
GATHER

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Intro

Smithsonian Magazine
Where the Buffalo No Longer Roame...

I've been pondering over the subject of conquering the wild west for many years. The more I read about the subject, the more I see the total devastation that we have committed against the indigenous people.

In grade school they made you feel it was an exciting time in American history. We were expanding our territory. I remember reading about the final train tie which tied together the east coast and the west coast by rail.

Yet lately I have been reading from the indigenous people and their side of the story

Can you imagine living on your land for thousands of years? The indigenous people knew they were custodians of the land. They knew their survival was dependent upon being harmonious with the land and all the magnificent creatures that exist in it.

Westerners might say they didn't have a technology-based society yet. Their society was full of ancient wisdom.

Just think every square inch of land that was taken the Indians never saw most of that land again.

The Indians would only kill a buffalo to survive for the winter.

Western man would kill buffalo by the millions. I remember seeing a photo once in a magazine it displayed a huge mountain of killed buffaloes. Two men with rifles had their rifles pointed out the window toward the buffalo's corpses.

This was a mere sport for them. It was a farm of genocide for the indigenous people at that time.

They knew that by killing all the buffalo, the indigenous people wouldn’t survive.

Almost every inch of land in America was taken from the indigenous people. Many have them have been forced off their lands and had to live on some reservation.

Many of them could no longer fish or hunt without a license. If you were found to break a law, your license would be taken away for life.

This is a tail of the great tragedy that occurred and is still occurring today in America.

I'm hoping this book will be an avenue where people can discuss what occurred in the past and what we can do to make sure it doesn't happen in the future.

For our world to survive, we need to change in so many different ways. We must stop being consumers of this life. We must learn how to be custodians. Mother Earth recently has been going through many traumatic changes. Hopefully, we can learn from our present and passed mistakes.

Many years ago I heard in Colorado a great teacher once said we are solving off the branch that we are sitting on.

This was said over 50 years ago and yet it is still so true today.

I pray that we can live once again in unity with nature and the universe.

Quite frankly, most of the world's leaders haven't a clue as to what has to be done. In the United States, the political system is in total shambles. I don't need to get into it. Just turn on the TV.

Time is ticking away. We must realize there's a threat of love tying us together. We think we are separate. We think that consumer goods will give us fulfillment and happiness in our life.

We were taught this from quite a young age. True happiness does not exist outside of you. Unfortunately, we have been living that way for thousands of years.

We are at a turning point where we must change our ways. If we don't I can almost guarantee you that in a couple of hundred years, humans won't be on this planet.

Talk to any climate scientist and he will tell you the same thing. Signposts are all around us. Humanity must make a critical decision. We must change our ways. There's no point even debating it.

Come join me on this adventure of life. You are a piece of this puzzle. Your piece of the puzzle is needed to solve the puzzle of life.

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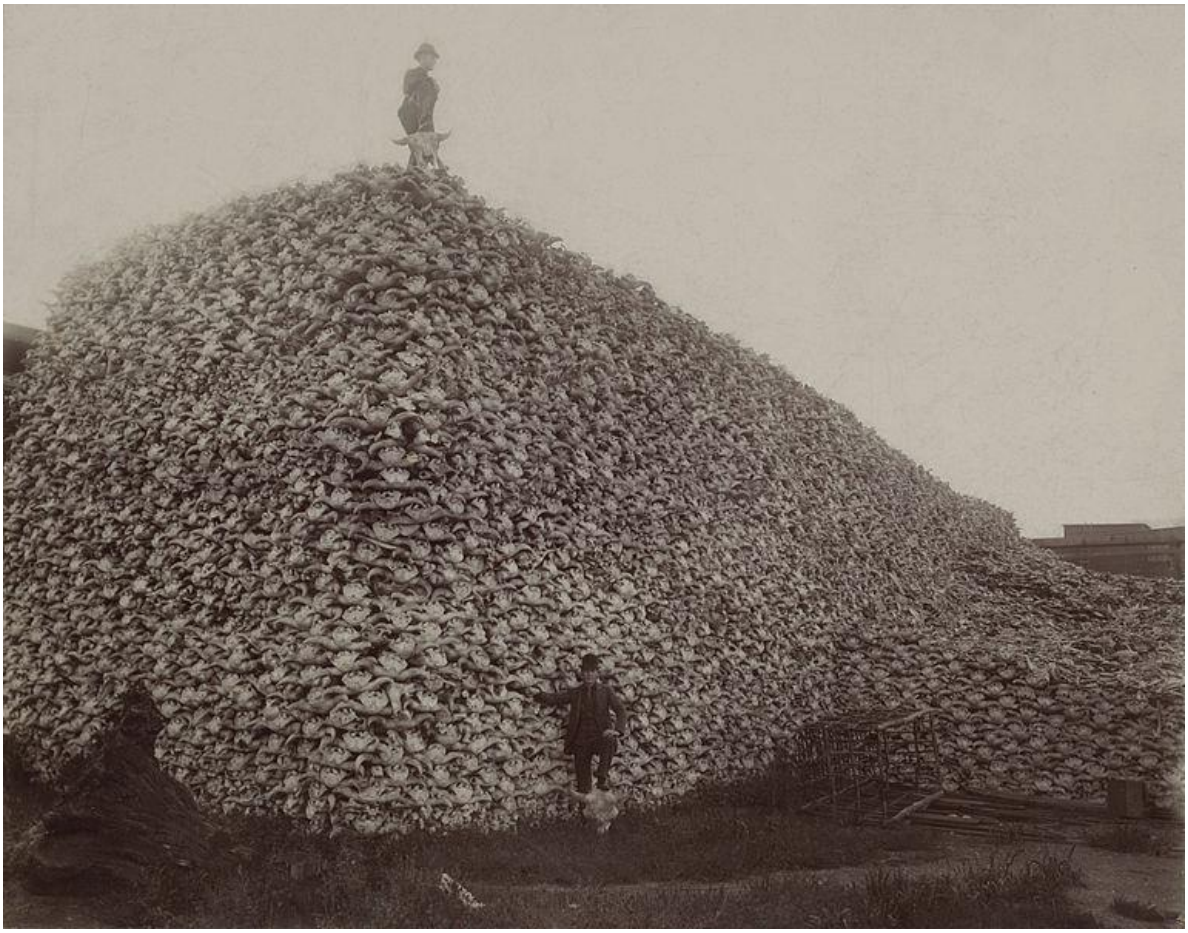
https://gather.film/

Where the Buffalo No Longer Roamed

[1]The Transcontinental Railroad connected East and West—and accelerated the destruction of what had been in the center of North America

Gilbert King

July 17, 2012



A pile of American bison skulls in the mid-1870s. Photo: Wikipedia

[1] https://www.smithsonianmag.com/history/where-the-buffalo-no-longer-roamed-3067904/

The telegram arrived in New York from Promontory Summit, Utah, at 3:05 p.m. on May 10, 1869, announcing one of the greatest engineering accomplishments of the century:

The last rail is laid; the last spike driven; the Pacific Railroad is completed. The point of junction is 1086 miles west of the Missouri river and 690 miles east of Sacramento City.

