At the Crossroads: Climate Change, Indigenous Perspectives and Sustainable Family Farming

Ruben P. Viramontez Anguiano
Mark Guttridge
Ana Eugenia "Kena" Guttridge Cordero
Olin Harrison Anguiano

United Nations Expert Group Meeting: Families and Climate Change
In observance of the 30th anniversary of the International Year of Family, 2024
New York, 15-16 May 2024, United Nations Headquarters, New York

At the Crossroads: Climate Change, Indigenous Perspectives and Sustainable Family Farming

Introduction

*One day there was a big fire in the forest. All the animals fled in terror, running in all directions. A jaguar sat at a distance, passively observing the chaos and panic of the fleeing animals. Suddenly, the jaguar saw a "colibrí" (hummingbird) pass over his head, but in the opposite direction from the fleeing forest dwellers. The hummingbird flew towards the fire! The jaguar watched the colibrí carefully. Moments later, the jaguar saw the tiny bird pass overhead again, this time in the same direction as the forest dwellers fleeing the fire. Then, again, the colibrí flew towards the inferno. Repeating this behavior over and over, seemingly endlessly, the bird seemed driven by a mission. The jaguar observed this coming and going until he decided to ask the bird about it, because it was a very puzzling behavior. "What are you doing, colibrí?" he asked. "I am going to the lake," the bird answered, "I drink water with my beak and throw it on the fire to extinguish it." The jaguar laughed. "Are you crazy? Do you really think that you can put out that big fire on your own with your very small beak?" "No," said the colibrí, "I know I can't. But the forest is my home. It feeds me; it shelters me and my family. I am very grateful for that. And I help the forest grow by pollinating its flowers. I am part of her, and the forest is part of me. I know I can't put out the fire alone, but I must do my part, no matter how small." (*An Indigenous Parable)

To answer this climate crisis, we need to be like "el colibri", affirming our connection to Mother Nature and actively contributing to the healing process. Indigenous people have been stewards of the land and climate for centuries, and yet their voices and wisdom have been silenced and undermined by Eurocentric and colonial agriculture (Kapayou et. al., 2023). Indigenous voices and wisdom have the insight to heal soils, food systems, and the planet.

This paper explores Indigenous farming practices (IFP) and the case study of *Ollin Farms*, a small family farm in Colorado providing opportunities for families of color and youth to be part of the planetary healing. The purpose of this paper is threefold: to understand the role of Indigenous farming practices in offsetting climate change; to explore how Indigenous farming practices inform regenerative/sustainable family farming efforts to steward the land; and finally, to examine the role of youth of color and their families in climate justice.

Background and Literature Review

For centuries, Indigenous farming practices, ecosystem management and climate health techniques were passed through storytelling, native wisdom, and hands-on learning from the elders to the youth, from generation to generation. The age of colonialism, both political and corporate, set up land management systems focused on extraction from nature rather than a partnership with nature (Sands et. al., 2023).

