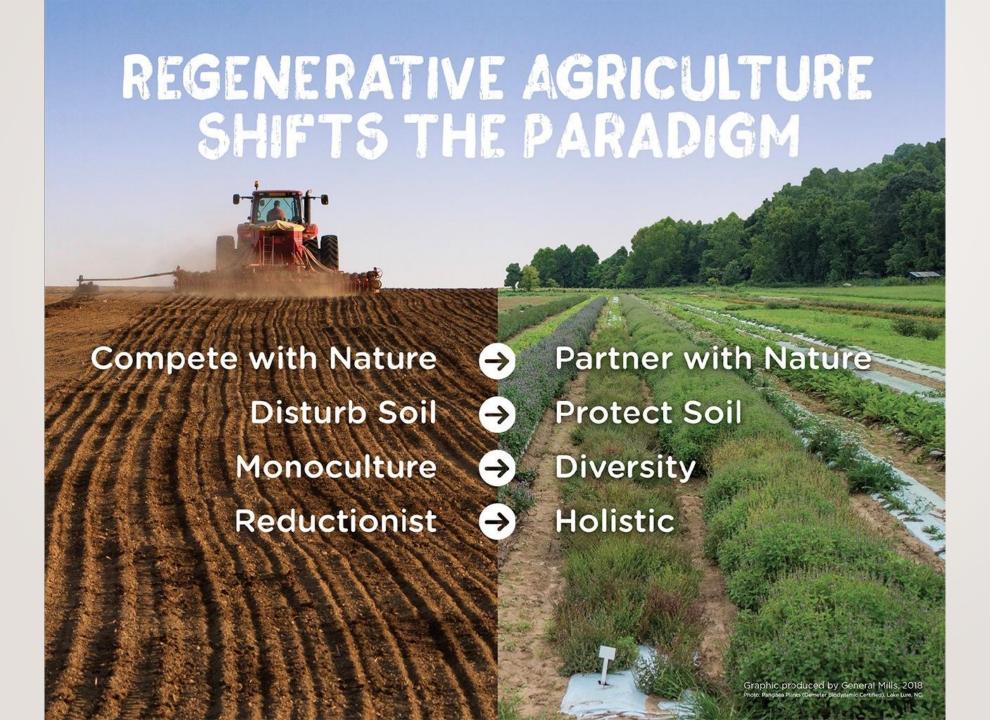


Photo: Natural Resources Conservation Service

- Rotate animals through pastures in ways that mimic grazing behaviors of native herbivores
- High intensity, short duration
- Stimulate vegetation growth, allow recovery





Compete with Nature Partner with Nature

Disturb Soil Protect Soil

Monoculture

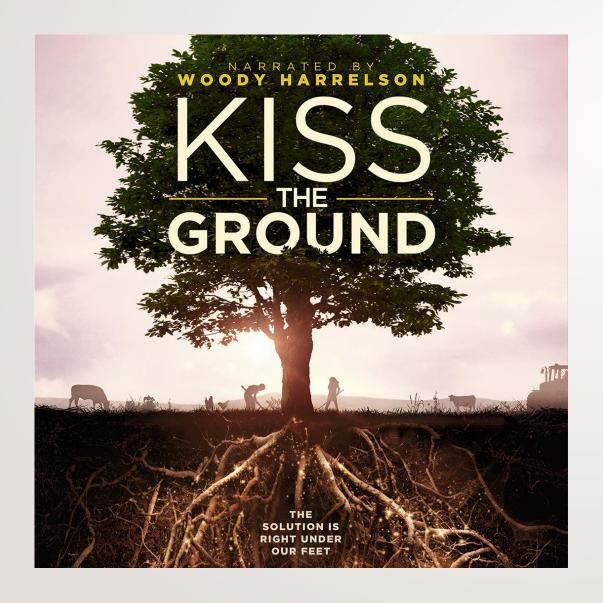
Diversity

Reductionist - Holistic

Image courtesy of General Mills https://blog.generalmills.com/2018/04/how-annies-is-working-differently-in-montana/



Image courtesy of General Mills https://blog.generalmills.com/2018/04/how-annies-is-working-differently-in-montana/







Climate Change and Land

An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Summary for Policymakers









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Soil carbon 4 per mille



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Prince Charles joins clean soil project to combat climate change

Prince of Wales says soil health is of 'critical importance' as he joins initiative to keep carbon locked in the world's soils



Photo: Niklas Halle'n/AP

Story: Fiona Harvey/The Guardian/10.28.2016



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OPINION

WILEY Global Change Biology

WILEY Global Change Biolog

Managing for soil carbon sequestration: Let's get realistic

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Abstract

improved soil management is increasingly pursued to ensure food security for the world's rising global population, with the ancillary benefit of storing carbon in soils to lower the threat of climate change. While all increments to soil organic matter are laudable, we suggest caution in ascribing large, potential climate change mitigation to enhanced soil management. We find that the most promising techniques, including applications of biochar and enhanced silicate weathering, collectively are not likely to balance more than 5% of annual emissions of CO₂ from fossil fuel combustion.