The telegram was signed, "Leland Stanford, Central Pacific Railroad. T. P. Durant, Sidney Dillon, John Duff, Union Pacific Railroad," and trumpeted news of the completion of the Transcontinental Railroad. After more than six years of backbreaking labor, east officially met west with the driving of a ceremonial golden spike. In City Hall Park in Manhattan, the announcement was greeted with the firing of 100 guns. Bells were rung across the country, from Washington, D.C., to San Francisco. Business was suspended in Chicago as people rushed to the streets, celebrating to the sounding of steam whistles and cannons booming.

Back in Utah, railroad officials and politicians posed for pictures aboard locomotives, shaking hands and breaking bottles of champagne on the engines as Chinese laborers from the West and Irish, German and Italian laborers from the East were budged from view.

Not long after President Abraham Lincoln signed the Pacific Railway Act of 1862, railroad financier George Francis Train proclaimed, "The great Pacific Railway is commenced.… Immigration will soon pour into these valleys. Ten millions of emigrants will settle in this golden land in twenty years.… This is the grandest enterprise under God!" Yet while Train may have envisioned all the glory and the possibilities of linking the East and the West coasts by "a strong band of iron," he could not imagine the full and tragic impact of the Transcontinental Railroad, nor the speed at which it changed the shape of the American West. For in its wake, the lives of countless Native Americans were destroyed, and tens of millions of buffalo, which had roamed freely upon the Great Plains since the last ice age 10,000 years ago, were nearly driven to extinction in a massive slaughter made possible by the railroad.

Following the Civil War, after deadly European diseases and hundreds of wars with the white man had already wiped out untold numbers of Native Americans, the U.S. government had ratified nearly 400 treaties with the Plains Indians. But as the Gold Rush, the pressures of Manifest Destiny, and land grants for railroad construction led to greater expansion in the West, the majority of these treaties were broken. Gen. William Tecumseh Sherman's first postwar command (Military Division of the Mississippi) covered the territory west of the Mississippi and east of the Rocky Mountains, and his top priority was to protect the construction of the railroads. In 1867, he wrote to Gen. Ulysses S. Grant, "we are not going to let thieving, ragged Indians check and stop the progress" of the railroads. Outraged by the Battle of the Hundred Slain, where Lakota and Cheyenne warriors ambushed a troop of the U.S. Cavalry in Wyoming, scalping and

mutilating the bodies of all 81 soldiers and officers, Sherman told Grant the year before, "we must act with vindictive earnestness against the Sioux, even to their extermination, men, women and children." When Grant assumed the presidency in 1869, he appointed Sherman Commanding General of the Army, and Sherman was responsible for U.S. engagement in the Indian Wars. On the ground in the West, Gen. Philip Henry Sheridan, assuming Sherman's command, took to his task much as he had done in the Shenandoah Valley during the Civil War, when he ordered the "scorched earth" tactics that presaged Sherman's March to the Sea.

Early on, Sheridan bemoaned a lack of troops: "No other nation in the world would have attempted reduction of these wild tribes and occupation of their country with less than 60,000 to 70,000 men, while the whole force employed and scattered over the enormous region…never numbered more than 14,000 men. The consequence was that every engagement was a forlorn hope."

The Army's troops were well equipped for fighting against conventional enemies, but the guerrilla tactics of the Plains tribes confounded them at every turn. As the railways expanded, they allowed the rapid transport of troops and supplies to areas where battles were being waged. Sheridan was soon able to mount the kind of offensive he desired. In the Winter Campaign of 1868-69 against Cheyenne encampments, Sheridan set about destroying the Indians' food, shelter and livestock with overwhelming force, leaving women and children at the mercy of the Army and Indian warriors little choice but to surrender or risk starvation. In one such surprise raid at dawn during a November snowstorm in Indian Territory, Sheridan ordered the nearly 700 men of the Seventh Cavalry, commanded by George Armstrong Custer, to "destroy villages and ponies, to kill or hang all warriors, and to bring back all women and children." Custer's men charged into a Cheyenne village on the Washita River, cutting down the Indians as they fled from lodges. Women and children were taken as hostages as part of Custer's strategy to use them as human shields, but Cavalry scouts reported seeing women and children pursued and killed "without mercy" in what became known as the Washita Massacre. Custer later reported more than 100 Indian deaths, including that of Chief Black Kettle and his wife, Medicine Woman Later, shot in the back as they attempted to ride away on a pony. Cheyenne estimates of Indian deaths in the raid were about half of Custer's total, and the Cheyenne did manage to kill 21 Cavalry troops while defending the attack. "If a village is attacked and women and children killed," Sheridan once remarked, "the responsibility is not with the soldiers but with the people whose crimes necessitated the attack."

Gen. Philip Sheridan photographed by Matthew Brady. Photo: Library of Congress

The Transcontinental Railroad made Sheridan's strategy of "total war" much more effective. In the mid-19th century, it was estimated that 30 milion to 60 million buffalo roamed the plains. In massive and majestic herds, they rumbled by the hundreds of thousands, creating the sound that earned them the nickname "Thunder of the Plains." The bison's lifespan of 25 years, rapid reproduction and resiliency in their environment enabled the species to flourish, as Native Americans were careful not to overhunt, and even men like William "Buffalo Bill" Cody, who was hired by the Kansas Pacific Railroad to hunt the bison to feed thousands of rail laborers for years, could not make much of a dent in the buffalo population. In mid-century, trappers who had depleted the beaver populations of the Midwest began trading in buffalo robes and tongues; an estimated 200,000 buffalo were killed annually. Then the completion of the Transcontinental Railroad accelerated the decimation of the species.

Massive hunting parties began to arrive in the West by train, with thousands of men packing .50 caliber rifles, and leaving a trail of buffalo carnage in their wake. Unlike the

Native Americans or Buffalo Bill, who killed for food, clothing and shelter, the hunters from the East killed mostly for sport. Native Americans looked on with horror as landscapes and prairies were littered with rotting buffalo carcasses. The railroads began to advertise excursions for "hunting by rail," where trains encountered massive herds alongside or crossing the tracks. Hundreds of men aboard the trains climbed to the roofs and took aim, or fired from their windows, leaving countless 1,500-pound animals where they died.
Harper's Weekly described these hunting excursions:

Nearly every railroad train which leaves or arrives at Fort Hays on the Kansas Pacific Railroad has its race with these herds of buffalo; and a most interesting and exciting scene is the result. The train is "slowed" to a rate of speed about equal to that of the herd; the passengers get out fire-arms which are provided for the defense of the train against the Indians, and open from the windows and platforms of the cars a fire that resembles a brisk skirmish. Frequently a young bull will turn at bay for a moment. His exhibition of courage is generally his death-warrant, for the whole fire of the train is turned upon him, either killing him or some member of the herd in his immediate vicinity.

Hunters began killing buffalo by the hundreds of thousands in the winter months. One hunter, Orlando Brown brought down nearly 6,000 buffalo by himself and lost hearing in one ear from the constant firing of his .50 caliber rifle. The Texas legislature, sensing the buffalo were in danger of being wiped out, proposed a bill to protect the species. General Sheridan opposed it, stating, "These men have done more in the last two years, and will do more in the next year, to settle the vexed Indian question, than the entire regular army has done in the last forty years. They are destroying the Indians' commissary. And it is a well known fact that an army losing its base of supplies is placed at a great disadvantage. Send them powder and lead, if you will; but for a lasting peace, let them kill, skin and sell until the buffaloes are exterminated. Then your prairies can be covered with speckled cattle."