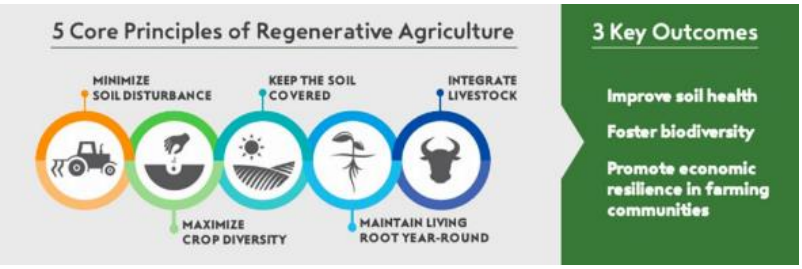
Indigenous farming practices (IFP) also referred to as traditional ecological knowledge (TEK) have served as a resilient mechanism towards climate change because of adaptivity in different conditions, shaping landscapes, natural environments, biodiversity, and agriculture (Gadgil et al., 2021). TEK provides in-depth ecological intelligence related to ecosystems that have been passed on over generations (Hosen et al., 2020; Ingty, 2017; Wyllie de Echeverria and Thorton, 2019). IFP examples that utilize biodiversity include *agroforestry* which is the practice of purposely planting, thinning, and managing trees and bushes with the intent of creating an ecosystem that optimizes interactions between crops, livestock, and the general ecology. It also creates a forest biosphere that will yield food, medicine, and resources (Elevitch et al., 2018). Another example is *companion planting* which is the process of planting different crop species together that share symbiotic benefits. For example, the IFP of planting beans, squash and maize together is known as the three sisters which is used in many Indigenous nations (McNulty, 2022). Yet another example is *crop rotation,* which is a farming method of periodically changing crop types or removing crops between fields to enhance the fertility of soil, and control weeds, insects, and more importantly diseases (Akullo et al., 2007). Other forms of IFP that are related to soil health include *rotational grazing practices* which is the driving of large ruminant animals such as bison in specific sequences across the land to improve soil health through aeration and increasing nutrients from manure (McNulty, 2022; Seymour and Connelly, 2022). Another IFP is *burns* which is the practice of purposely igniting and managing a fire through an area to improve or harness a resource. Fire can improve soil quality, spur growth, and create a more resilient and tolerant landscape (Roos, 2021). A critical agricultural practice is *water preservation* which is using engineering methods to preserve and retain water in drought conditions. Technologies such as check dams, gravel mulched border gardens, ditches, and grid planting are techniques used to harness and preserve water (Force, 2004; Vivian, 1970). *Composting* has long been practiced by Indigenous people. Composting is a process that converts organic materials into a nutrient-rich, biologically stable soil amendment or mulch through natural decomposition (EPA, 2023; SMSC, 2022). This practice creates compost to keep lands fertile, employing different methods that mimic the build-up of nutrients on the forest floor (Platt and Gannon, 2022). Finally, *biochar* is an IFP of adding carbon to the soil in the form of charcoal derived from fireplaces and burns. This soil amendment increases soil fertility by adding more nutrient-holding structure to the soil (Bezerra et al., 2019).

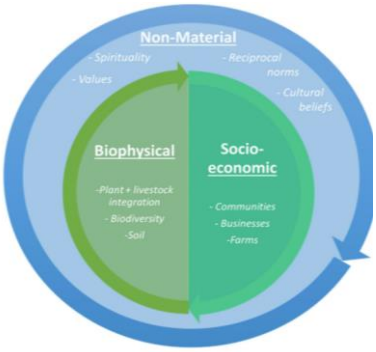
IFPs have served to mitigate the effects of climate change through carbon sequestration, reducing erosion, and maintaining topsoil health. Indigenous farming practices established over thousands of years through interconnected relationships with the local ecology and cultures and the climate and natural environment serve as a foundation to modern Western regenerative agriculture. (Sands, et. al, 2023).

IFP, Soil Health and Regenerative Agriculture

A critical aspect of regenerative agriculture is soil health as the erosion of soil has reached detrimental levels. Rhodes (2017) describes soil as a "the fragile, living skin of the Earth." He goes on to discuss how the world treats soil has a significant impact on climate change. Regenerative agriculture is adapted to the specific climate to include environmental factors such as temperature, soil types and precipitation.

There are various models of regenerative agriculture that include ecological, biological, social, spiritual and cultural aspects. The following model illustrates the Western scientific interpretation of regenerative agriculture that emphasizes biophysical and economic factors. (Sands et. al, 2023)