KEYWORDS

biochar, carbon sequestration, climate change, silicate weathering, soil organic carbon

The long decline in the stock of soil organic matter began with the first furrow of human cultivation and is now estimated to have contributed 116 Pg of carbon (as CO_2) to the atmosphere and smaller amounts of organic carbon to marine and freshwater sediments (Sanderman, Hengl, & Fiske, 2017). Currently, losses of soil organic matter continue with the areal expansion of agriculture, especially in the Amazon basin (Assad et al., 2013; Don, Schumacher, & Freibauer, 2011). Along with methane from cattle and nitrous oxide from fertilizers, CO_2 from soils is a major agricultural by-product, changing our climate as we attempt to feed the global population of 7.6 billion people.

Minasny et al. (2017) consider the 4 per mille initiative—that is, raising the content of soil organic matter by 0.4% per year—as an optimistic and aspirational challenge to maintain and improve soil health and provide food security for the world's peoples. An ancillary benefit of this program would be to increase the removal of carbon dioxide from the atmosphere and increase its rate of storage in soil organic matter, providing a mitigation of global climate change. They suggest that this storage would "effectively offset 20%—35% of global anthropogenic greenhouse gas emissions." The proposal has been criticized on technical and political grounds, but defended vigorously by its proponents (Minasny & McBratney, 2018). Here, we argue

management, while laudable, is likely to be very limited and is distracting to policy makers who must focus on the enormity of the climate change problem driven by fossil fuel combustion. Soil science knows of ways to reduce the ongoing losses of soil organic matter and to reduce the emissions of greenhouse gases to

that the potential mitigation of climate warming by improved soil

Soil science knows of ways to reduce the ongoing losses of soil organic matter and to reduce the emissions of greenhouse gases to the atmosphere. Unfortunately, many of these management practices produce ancillary emissions, such as CO₂ from the pumping of irrigation water and from the off-site manufacture of fertilizer (McGill, Hamilton, Millar, & Robertson, 2018; Schlesinger, 2000). Others, such as conservation tillage, reduce the emissions from agricultural machinery (West & Marland, 2002), but with only limited success in increasing the storage of carbon in soils (Powlson et al., 2014). Conversion to no-till practice on the lands under corn-soybean cropping rotation could sequester about 2% of the annual anthropogenic emissions of CO₂ emissions in the United States (Bernacchi, Hollinger, & Meyers, 2005). Decades of improved agronomy have reduced, but not eliminated, the role of agriculture as a source of CO₂ to the atmosphere (Emmel et al., 2018; West et al., 2010).

Smith et al. (2008) estimate 1.6 Pg C/year as the maximum potential for enhanced agricultural management to mitigate CO₂ emissions to the atmosphere, whereas Zomer, Bossio, Sommer, and Verchot (2017) estimate potential storage of 0.90–1.85 Pg C/year in croplands. At 2.45 Pg C/year, a recent new estimate by Lal (2018) is slightly more optimistic. A separate analysis by scientists organized by the Nature Conservancy suggests that better soil management,

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Glob Change Biol. 2019;25:386-389.



Insights

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Regenerative Agriculture: Good for Soil Health, but Limited Potential to Mitigate Climate Change

May 12, 2020 By Janet Ranganathan, Richard Waite, Tim Searchinger and Jessica Zionts

Commentary

Topic Food





This contribution is partially derived from a presentation by the senior author for the 2017 Francis E. Clark Memorial Lecture at the Annual Meeting of the Soil Science Society of Apartics in Traces Societies.

[[]Corrections added on 7 December 2018, after first online publication: The unit "gg" has been changed to "Pg" to correct a typesetting error.]



Regenerative Agriculture in Action

Latrice Tatsey





Photos courtesy of Latrice Tatsey







Latrice Tatsey et al.