Chief Black Kettle, leader of the Southern Cheyenne. Photo: Wikipedia

The devastation of the buffalo population signaled the end of the Indian Wars, and Native Americans were pushed into reservations. In 1869, the Comanche chief Tosawi was reported to have told Sheridan, “Me Tosawi. Me good Indian,” and Sheridan allegedly replied, “The only good Indians I ever saw were dead.” The phrase was later misquoted, with Sheridan supposedly stating, “The only good Indian is a dead Indian.” Sheridan denied he had ever said such a thing.

By the end of the 19th century, only 300 buffalo were left in the wild. Congress finally took action, outlawing the killing of any birds or animals in Yellowstone National Park, where the only surviving buffalo herd could be protected. Conservationists established more wildlife preserves, and the species slowly rebounded. Today, there are more than 200,000 bison in North America.

Sheridan acknowledged the role of the railroad in changing the face of the American West, and in his *Annual Report of the General of the U.S. Army* in 1878, he acknowledged that the Native Americans were scuttled to reservations with no compensation beyond the promise of religious instruction and basic supplies of food and clothing—promises, he wrote, which were never fulfilled.

“We took away their country and their means of support, broke up their mode of living, their habits of life, introduced disease and decay among them, and it was for this and against this they made war. Could any one expect less? Then, why wonder at Indian difficulties?”

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Gilbert King | | READ MORE

‘Gather’ Review: The Struggle to Remain Sovereign

[2]This documentary wonderfully weaves personal stories with archival footage that contextualizes the continued violence against Native Americans.

Sammy Gensaw, one of the subjects of the documentary “Gather.”Credit...Renan Ozturk/Illumine

[2] https://www.nytimes.com/2020/09/08/movies/gather-review.html

By Lovia Gyarkye
Sept. 8, 2020

Gather

NYT Critic's Pick

Directed by Sanjay Rawal

Documentary

1h 14m

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Many are familiar with the tangible losses associated with colonization — land, homes and people. But there are also the intangible losses — language, designs and cultural practices — that can totally reconfigure how Indigenous people and their descendants relate to each other. “Gather,” a documentary by Sanjay Rawal, intimately examines one intangible loss — food traditions — and its use in pursuit of Native sovereignty in the United States.

The documentary, available on demand, follows members of four different tribes as they use their individual interests to work with community members to reclaim or preserve

their cultural traditions. Nephi Craig, a White Mountain Apache chef, is trying to combat food insecurity in his community by opening a restaurant that uses Apache-grown produce in innovative dishes. Elsie Dubray, a 17-year-old member of the Cheyenne River Sioux Tribe, uses her passion for science to analyze the benefits of a traditional buffalo-based diet as compared with a modern beef-based one. Sam Gensaw, a Yurok Tribe member, leads a group of teenagers in the preservation of the salmon fishing traditions of their tribe, while Twila Cassadore, a master forager of the San Carlos Apache, works to introduce ancient medicinal and food practices to the youth in her community.

The film wonderfully weaves personal stories with archival footage that contextualizes the continued violence against Native Americans. Rawal covers a substantial amount of ground and deftly balances the dense material without losing sight of the mission driving the bigger story: Healing from generational trauma sometimes starts with just one person.

Gather Centers Efforts to Heal and Rebuild Indigenous Traditions and Foodways

[3]Filmmaker Sanjay Rawal explains the complexities of making the documentary for and about Indian Country.

BY JADE BEGAY

OCTOBER 14, 2020

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[3] https://civileats.com/2020/10/14/gather-centers-efforts-to-heal-and-rebuild-indigenous-traditions-and-foodways/

12 Native-Owned Food Businesses to Support on Indigenous Peoples' Day

Rediscovering Detroit's Roots Through Indigenous Food

Indigenous Youth Reboot Acorns to Revive Food Sovereignty

Director Sanjay Rawal is the first to admit that he, the First Nations Development Institute, and the half dozen Indigenous-led partner organizations they worked with to make the new documentary *Gather*, didn't set out to reach a general audience.

"We never expected that anybody outside Indian Country would like this movie. And we didn't make it for anybody outside Indian Country," says Rawal. Instead, they wanted to capture a series of pivotal efforts to re-engage with Indigenous foodways around the country and inspire more of the same. And yet, *Gather*, which was released in September, has also been well-received on the national stage.

The film follows a handful of central characters, and weaves together historical threads of forced displacement, violence, and disenfranchisement with those characters' current day work to rebuild traditional foodways and heal intergenerational trauma.

Traditional forager Twila Cassadora of the San Carlos Apache Nation (pictured above) gathers wild amaranth seeds with her niece and hunting for wild rodents. Chef Nephi Craig launches Café Gozhoo, a café designed to introduce the residents of White River, Arizona to traditional Apache cuisine using the food grown by farmer Clayton Harvey at Ndee Bikiyaa or "the People's Farm."

The film also follows high school senior Elsie Dubray of the Cheyenne River Lakota Nation, who uses Western science to prove the nutritional value of her family's bison herd. And the Gensaw brothers—Samuel III, Peter, and JonLuke—of the Yurok Nation spend time catching salmon, and teaching young people about their tribe's traditional foodways through their group The Ancestral Guard. The work is not without its challenges, but all the characters are doing more than feeding themselves—they're rebuilding their lineage, and repairing their shared world.

As Chef Craig says in the film:

Our ancestors saw the world end once. That whole lifeway is gone. Now, we're on the other side of the apocalypse, but we are still very much in resistance today . . . . Maintaining our foodways is our own battle to fight for our human rights. We still hold dear these traditions of food and agriculture, and the generosity attached to those practices, so I feel that we are experiencing a profound, wonderful, and amazing return to those concepts and ideals.

Rawal has been making documentaries for over a decade, and his films include *Ocean Monk*, *Challenging Impossibility*, *3100: Run and Become*, and *Food Chains*, which tells the story of the Coalition of Immokalee Workers, the group of farmworkers known for revolutionizing the tomato harvest in Florida.

Civil Eats spoke with Rawal recently about the collaboration at the heart of the film, the connection between land access and food sovereignty, and his hopes for larger change in the food system.

I wanted to hear about your relationship or connection to food traditions and food sovereignty and why this topic? Why did this appeal to you?

Sanjay Rawal.

There isn’t enough knowledge out there about the suffering that cultures around the world have gone through because of colonization. And as people know, the Crusades were the petri dish for the colonization of the Western Hemisphere. But then the colonization of the Western Hemisphere became the playbook for going to Southeast Asia, to India—where I’m from—and to other parts of the world. They were all based around fortune hunting and extractive economies.

This was all pre-Industrial Revolution, it was land-based farming of cash crops like tobacco, cotton, and spices. The appeal of going to places where you could enslave people and get these cash crops produced with a zero labor [cost] drove the creation of massive fortunes in Europe and then subsequently in America and my country. India was under British occupation until 1947. And one of the things that colonial systems do as they extract wealth, is develop supply chains and those supply chains end up changing diets tremendously.

When you look at the food system as a whole, really nobody is eating the same foods that their great-great-grandparents did. There are remnants of the techniques, like fermentation, etc. But corporate controlled agriculture, the commodification of calories, and the development of supply chains and supermarkets have all led us to a very unhealthy physical lifestyle. And so that’s been my interest in food and food systems. My dad was also [a tomato breeder].