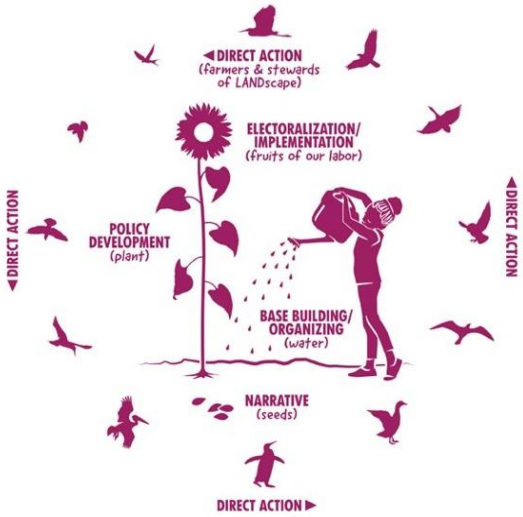


Conversely, this regenerative agriculture model not only demonstrates the biophysical and economic factors, but also emphasizes cultural beliefs and values, spirituality and reciprocal norms related to balance with the climate and natural environment (Sands et. al, 2023).

As the benefits of regenerative agriculture are examined, it is critical to acknowledge that IFP serves as the bedrock to modern regenerative agriculture. Moreover, comprehending that racial and social justice is central to the discussion of reversing the ecological damage that post-colonial agriculture has had on the climate for centuries. Thus, Sands et. al (2023) proposed an *anti-colonial* definition for regenerative agriculture: "*A way of farming comprised of entangled values and practices and founded in Indigenous principles of loving-caring for the Earth. This*

approach to farming values 1) reciprocity, 2) respect, 3) collective (human and non-human) wellbeing, 4) knowledge co-creation, and 5) (re)localization, and it is often practiced through some combination of 1) minimizing soil disturbance, 2) maintaining vegetative soil cover, 3) maximizing diversity, 4) integrating livestock, and 5) minimizing synthetic agrichemicals."

To better understand how to bring indigenous wisdom into policy making, the United Frontline Table (2020) proposed the following framework for policy organization:



The UNFT (2020) outlined five key concepts including *narrative* which was represented by seeds, that all our efforts must begin with a story and possible vision for the world. The second concept was *base building and organizing* represented by water that provides collaboration and vision. The third concept was *policy development* which is the plant nourished by organizing to develop policies informed by a community's principles. The fourth concept was *electoralization and implementation***,** which is developing and introducing policies to support a regenerative economy. All these concepts are moved through *direct action* in which individuals and families become stewards of the movement and the struggles that guide them.

Generations and Climate Change

Youths' voices have continued to be heard around the world related to climate justice (Morgan, et. al., 2024). However, despite all the publicity this has not been the case for youth of color and their families who are advocating for the climate, natural environment, and regenerative farming (Minkoff-Zern, 2020; Morgan, et. al, 2024). Huang and Bent (2022) found that young women of color in New York were actively advocating for climate justice through a collectivistic lens focusing on their communities. Moreover, this study found that these young women's quest was intersectional as climate justice also involved factors including race, gender, and economic factors. Research has also found that often BIPOC young people stress the importance of the

well-being of their family and community as related to climate change (Wegemer and Eccles, 2019). For people of color, climate change is configured in an interfacing context of race, ethnicity, gender, economics, culture, spirituality, an oppressed history, and these factors' relationship with the ecology.

The Case of Ollin Farms

The adventure of Ollin farms started in 2007 with a small garden behind a farmhouse. Kena and Mark had moved back two years earlier to take care of Grandma Lee, who was now living alone on the farm and dealing with dementia. While they were taking care of Lee, they planted a garden and got sheep and chickens so that their two daughters, Sofia and Jimena, could grow up with a connection to the land. Mark's background in water resource engineering led to a water-efficient garden utilizing drip irrigation, and the first gardens came to life. Kena has a rich *Mixteca* background from Mexico and a direct understanding of IFP.

Ollin Farms was established with the focus of food-as-medicine through healthy, mineralized, and microbially active soils. Ollin is an *Aztec* word meaning constant motion or constant change, which was chosen to reflect the cycling and always evolving aspect of the farm and life. Observing the patterns of nature, and mimicking those processes without the reliance on herbicides, pesticides, or chemical inputs became a driving focus that aligned more with traditional Indigenous practices.