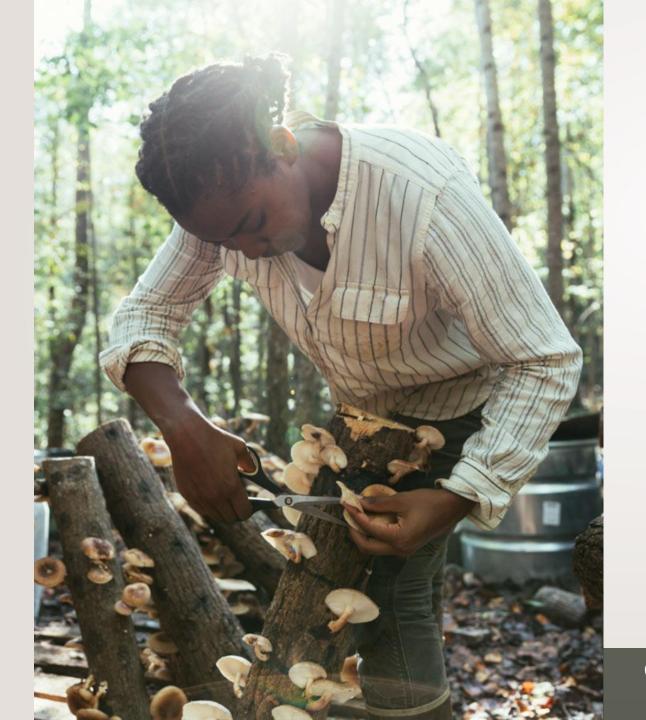


"Liz, I was hoping I could add these photos of me and my children. In the 1st picture I am sifting soils from my sample collections from the Blackfeet Buffalo Ranch with my daughter Baeley and my son Terrance. Then the 2nd photo my daughter Cassie is organizing the soil sample of the 0-6in and 6-12in depths for each soil pit collected at the Blackfeet Buffalo Ranch. I would like to include them because they are the future generation that will continue to bring changes for generations to come." Latrice Tatsey, Sep 10, 2020

Olivia Watkins



Photo: Leia Marasovish/Farmers Footprint



Olivia Watkins, Photo: Leia Marasovish/Farmers Footprint https://farmersfootprint.us/olivia-watkins/

Aidee Guzman



Photo: Sarah Craig/High Country News

Simplifying landscapes negatively impacts biodiversity and ecosystem functioning



Illustration: Aidee Guzman

aboveground diversity



belowground diversity

- crop diversity over space and time
- floral strips and/or hedgerows
- livestock
- insect communities (e.g. pollinators and natural predators)

•

ecosystem functioning depends on biodiversity

Ecosystem services

- pollination
- food
- erosion control
- control of pest or pathogens
- nutrient cycling
- And much more!

- Fungi
- Bacteria
- Insects
- Worms
- And much more!

What happens when we diversify farms?



Illustration: Aidee Guzman





Aidee Guzman, Lindsey Moore/KQED https://www.kqed.org/science/1943671/centers-of-insurrection-central-valley-farmers-reckon-with-climate-change



Nikiko Masumoto



Photo: Gosia Wozniacka/Civil Eats

"Whenever I begin conversations about myself and my relationship to the land, it's always through my grandparents and great-grandparents who touched this same soil. There is a gift of that, which is thinking of my life in a lineage that is much more important than my own individual life."

Nikiko Masumoto



Nikiko Masumoto and her father David "Mas" Masumoto. Still from *Changing Season: On the Masumoto Family Farm.*

"So many of the methods that develop soil take time—the horizon is long. When you're wanting to leave a farm to several generations in the future, you have a vested interest in taking up those practices."

- Nikiko Masumoto

"We are the ones that the world needs in this climate crisis. Because we have those stories, we have that sense of fighting against the impossible."

Nikiko Masumoto



Clockwise from top: Latrice Tatsey, Olivia Watkins, Nikiko Masumoto, Aidee Guzman