But I would have never, ever have dared to attempt to make a film about Native American food sovereignty were it not for the First Nations Development Institute. My first film was about migrant farmworkers in South Florida. And they had a hard enough time getting a seat at the table, being considered Latino. But in fact, they were all Indigenous—Guatemalan, Chiapan, and Oaxacan migrants.

And that organization, the Coalition of Immokalee Workers, is undoubtedly the most successful anticorporate Indigenous movement in the world. So, I got a sense of indigeneity and the deep connection with food systems by making that movie. But it was through a series of conversations with First Nations that *Gather* developed. And it was very much a partnership or, more accurately, they were the driving force behind the content, and behind the relationships, and they infused the film with indigeneity.

Preserving foodways seems to be the high-level topic. But there's another thread that ties all of these stories together, and that is healing intergenerational trauma. Can you talk more about the experience of seeing that thread emerge in this story?

With the development of extractive agricultural economies on Turtle Island, African American bodies had value in terms of labor, Native American bodies didn't have value because it was the land that they stewarded that had the value. So, when people were stripped from their lands, they were stripped from all of the traditions that they developed over tens of thousands of years. And *Gather* really outlines in a nutshell how it wasn't just physical removal from land because Native tribes were very, very powerful. It took asymmetrical warfare and the destruction of food systems, destruction of culture, language, and creation stories, which all tied into land, food, and physical and spiritual survival.

Nephi Craig. (Photo credit: Renan Ozturk)

But you can’t ever extinguish spirituality completely. Kernels of spirituality obviously exist deep within the Native American communities we were in and you could see how valuable they were, like coals or embers of a long-forgotten fire.

Those embers, and the redevelopment of those systems are literally healing because they are identity. The great conundrum in human life is answering that question: Who am I? That’s deep on so many levels. And the first thing that people need to feel comfortable with addressing is what their histories are, what their place is right now in the world vis à vis other people, vis à vis creation, vis à vis the creator. And food knowledge that exists within the food sovereignty space holds all of that.

So, this idea of healing comes from those embers, from that knowledge itself. Opening up that knowledge, that wisdom to a young heart or a young mind is naturally healing because knowledge is consciousness and consciousness is energy and life. We saw those threads all throughout Indian Country while developing this film.

And there were a number of incredibly worthwhile stories. But we ended up having to select the stories that best fit the medium of visual storytelling.

How do you hope this film can shift perspectives on food systems?

I take cues from the characters in our movie. What non-Native, non-BIPOC audiences can't really see in a film like this is the fact that food system work is life or death. The work *has* to be done in its fullest capacity right now, or we're going to continue to lose loved ones. And there has been a 500-year history of creating institutions that prevent physical, emotional, and spiritual health in Indian Country. So, there's a lot of work to do. There are a lot of people out there engaged in this work on very deep levels, from Denisa Livingston to Sean Sherman to tens of thousands of other people.

They need support, and that support is really two-sided. In some cases, it's staying out of their way. That is an institutional perspective, a policy perspective. Stopping or dismantling the systems that are purposely preventing them from [doing their work to the fullest]. The other form of suppert is delivering the resources or allyship that those organizations need. Less than one-third of 1 percent of American philanthropy goes to Indigenous-led organizations working with Indigenous people in North America. And the vast majority of philanthropy comes from fortunes that are directly dependent on stolen land and enslaved bodies. So, the inequity is based around the original extractive economy of the U.S. But the solutions aren't coming from that same money.

Elsie DuBray (Photo credit: Renan Ozturk)

The characters in the movie don't necessarily present themselves as leaders or as examples, but rather as inspirations. Hopefully they can inspire people to listen to their elders, to start helping the activists and advocates in their communities, achieve community goals.

As a young person, I was particularly inspired to see the young people with the Ancestral Guard taking initiative to bring youth into closer relationship and connection to traditional foodways. This is what I want to be doing in the future with land and my community—restore our relationship to sheep and crops. I notice how sensitive you are around this material and how you've really navigated the challenges of telling a story about Indigenous people for Indigenous people. Why was it important for you to do this film in a way that is not extractive and does not perpetuate patterns like tokenizing or romanticizing?

The very first documentary film ever was a 1929 film called *Nanook of the North*, which started an industry of ethnographic filmmaking—outsiders going into communities and telling stories—which, on the surface, isn't inherently problematic. But it just so happens that *Nanook of the North* was a complete recreation, entirely staged, extraordinarily

exploitative, and it set a pattern for outside filmmakers coming in communities all around the world and not working in partnership, much less with oneness of spirit and goals with those communities. So in dealing specifically with the dark history of outsiders coming and making films about Native Americans, that issue was top of mind. Native kids get more media about their own people made by non-Natives than they do [media made by] Natives.

And I'd seen people coming and making films about the community that I'm a part of and I'd seen how inaccurate they were and how problematic they were. So, it was a little bit of a challenge, stepping up to the role of director of this film. But First Nations Development Institute was explicit that they would be there to tell me what mistakes I was making and help guide the depth of the content. So, with that really deep friendship, I felt comfortable taking on a role that, frankly, I had no place to take.

Samuel Gensaw III. (Photo credit: Renan Ozturk)

You framed a lot of the stories in *Gather* around the inequities that have led to loss of Indigenous foodways, and right now there's a movement of Indigenous people demanding their land back. I'm sure you've heard the phrase or seen the hashtag #landback. And we're at a point where, if we want to preserve foodways, if we want to have food sovereignty, if we want a safe climate, land (and other reparations) needs to go back to our communities. What your thoughts on that?

I can only speak about it from a food systems standpoint. Readers will be familiar with the "school to prison pipeline" that a lot of African American children are subjected to. And that's institutional racism any way you look at it.

But there is a corollary for Native American men and women to pull them into the prison system, or the fine-based extractive governing economy, and that's by denying them treaty access to land. And denying their hunting and fishing rights, even when those rights are bound by treaties. We've seen, especially during COVID, even stay-at-home enforcement has resulted in fines placed on ,Native foragers for harvesting (and those acorns can provide a year's worth of food). But folks aren't being fined for going to Trader Joe's or Whole Foods.

There's a deep-seated institutional racism around land use and land access on the most basic level, and the goal is basically to penalize Native people, pull them away from any sort of claim on the land so that the extractive economy can take over. So, the Land Back movement includes dismantling a system that literally prevents Natives from feeding themselves.

Twila Cassadora and her niece hunt rats in the Arizona desert. (Photo credit: Renan Ozturk)

And this idea of public land being wilderness as opposed to something that requires human intervention, has resulted—to some degree—in the massive wildfires in the West. Obviously, there's a climate change component, a strong one, but the lack of Natives at the table when it comes to preventative fires, and using fire suppression measures rather than controlled burns, is a direct result of those policies, too. There's so much "public land" out there that's totally mismanaged, and [non-Native] people need to realize that Land Back movements are critical to the survival of our environment. It's not even so much an economic argument. It's about the survival of everybody living on Turtle Island.

Today's food system is complex.

How have the people in the film responded to it?

I believe our characters have really enjoyed the movie. They've all been on a number of panels and I think that they've been able to see that the movie at least moderately effectively conveys the scale and scope and depth of their work. Audiences have been pretty effusive and nonjudgmental and really, really supportive of their work. And it's been evident in the dozens and dozens of questions they have, not for me, but for our characters at every Q&A that we do.