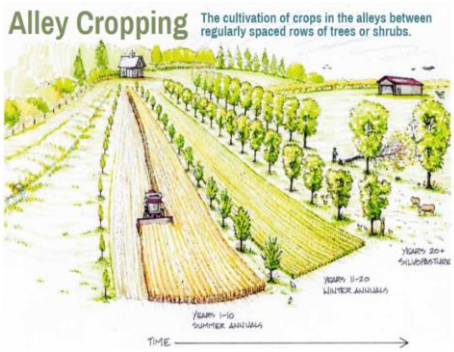
Ollin Farms and Climate Change Mitigation

The farm has faced major challenges from Mother Nature including a 500-year flood, multiple hailstorms, and weather challenges. These have been powerful lessons in the human and nature connection and the realization that being farmers isn't just about growing food, but also about supporting the entire ecosystem around the farm through providing habitat for birds, fish, pollinators, and other wildlife. Restoring the flooded creek area, planting a diverse cover crop to get living roots established, adding compost and minerals to aid the soil biology, and planting shrubs and trees into eroded banks have been important steps to restoring the creek ecosystem on the farm. In 2019, Ollin Farms partnered with the National Resource Conservation Service (NRCS) to develop a conservation plan that helped provide cost-sharing for the installation of 12,000 linear feet of hedgerows which would act as windbreaks around the farm's production fields. The conservation plan included soil health practices that reflected the IFPs listed below.

Ollin Farms has developed a *composting process* that takes manure from chickens and sheep and mixes it with shredded leaves from a local landscaper. Since 2019, the farm has been able to divert over 50 tons of leaf waste from the landfill and mix it with waste products from the farm to produce rich compost used to fertilize the vegetable fields. The second IFP includes *on-farm fungal decomposition/composting* which is important to soil building. Partnering with a local mushroom farm, spent bags of fruited mycelium are brought to the farm and combined with

wood chips to allow the mycelium to continue to spread and eventually turn the wood chips into soil, mimicking how nature cycles wood waste in the forest. Another key IFP is *rotational grazing of livestock* which has been identified as one of the most powerful climate mitigation strategies. Rotational grazing allows plants and animals to do the work of sequestering carbon and growing topsoil. In a semi-arid climate such as Colorado, this often involves moving the animals, in this case sheep, to new grazing areas daily. *Cover cropping* is a practice of growing diversified crops primarily to benefit the soil rather than for harvest. This ties back to the idea of keeping a living root in the soil, which keeps the photosynthetic engine running. Ollin Farms plants cover crop mixes in the fall or early spring to keep the ground covered, feed soil biology, and add carbon and nutrients to the soil. Ollin Farms also utilizes *alley-cropping practices* within their vegetable production fields (diagram by Savanna Institute, 2022). Ollin Farms has utilized shrub species that can also produce food or medicine, with many of these same shrubs having cultural significance to indigenous communities including buffalo berry, chokecherry, American plum, Sand Hill plum, currants, goji berry, elderberry, and mulberry. Compost, biochar, shredded leaves, wood chips and mycelium are all applied as mulch under the hedgerows and all of these products are derived from materials diverted from the landfill.

Ollin Farms Generational Realities



Ollin Farms welcomes youth and their families, preschool classes, college students and other community members from throughout the Denver Metro Area. Youth from different cultures and backgrounds come with their natural curiosity, their energy and their happiness when connecting with Mother Nature and La Tierra. The youth have continued to find a place where they can learn and understand sustainability and actively help to regenerate soil and restore ecosystems. For Ollin Farms, teaching the next generations through an Indigenous lens about the importance of the land, nature and climate change has become a priority. An example of youth of color volunteering is the Esperanza Youth Group who are actively involved in serving their community. Volunteering at Ollin Farms has served to connect Latino youth to their *mestizo roots* as many come from indigenous farming heritage. Working at the farm fosters a care for the natural environment and knowledge on how sustainable/regenerative farming relates to climate change.