Regenerative Agriculture is Not New



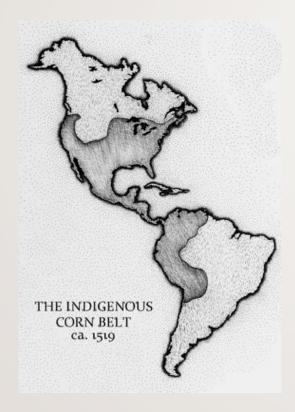
Indigenous African Agroforestry



Image courtesy of the Green Belt Movement https://www.greenbeltmovement.org/

- Fruit
- Nuts
- Oil
- Medicine
- Fiber
- Ecosystem Services

Three Sisters

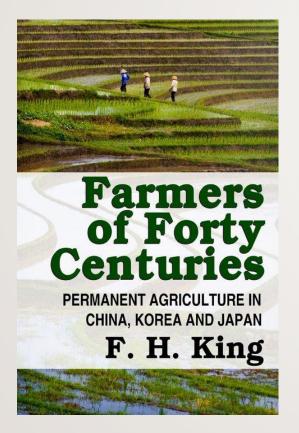


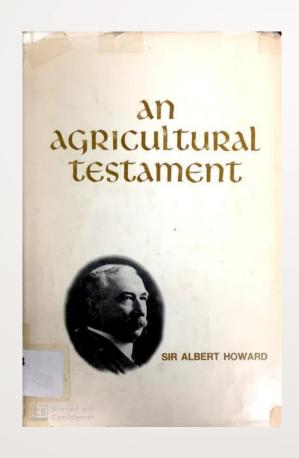
Map by Davidv35. Courtesy of The Acequia Institute. In Peña et al., Mexican-Origin Foods, Foodways, and Social Movements (p. iv)

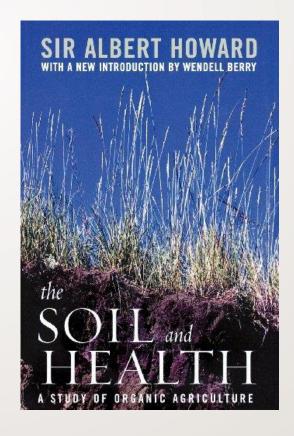


Image: Info Rural

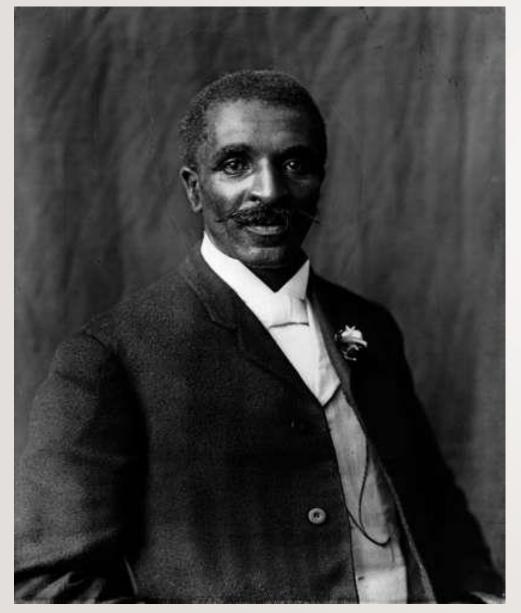
https://www.inforural.com.mx/milpa-por-proyecto-alimente-2







Regenerative agriculture has been refined and honed as a strategy for survival and resistance.



George Washington Carver, Tuskegee Institute, 1906. Library of Congress Prints and Photographs Division, LC-J601-302/Frances Benjamin Johnston.

"We know that commercial fertilizers will stimulate and for a while produce good results, but by and by a collapse will come, as the soil will be reduced to practically clay and sand."

George Washington Carver,
 1911 letter to Booker T.
 Washington



'Negro Habitations.' Source: Samuel Hazard, Santo Domingo, past and present, with a glance at Hayti, 1873, facing, 368. In Judith A. Carney, "Subsistence in the Plantationocene: Dooryard Gardens, Agrobiodiversity, and the Subaltern Economies of Slavery," Journal of Peasant Studies (2020).



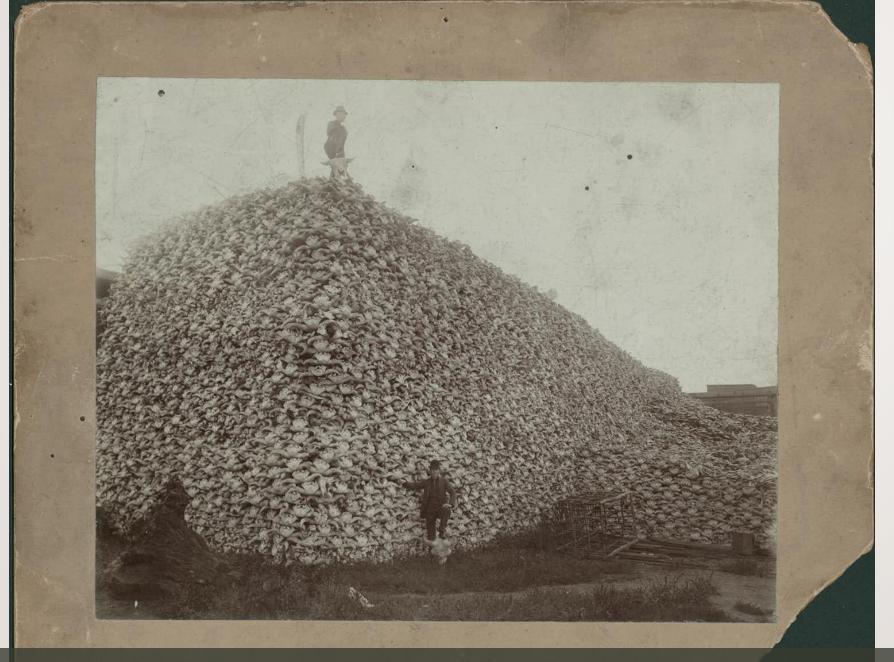
Regenerative agriculture is rooted in the ancestral knowledge of communities of color.