How have your subjects been impacted by the COVID epidemic?

The San Carlos Apache Nation—where Twila Cassadora lives—has experienced an almost entire shutdown and lockdown and so travel on and off the rez has been impossible. And I know a lot of Twila's work involves meeting people and teaching people. She's been able to continue doing that on her reservation, but she hasn't been able to do the knowledge sharing that she usually does with people from different tribal nations.

Café Gozhoo had to close—not permanently, but it had to shut down because of COVID. They couldn't serve food in a socially distance way on a reservation that was experiencing probably as high or even higher numbers per capita than Navajo was. Obviously with a different time window.

FILMMAKER Q&A WITH SANJAY RAWAL OF 'GATHER: THE FIGHT TO REVITALIZE OUR NATIVE FOODWAYS'

SUSAN MESSER

2021 FESTIVAL, 2021 FILMS, FOOD, AGRICULTURE

Mae from the film "Gather: The Fight to Revitalize our Native Foodways."

"Gather: The Fight to Revitalize our Native Foodways"
Saturday, March 6, 3 p.m. CST

"Gather: The Fight to Revitalize our Native Foodways" is an intimate portrait of the growing movement among Native Americans to reclaim their spiritual, political, and cultural identities through food sovereignty, while battling the trauma of centuries of genocide. "Gather" follows Nephi Craig, a chef from the White Mountain Apache Nation (Arizona), opening an indigenous café; Elsie Dubray, a young scientist from the Cheyenne River Sioux Nation (South Dakota), conducting landmark studies on bison; and the Ancestral Guard, a group of environmental activists from the Yurok Nation (Northern California), trying to save the Klamath river. This film was a critic's pick in the New York Times, September 2020.

***Susan Messer** talked with director **Sanjay Rawal**.*

Film Director **Sanjay Rawal**

Q: You've made a film about Native Americans, but you are not Native American yourself. How did you manage this sensitive issue?

A: The first documentary we have, "Nanook of the North," was made in 1922 by an Anglo-American, Robert Flaherty. He made up the rules as he went along, in what I've understood from some local accounts was a collaborative process with his subjects—an Itivimuit community in northern Canada. The film spawned an industry of people who could afford to travel around the world and capture stories of people who they considered exotic. Today, most media about indigenous communities have been made by non-Native people. I'm a person of color, yet not a Native American. I was mindful of the space I was entering.

Of great benefit were the strong relationships my partners at the First Nations Development Institute (FNDI) had in Indian Country. We put the film together as a team. FNDI has a 40-year history of working on food issues in Native cultures. With them, I assessed the types of stories we could cover cinematically, including which tribal nations would be our

focus. Without FNDI, it would have taken me, a non-Native, several years to develop the trust that allowed me to work on the ground in those communities.

Q: What is the focus of your film?

A: The film looks at colonization and the destruction of food systems, and at those attempting to revive them. It focuses on areas that were colonized post-1870s, west of the Mississippi—places where I could find the essential imagery, the photographic evidence, I needed to tell these stories. The challenge was to hone a very large subject scope into something based in image. Structure is essential in film, as are length considerations, as is, of course, finding the best stories to tell.

All storytelling, especially by an outsider, can come with a sense of exploitation. We wanted to have a clear participatory role for our subjects, to show them as the experts they are. We didn't want to go to outsiders to present context.

Because we had Native producers, we were able to avoid stylistic pitfalls—that is, to avoid romanticizing or treating these people or their lives as anachronisms. We picked characters based on their background, on their cinematic charisma, on how well they could carry a story without speaking. We didn't come to the film with a strong thesis; we let the people drive the narrative, drive the set of facts that are presented.

Q: What surprised you in the making of this film?

A: Really getting to experience the front line of Native activism—learning about the role Natives play as stewards of the land, and coming to understand that issues that may at first appear to be local can affect people thousands of miles away. The outcome of any of these efforts will have a bearing on how environmentally clean the future will be for all of us.

Sammy from the film "Gather: The Fight to Revitalize our Native Foodways."

One story we follow in the film concerns activists from the Yurok Nation in northern California, whose goal was the removal of four hydroelectric dams on the Klamath River. These dams have seriously undermined the health of the whole river system—a formerly rich fishing ground for the Yurok—and in turn almost completely undermined the livelihood of the Yurok people and their relationship with their environment. But the story isn't only about the Yurok. People in LA might not be paying attention to this effort, but its success will have long-term implications for the health of all California water and forest systems.

I've always lived in cities, the Bay Area, New York. It can be hard for us urban folks to understand the whole chain of processes and people that affect us, how protecting resources in one community can affect all communities in North America.

Q: But the focus of the film is food, correct?

A: Yes. And food traditions. Many of us had ancestors who remained in the same general part of the world for hundreds or thousands of years, so they knew the foodways—what you could eat and not eat, how you gathered and prepared your local food. They had strong cultural ties to their food systems. And these foodways intertwined with identity. These traditions and cultures and identities around food were one of the many things that were taken from Native Americans.

One story in the film is about Nephi Craig, a chef from the White Mountain Apache Tribe in Arizona. What he was doing was so relatable. He had a dream to open a high-end affordable café on his reservation, and to bring together a network of Native chefs dedicated to researching, refining, and developing Native American cuisine. And he faced all the challenges a dream like that can take. His understanding of ingredients and the rationale around cooking, how food intertwines with identity was so deep. But I didn't want to make a Food Network film and show recipes. I wanted to show the role a chef—this chef—could play in

advancing ideas in the food system. All the film's stories weave together during the course of the film, but his is the spine.

Sanjay's film will be followed by a discussion led by ***Maddie Oatman****, Senior Editor and Writer, Mother Jones Magazine; contributor to Mother Jones' food politics podcast, "Bite." She'll be talking to these panelists:*

- ***Danielle Hill****, Founder, Heron-Hill LLC; Mashpee Wampanoag tribes; appears in "Gather: The Fight to Revitalize our Native Foodways"*
- ***Kayleigh Warren****, Communications Coordinator, Native American Food Sovereignty Alliance; Tewa and Tiwa from the Pueblo Nations of Santa Clara and Isleta*

Tickets are free, with $8 suggested donation.

Nephi Craig inside Café Gozhoo. (Photo credit: Renan Ozturk)

With regard to the Ancestral Guard, they're literally further away from any major supply chains than any of our other characters, despite how remote the other reservations are. So, they have had to double down on a lot of their food sovereignty work and have had expand out of the river and plant gardens. They've rapidly expanded the scope of their work and are doing regular food deliveries to elders and all sorts of other people who have been heavily impacted economically and health-wise by COVID.

And lastly, Elsie Dubray, hasn't been able to attend classes in person. She was she was given the option to take this fall quarter as though it were a summer quarter. And so she is hoping to get back to campus at Stanford for the winter semester and then really do a full summer of studying next year.

This interview has been edited for length and clarity.

Native American Food Sovereignty: An Interview with Filmmaker Sanjay Rawal

Arty Mangan

ARTICLE

Sanjay Rawal is a James Beard Award winning filmmaker who spent 15 years working on global human rights campaigns. His films include FOOD CHAINS about the battle of the Coalition of Immokalee Workers against the largest agribusiness conglomerates in the world and 3100: Run and Become about ultra-marathoners who value running as a spiritual exercise. Arty Mangan of Bioneers talked to Sanjay about his latest film Gather, the story of reclaiming food sovereignty in three North American Indigenous communities.