Ollin Farms Spirituality and Soul

While Ollin Farms started with the mission to heal the community through access to healthy food, it has evolved to understand that another type of healing, one focused on the mental and spiritual is as important in these times where youth are growing more disconnected from the natural world. Thinking holistically about the effects of our actions is an example of the

Indigenous principle of respecting the 7th generation. The Seventh Generation Principle emphasizes the consideration of future generations in decision-making. It urges individuals and societies to act with the well-being of the seventh generation yet unborn in mind. This principle underscores the interconnectedness of humanity with the environment and advocates for sustainable practices that prioritize long-term ecological and cultural health.

Conclusion

In summary, Indigenous Farming Practices offer essential wisdom to offsetting climate change. Regenerative farming is grounded in IFP and the positive balanced impact this science has had on the ecology of the land for thousands of years. Through the case study of Ollin Farms, this paper illustrates how a working regenerative farm in Colorado has been guided by the principles of IFP and has engaged a diversity of families in their local community in direct climate action. Moreover, this paper also demonstrated how critical it was to make climate justice an intergenerational reality. Furthermore, the importance of involving youth of color and their families as future climate advocates was essential to the balance between nature and humans. A diverse ecosystem is best created by a diversity of hands in cooperation with Mother Nature.

Important recommendations include:

- Government agencies should identify local regenerative family farms and Indigenous communities focused on ecosystem health and engage them when writing policy to ensure that subsidies, insurance policies, grant opportunities, and sales channels are supporting a regenerative local food system.
- Government agencies should identify opportunities to educate and engage families in their local communities to be active participants in ecological land management. Local farms interested in engaging the public can host the families for educational workdays or engagement opportunities can be organized on public lands.
- Leaders and land managers at the local, regional, and national level should include youth and families of color as they can be important climate advocates at the leadership table.
- That youth of color and their families who are Indigenous and of mestizo background who have indigenous farming heritage should be invited to learn about their farming ancestry and to have a voice.
- Biodiversity is key to climate resilience, whether in our agricultural fields or in our communities.

In closing, as stated by Kena Guttridge-Cordero, *Mixteca* mother and co-owner of Ollin Farms, referring to youth and climate change. "*Yes, we need to leave a better planet for our children, but equally important is to leave better humans for our planet."*

References

Akullo, D., R. Kanzikwera, P., Birungi, W., Alum, L., Aliguma, L. and Barwogeza, M. (2007). Indigenous knowledge in agriculture: A case study of the challenges of sharing knowledge of past generations in a globalised context in Uganda. Paper read at the World Library and Information Congress: 73rd IFLA General Conference and Council, Durban, South Africa, 19–23. doi:10.3184/003685017X14876775256165

Bezerra, J., E. Turnhout, I., Vasquez, M., Francischinelli, R., Arts, T. B. and Kuyper, T. W. (2019). The promises of the amazonian soil: shifts in discourses of Terra Preta and biochar. *Journal of Environmental Policy & Planning 21*, 623–635. DOI:https://doi.org/10.1080/1523908X.2016.1269644.

Elevitch, C. R., Mazaroli, D.N. and Ragone, D. (2018). Agroforestry Standards for Regenerative Agriculture. *Sustainability*, 10: 3337. https://doi.org/10.3390/su10093337.

Force, E. R. (2004). Late holocene behavior of Chaco and McElmo Canyon drainages (Southwest U.S.). A comparison based on archaeologic age controls. *Geoarchaeology: An International Journal,* 19 583–609.

Gadgil, M., Berkes, F., & Folke, C. (2021). Indigenous knowledge: From local to global. *Ambio*, 50, 967–969. https://doi. org/10.1007/s13280-020-01478-7.

Huang, T. S. and Bent, E. (2022). When girls lead changing the playbook for climate justice. *Girlhood Studies*, 15, 35-52.

Hosen, N., Nakamura, H., Amran, & Hamzah (2020). Adaptation to climate change: Does traditional ecological knowledge hold the key? *Sustainability* 12, 676. https://doi.org/10.3390/ su12020676.