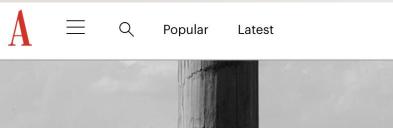
Legacies of Colonization



Deforestation: Sombra y Sol. Ricardo Levins Morales. https://www.rlmartstudio.com/product/sombra-y-sol/Q/



Burton Historical Collection, Detroit Public Library (1892) https://theconversation.com/historical-photo-of-mountain-of-bison-skulls-documents-animals-on-the-brink-of-extinction-148780







"an area the size of New York's Central Park erased with each sunset."

The Great Land Robbery

The shameful story of how 1 million black families have been ripped from their farms





Home in Hollywood, California. Photo: Los Angeles Examiner, courtesy of the National Japanese American Historical Society Keep the Japanese Out of California

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November 2, 1920

Issued by

THE JAPANESE EXCLUSION LEAGUE OF CALIFORNIA
910 Humboldt Bank Building,
San Francisco

Flyer urging California's white residents to vote in favor of 1920 Alien Land Law. Photo courtesy of the National Museum of American History





Artist: Patricia Wakida. In Liz Carlisle (2022). *Healing Grounds*. Washington, DC: Island Press.



Deep Regeneration

A Brief Recap:

- Food systems account for 1/4 to 1/3 of global GHGs
- Implementing regenerative ag can potentially transform farming from a climate problem to a climate solution
- Regenerative agriculture techniques are not new, they are rooted in the ancestral knowledge of communities of color
- Extractive agriculture is a legacy of colonization

A Brief Recap:

- Food systems account for 1/4 to 1/3 of global GHGs
- Implementing regenerative ag can potentially transform farming from a climate problem to a climate solution
- Regenerative agriculture techniques are not new, they are rooted in the ancestral knowledge of communities of color
- Extractive agriculture is a legacy of colonization
- 98% of US agricultural land is white-owned

Indigenous Land Dispossession, 1776-1930



Credit: Ranjani Chakraborty/Vox

Stephanie Morningstar Co-Coordinator, NEFOC Land Trust



Stephanie Morningstar is Mohawk, Oneida, and mixed European descent. She is an herbalist, soil and seed steward, scholar, student, and Earth Worker dedicated to decolonizing and liberating minds, hearts, and land one plant, person, ecosystem, and non-human being at a time. Stephanie is the Executive Director of the Northeast Farmers of Color Land Trust, an organization dedicated to advancing land access for BIPOC land stewards of color. Stephanie tends medicines at Sky World Apothecary & Farm; and teaches about the wonders of plant medicine at Seed, Soil, + Spirit School.

Photo courtesy of Stephanie Morningstar



TO ADVANCE LAND SOVEREIGNTY

in the northeast region through permanent and secure land tenure for Indigenous, Black, Latinx, and Asian farmers and land stewards who will use the land in a sacred manner that honors our ancestors dreams - for sustainable farming, human habitat, ceremony, native ecosystem restoration, and cultural preservation.

COMMONS

COMMUNITY Vision

CONSERVATION

Image courtesy of NEFOC Land Trust https://nefoclandtrust.org/

MAI NGUYEN



NEIL THAPAR



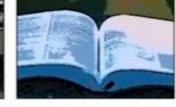




Photo: Blackfeet Agricultural Resource Management Plan

Illustration: Gesiye Souza-Okpofabri/ Black Farmer Fund 2020 Annual Report









Artist: Patricia Wakida. In Liz Carlisle (2022). *Healing Grounds*. Washington, DC: Island Press.

What we are doing is we are healing our ancestral lineages. It's about going back to the root issues: Indigenous land dispossession and enslavement. How do we right those relationships between our own communities so that we can heal those things in this healing ground."

Stephanie Morningstar

Thank You