ARTY: Your film *Gather* tells the stories of how young Yurok leaders, a Lakota high school scientist, and a White Mountain Apache chef are reclaiming indigenous foodways. What drew you to these particular people and their stories?

SANJAY: My first film, *Food Chain*, was on the Coalition of Immokalee Workers, the farmworkers who pick tomatoes in Southern Florida. As it happens, Spanish wasn't the first language for any of them. They're displaced migrant workers from indigenous communities in Oaxaca, Chiapas, and Guatemala.

After that film a funder reached out to me and asked me if I wanted to make a movie on Native American food sovereignty. The topic of native representation in media is a serious one, and I felt as a non-Native, even though I come from a country that has a horrific colonial past under the British, I didn't have the frame of reference to address the topic. But the funder assured me that I would be working with one of their partners, the First Nations Development Institute and A-dae Romero-Briones who provided the indigeneity oversight that most, if not all, non-Natives in this space don't have. That's why there are a lot of tropes and mistakes that non-Natives make on these types of films.

The film looks at the effects of colonization and genocide on the Native American food system. Being in the form of visual media rather than a book, I'm limited by the access I have to visual media. I couldn't look at East Coast tribes that experienced genocide in the 1860sand 1870s before there were photographs. So, I looked at tribal nations west of the Mississippi. By the time the US government began moving west of the Mississippi, it had consolidated its military might and focused on Native American extermination to a degree that it hadn't before as an institution. There were probably no more heavily affected areas, as a whole, than the plains and the Apacheria [the area inhabited by Apache people] in the Southwest.

Sanjay Rawal

California Native history is not taught. The fact that California is seen as a progressive bastion shrouds the reality that there is a wild west spirit still in many areas of California. Many areas of California were settled by people from the confederacy, and those traditions of manifest destiny, colonial Christianity, and white supremacy created a kind of perfect genocidal storm that's still affecting California Natives today in a way that progressive California is very much unaware of. That reality took us up to the Yurok and neighboring Hupa Nations.

ARTY: Years ago, I attended a farming event at the Gila River Reservation in Arizona. Before things started, a group of about 10 folks circled up for a conversation. Half of us were white, half were Native farmers, and out of the blue, one of the Native farmers said, “My parents always taught me that white people lie,” which of course is too often true. My question to you is how did you, as an outsider, gain trust of these folks to be able to capture their stories?

SANJAY: In all honesty, it was primarily because the characters in the film had either worked closely with the First Nations Development Institute or had known intimately of their work. There are 574 federally recognized tribes and hundreds more that haven’t gotten that political stamp of approval but are very much Native. It would have taken me years to develop relationships with any single Native tribe that’s featured in the film, but it was their trust in the folks from the First Nations Development Institute that opened the door.

I had a great crew of partners on the film, all of whom had worked as outsiders in indigenous communities before. Our tactic number 1 was to stay out of the way. What that meant was really treating our characters as the experts as they are. We didn’t even interview Native academics unless they were actually from the tribes we were speaking of, lived in those communities, or worked with our characters. We realized very quickly that the film had to be completely in the voices of our characters with nobody external to any of those stories, Native or not. So, I think that approach saved us from making 95% of the mistakes non-natives usually make.

That said, we made sure First Nations was very much part of the editing process. They pointed out a couple of things that I’m embarrassed about that were included in hindsight that were just such obvious mistakes from a non-native perspective. It was really their oversight that made the film kind of ring true for Indian Country.

ARTY: As the folks in the film revive and carry on traditional ways as part of a collective community healing, their work is also a way for them to heal personally from past traumas, addictions, incarceration or living in a food desert.

Gathering wild plants on the White Mountain Apache Reservation in Arizona

SANJAY: I can only speak peripherally to the effects of food sovereignty and food systems on healing from colonial trauma. I just don't have the frame of reference for the historical trauma. What I observed for indigenous cultures all around the world, and really if we look back into our own family trees, human beings weren't really nomadic. We had exceptionally close relationships with the immediate environment and understood that the immediate environment was absolutely essential to our survival. We developed not just an intimate knowledge of the plant life and the animal life in those ancestral areas,

but we also developed a sense of gratitude and thus a whole series of spiritual practices to express that gratitude and to express the sacredness of the knowledge of survival.

Indigenous communities in North America still have those spiritual connections to a good degree, even though a lot of that was almost destroyed. That spiritual connection forms a foundation for what we consider food sovereignty.

When people, who are suffering from historical trauma of the devastation of capitalism on their communities, are reintroduced to their traditional foods by Nephi Craig from White Mountain Apache, and Twila Cassadore from San Carlos Apache, it wasn't just here's a squash, here's some sage, it was an introduction or reintroduction to the lifestyle that their ancestors experienced pre-contact. That was a time when they were free from the yoke of continued occupation and colonization.

It's not enough just to learn how to identify a squash, you end up learning how to love it by learning the songs and learning all of the spiritual traditions that their ancestors practiced around those foodways and lifestyles. Introducing people to traditional foods, essentially, is a first step to reintroducing them to their identity. That sense of self-discovery, as we know, is the key to happiness for anybody, whether they're in the immediate grasp of suffering or whether they're more in the space of just trying to develop themselves free from trauma.

ARTY: When I was formulating these questions, I tried to be careful to not ask you to be in a position to speak for anybody but yourself.

SANJAY: Folks involved with the film know that I always overstep, so they have a lot of forgiveness.

ARTY: Okay. Nephi Craig, the White Mountain Apache chef said in the film, "The food system has been colonized." He also said that alcoholism, diabetes, homicides and suicides are the physical manifestations of colonialism, and that fighting for Native foodways is a human right. Can you talk about how you see Nephi Craig overcoming colonialism?

Nephri Craig

SANJAY: I think when Nephi is speaking about decolonization, he's really speaking about economic justice and the right a person has to eat the way they want to eat. Indian Country is under an arcane system of governance. They're governed effectively by the Bureau of Indian Affairs, which is under the Department of the Interior. There is a devastating set of policies that make it very difficult for Natives to farm, make it difficult to hunt, and make it very difficult to serve kids in schools traditional foods. When Nephi talks about decolonization, it's about understanding the freedom that someone can experience when they're able to gather and grow and hunt their own food and to cook

that food and experience the change in identity that comes from connecting to your past.

I'm making it sound complex, but for Nephi I think it's simple. Cook the food of our ancestors and then figure out how everybody in the tribal community has access to that food. There's policy ramifications; there's local economy ramifications; there's ramifications around subsidies. Each of those limitations will vary from tribe to tribe.

ARTY: Food sovereignty, the central theme of the film, is the paramount quest for the people in the film. When you met all of these great folks to tell their stories, what did you personally learn about food sovereignty?

SANJAY: Twila Cassadore started a project called the Western Apache Diet Project with a non-Native colleague named Seth Pilsk. They began by interviewing elders who were born in the 1920s. Their first memories were probably in the late 1920s. They asked them if they could remember what was in the pantries of their grandparents. If they were in those kitchens in the late 1920s, or 1930s, and their grandparents were 80, 90 years old, that means that they were coming of age in the 1850s, 1860s, pre-reservation. Their food system hadn't been really devastated by contact with non-Natives yet. And so they began putting together lists of ingredients in the Apache language, and kind of cobbling together how those ingredients might be prepared.