Ingty, T. (2017). High mountain communities and climate change: Adaptation, traditional ecological knowledge, and institutions. *Climatic Change*, 145, 41–55. https://doi.org/10.1007/ s10584-017-2080-3.

Kapayou, D.G., Herrighty, E.M., Gish Hill, E., Cano Camacho, V., Nair, A., Winham, D.M., McDaniel, M.D. (2023). Reuniting the three sisters: collaborative science with Native growers to improve soil and community health. *Agriculture and Human Values*, 40, 65–82. https://doi.org/10.1007/s10460-022-10336-z

Khangura, R., Ferris, D., Wagg, C. and Bowyer, J. (2023). Regenerative agriculture: A literature review on the practices and mechanisms used to improve soil health. *Sustainability*, 15, 2338. https://doi.org/10.3390/su15032338.

McNulty, A. (2022), Native agriculture never went away. Now it is on the rise. The Bill Lane Center for the American West, Stanford University. https://andthewest.stanford.edu/2022/native-agriculture-never-went-away-now-it-is-on-the-rise/

Minkoff-Zern, L. A., Welsh, R. and Ludden, M. T. (2020). Immigrant farmers, sustainable practices: growing ecological and racial diversity in alternative agrifood spaces. *Agroecology and Sustainable Food Systems*, 44, 947–972 https://doi.org/10.1080/21683565.2019.1666076.

Morgan, O.S., Melchior, F., Thomas, K., and McNab-Coombs, L., (2024). Youth and climate justice: Representations of young people in action for sustainable futures. *The Geographical Journal*, 190, https://doi.org/10.1111/geoj.12547

Platt, B., Gannon, L. (Host).(2022). Past Present and Future of Composting. Institute for Local and Self Reliance. https://ilsr.org/brenda-platt-explains-the-past-present-and-future-of-composting/

Rhodes, C.J. (2017). The Imperative for regenerative agriculture. *Science Progress*, 100.

Roos, D. (2020). Native Americans used fire to protect and cultivate land Indigenous people routinely burned land to drive, prey, clear underbrush and provide pastures. https://www.history.com/news/native-american-wildfires

Sands, B., Machado, M.R. White, A., Zent, E., Gould, R. (2023). Moving towards an anti-colonial definition for regenerative agriculture. *Agriculture and Human Values*, 40, 1697–1716.

Savanna Institute, 2022. Understanding Agroforestry. https://www.savannainstitute.org/wp-content/uploads/2023/04/AlleyCropping_Infosheet_English_web.pdf

Seymour, M. and Connelly, S. (2022). Regenerative agriculture and a more-than-human ethic of care: a relational approach to understanding transformation. *Agriculture and Human Values*, 40, 231-244. https:// doi.org/10.1007/s10460-022-10350-1.

Shakopee Mdewakanton Sioux Community (2022). https://www.smscorf.com/blog/a-look-into-the-history-of-composting/#:~:text=In%20North%20America%2C%20Native%20Americans,into%20more%20large%2Dscale%20operations.

UNTF, 2020. A People's Orientation to a Regenerative Economy https://unitedfrontlinetable.org

United States Environmental Protection Agency (2023). What is Composting? https://www.epa.gov/recycle/composting-home

Vivian, R. G. (1970). An Inquiry into Prehistoric Social Organization in Chaco Canyon, New Mexico. In *Reconstructing Prehistoric Pueblo Societies*, Ed. William A. Longacre, pp. 59-83. Albuquerque: Univ. of New Mexico Press.

Wegemer, C.M., and Eccles, J.S. (2019). Gendered STEM career choices: Altruistic values, beliefs, and identity. *Journal of Vocational Behavior*, 110, 28–42. https://doi.org/10.1016/j.jvb.2018.10.020

Wyllie de Echeverria, V. R., & Thornton, T. F. (2019). Using traditional ecological knowledge to understand and adapt to climate and biodiversity change on the Pacific coast of North America. Ambio, 48, 1447– 1469. https://doi.org/10.1007/s13280-019-01218-6.

May 12, 2024