My theory is that all of us at some stage 300, 500, 1,000 years ago, were pretty much rooted to particular communities, with the exception of certain ethnicities like Ashkenazi Jews who just kept getting kicked out of places generation after generation. For example, my mom's side of the family has been in a particular place in South India for thousands of years. If you're not acclimatized to the food in your immediate environment, you die. You can't pass on your genes. If you're born above the Arctic Circle and you can't survive on a high fat diet, forget it.

Sammy Gensaw

So conversely, it would make sense to say that our ancestral genetics are very highly specialized to particular foods in particular environments. When Twila began looking at those ingredients and began serving them to people, there was an immediate health effect, not just physical, but kind of a psychological health effect as well. Those foods, in a sense, spoke to the genetic makeup of her people.

I went back and asked my mom, who's now in her mid-80s, if she could remember what was in the pantry of her grandmother who lived in the village. My mom listed

ingredients that were pretty much unintelligible when it comes to modern East Indian cuisine. In fact, none of those ingredients seemed familiar at all to me. At the same time, they're the most familiar ingredients to my genetics that I could ever come across. But the supply chain system of agricultural economics basically took those ingredients out of the marketplace and replaced the really tough red rices with mass-produced white Basmati rice and substituted coconut oil, which was the fat in the South, with ghee and butter and other things that could be developed on farms and shipped around the country in India.

I realized there's a food sovereignty aspect in every family. Ingredients and preparations don't just connect you with your ancestors, but might hypothetically connect you with a deeper set of genetic knowledge and genetic memory.

ARTY: That reminds me of an experience that I had at that same farm conference at Gila River. At one point, everyone was sitting around roasting corn on an open fire. That traditional food triggered a memory of one of the O'odham elders. When he was a kid, he'd ride out into the desert on a horse with his friends and they would carry flatbread, bailing wire and matches. When the sun went down, they would catch flying insects, put them on the bailing wire, make a fire and pop-roast them, and eat them on the flatbread. That was their dinner. So, I have to ask you about the pack rat hunt scene. It's a very visceral scene. I imagine a lot of people who watched that had a very strong reaction. Why was it important for you to put that in the film?

Twila Cassadore and her niece hunting pack rats

SANJAY: My weird academic fascination has always been with supply chains, and looking at the destruction of genetic variety and the destruction of genetic choice because of the economics of agriculture. None of us in the United States who shop at supermarkets eat any sort of diet that's specific to our own genetics. Even at farmers' markets, you pretty much get the same types of cherry tomatoes, mescaline lettuce, tubers, etc., in California as you would in the summer season at Union Square in Manhattan. It's always been really interesting to me how many people's global diets just morphed into the Costco, Whole Foods, Trader Joe's diet once they moved to North America. Any control

over local food systems is completely usurped by the power of these large supermarkets.

I live in New York City, and I eat a diet where pretty much nothing that I eat or buy at the stores was ever traditionally grown in New York City. I think most New Yorkers have no idea what the food system would have been like pre-New York City. Most likely it was heavy on shellfish, heavy on fowl, heavy on a lot of proteins and plants that would now seem or taste strange. What fascinates me is to understand how media, television normalcy dictates what we think is appropriate and what we think is inappropriate to eat.

When I first learned about Twila's work trying to reintroduce pack rat as a protein source, it formed a microcosm of my own interest. The Spanish conquistadors, when they first started moving up from Mexico into what's now Arizona in the 1500s and 1600s, were basically coming from gigantic European cities where rats were an anathema. When they saw Apaches roasting and eating rats, they were mortified. Through the process of Western education and conversion, they created a huge stigma around this source of protein, which is completely relevant, completely sustainable, completely clean according to the timelines when Apaches would traditionally hunt them. It was the first example I could think of in North America where an important food source was pushed out because of this European mode of thinking.

When Twila was trying to revive it, there was a stigma that the Apaches who were introduced to it had to overcome as Westernized Americans. Twila's process of 1) taking people out into the desert, 2) teaching them how to hunt in this very unique way, and 3) feeding it to them (she cooked it in incredibly tasty ways; I had it in a tamale), and 4) how reclaiming this food was reclaiming their power over the food system, that to me was the meaning of the film.

There's no ingredient that we came across in the film that typified that more than this little creature. Even though Americans destroyed the buffalo, there's always been a mythic symbolism of the buffalo. But rats, from the Western standpoint, are not seen as romantic.

ARTY: That's for sure. Speaking of buffalo, there's a scene where Elsie DuBray, the young Lakota high school scientist standing in the field with her father, says, "I love the sound of the buffalo." Talk about her journey. She is a bridge person blending her dual passions of traditional knowledge and science.

SANJAY: Elsie is now a junior at Stanford University. As anybody who was filmed in high school would reflect years later, she looks back at her confidence in wanting to combine Western science with Native American traditional knowledge with a little bit of, in her words, embarrassment. She actually spent the first two years of her university career staying as far away from science as possible, and trying to root herself in–what I understand as the true basis for Native science– a deepening connection to her people in a spiritual sense. She's learning the Lakota language and immersing herself in Native American studies. As Dr. Gregory Cajete of Santa Ana Pueblo has written, it's through the spiritual lens that first allowed a Native scientist to observe an environment with the correct perspective. Elsie recognized that, and I believe she's pursuing that foundational element of Native science and Native ecology earnestly before she enters back into the field of molecular biology.

ARTY: In another scene, at the mouth of the Klamath River, Samuel, the young Yurok man, is with a younger boy who had experienced some trauma. They see a group of seals laying on the other shore, and Samuel says to the boy, “The seals are our people too. Say hello to them. Acknowledge them.” What does that scene mean to you?

SANJAY: Sammy, much more than any of our characters, typifies the youth in Indian Country. No one in his immediate group really has the academic potential of Elsie. They didn’t have the kind of ambition and talent of Nephi Craig who was able to cook in some great kitchens. They’re going to live on their tribal land for the rest of their lives whether it’s their choice or not. They’re seeing their people gradually disappear both culturally and civically. They have a tremendous burden of having to contemplate survival as teenagers and as young 20 year olds. They didn’t have access to any real economic or academic resources. They had to use their dedication and their determination at every step of the way. They literally started from scratch.

Now four or five years into their official project work, they’re building gardens all over the Yurok Nation to redevelop self-sustenance, particularly when COVID decimated food systems and food supplies in that far-off section of California. They’ve realized a deep integral appreciation of their environment in its entirety. They were witnessing it disappear, not just the salmon but the plant life, the other aquatic life, and because of that, people’s connections to the river and the outdoors. They began to understand that without the frame of reference with nature as a relative, that kind of appreciation wouldn’t develop.

So, I think when Sammy speaks to that young boy, Uriah, about understanding their place on their land, it really rings true in Uriah's ears that they aren't the apex inhabitants of their tribal land. I think this is a theme across Indian Country. They have been given the role by the Creator of being stewards of the land, and that requires hunting and environmental management, but at the root of it all is an understanding that every creature, big or small, in your environment is your relative and should be approached with love and gratitude. I think that's the root of Sammy's own environmental ethos.

That's one of the reasons why the Yurok, the Hupa, the Karuk have been so successful at their campaign to remove the four dams on the Klamath River. But Sammy's speech to the young Uriah is the nucleus to that ethos and environmental consciousness.

ARTY: The struggle has, at times, been violent as shown in archival footage where there was police brutality on the river in the 1970s and '80s against the local Native people who wanted to maintain their fishing rights.

SANJAY: There's a whole series of issues in Indian Country that are the same as the issues of Black Lives Matter. It's important to note that the economy on North America, or Turtle Island, from the early 1600s through the late 1800s was agricultural. Unlike the Spaniards who were looking for gold, Anglo-Europeans understood the value of North America was the topsoil. They very quickly formed a series of plantations up and down the East Coast, mainly in the Southeast, to grow cash crops. That was the way Mother England was going to benefit economically off of its investment in the 13 colonies.

Rather quickly, the American farmer's monocropping exhausted the fertility of the soil, and they wanted to move west. The Royal Decree of 1763 by the British military forbade American farmers from crossing the Appalachian Mountains. American farmers needed the British military support because they were literally in search of native farmland to steal. To dispossess that land, they needed to kill Natives. They were in need of military support to protect them from Native incursions attempting to retake that land. That was the economic driver for the Revolution War.

The history of agriculture in North America has always been a history of violence. When settlers were encouraged to go west of the Mississippi, they were going onto land that had been promised to Natives for time immemorial in perpetuity [although California had 18 treaties that were never ratified]. So everywhere we see a farm, everywhere we see a ranch, everywhere we see the farming economy, it's literally built on genocide.

That's not to say that anybody living today has responsibility for what their ancestors did. But that historical trauma is on both sides. Natives just recognize that there's trauma in their lives from that genocide. People on the other side don't recognize that trauma, or if they do recognize it, they refuse to deal with it. We're in a time when Natives are still being policed for their traditional ways of hunting, for their traditional ways of fishing, or gathering traditionally on land. There has been an increased set of ramifications during COVID, and an increased set of policing policies to penalize Natives for use of their land.

This is back to that initial example. African American bodies are policed; their ability to gain economically is policed by institutions consciously or unconsciously. For Natives, the primary objective of the American economy has always been to separate them from their land. There's a whole host of policies from the way Fish & Wildlife police Natives to the way the Bureau of Indian Affairs polices Native access to land and resources that continue to perpetuate a genocide.

That's what folks like Sammy and his cohort, the Ancestral Guard, are dealing with day-by-day. There have been a number of Native youth that were fined during COVID for hunting more than their licenses allowed them to. But in essence, they were hunting and fishing to feed elders who couldn't physically leave their house because of lockdown,

who couldn't safely go hunting on their own. It wasn't like the Yurok were trying to decimate populations of elk or salmon, they were just trying to feed themselves in an environmentally and economically sustainable way. They were hit with penalties that could result in losing their gun licenses, which these young teenagers and 20 year olds would never be able to hunt again for the rest of their lives. That would separate them from their land, and that's the end game.

ARTY: Colonization and oppression continue still.

SANJAY: In very concrete, very measured, very institutionalized ways.

ARTY: The totem species of the Lakota is the buffalo, and for the Yurok it's the salmon, which obviously are living entities of the world. I would suggest that the icons of modern society are the iPhone, the car, and the computer, which obviously are machines. Samuel, the young Yurok leader, towards the end of the film says, "The Industrial Revolution is over now. If we want to survive, if we want to carry on living on the Earth, we need to be part of the restorative revolution." He also said that if salmon disappear, the Yurok will follow. Elsie's father Fred DuBray, the Lakota buffalo rancher, said, "By destroying the buffalo, they tried to destroy the Lakota." These are deep expressions of the relationship that these indigenous people have with the natural world. What do you think industrial society is losing by its disconnection to the natural world?

SANJAY: That's a great question. Industrial society and capitalism in essence are based on one principle, extraction. Extracting goods from one place and then shipping them, in some cases thousands of miles, to another place to combine those products– whether they're petroleum products, minerals, food or water–with other inputs to create something that has value in the market. Extractive capitalism creates a tremendous amount of inequality. That inequality isn't just economic. We know, from thousands of studies, that the elite don't suffer from environmental issues. They haven't suffered to the same degree from the pandemic as lower classes of people have.

At some point, there's going to be a proverbial tipping point where life is just not sustainable for the non-elites. Before that happens, as Sammy suggests, we need to reframe our relationship with Mother Earth and begin to practice things that restore rather than extract.

I think what Sammy's trying to say is that we can't have the same level of consumption as we've had in the last 100 years. There needs to be a whole-scale shift in philosophy. He and his people have referred to that as the restorative revolution, as the bedrock principle of environmental justice.

ARTY: The film opens with a quote from Crazy Horse who lived in the 1800s: "The Red Nation will rise again and be a blessing for a sick world." How do you think your film reflects on that prophecy?

SANJAY: That's a personal wish. I wish that one day the Native ethos will permeate larger Western society. As an outsider, I see that as essential to survival. But the expansion of that philosophy isn't going to happen unless Indian Country is allowed to redevelop itself on its own terms. There's wishful thinking of having Native practices and Native

approaches permeate all of Western industry, but, in the past, that has led to cultural appropriation and a dilution of the power of those philosophies and approaches.

The purpose of the movie was to make something that Indian Country could use as a tool. As a filmmaking team, we have been shocked by the interest of non-Natives in this film. One of the reasons why I think the film ended up being good was because we made it for Native audiences. We didn't over-explain; we didn't have to explain to Natives what genocide was; we didn't have to go through colonial history; we didn't have to really explain trauma; we just dove right into that topic. The idea was to prioritize Indian Country first, and Indian Country for its own sake. Let the individual communities grow and prosper and strengthen on their own terms. If there are partnerships to be made with the non-native world that further tribal nations, great, but if those tribal nations don't want to have contact, don't want to share with outside communities, that's their choice.

The quote reflects my hope that one day Indian Country will be strong enough and will be back on its own feet to such a degree that their practice and their approach, their descendants can have a more powerful role in leadership in all of our industries. We're beginning to see that with Deb Holland of the Laguna Pueblo tribe, nominated for the Secretary of the Department of Interior. Her position as the overseer for the Bureau of Indian Affairs [a branch of the US Department of Interior] would be quite monumental. The more Natives that we have in those positions of leadership, from politics to the economy, the stronger our own chance is of survival.

BISONDECOLONIZINGDOCUMENTARY FILMELSIE DUBRAYINDIGENOUS AGRICULTUREINDIGENOUS FOODLAKOTANEPHRI CRAIGSAMMY GENSAWSANJAY RAWALTWILA CASSADOREWHITE MOUNTAIN APACHEYUROK

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01-25-2020 The Wild West

It seems to me that western man is still living in conquering the wild west. We still have the mindset that life must be conquered. Mind you we annihilated millions of Indians along the way. Yet we still don't have any remorse for doing so. You would think that we might change our ways.

Yet this is embedded into our consciousness. We feel conquering is the only way. Whether it's war, politics, sports, or business. There are winners and losers. We even fight with Mother Earth. We take and steal precious resources without any sense of morals or ethics.

The following is from CNN. Prince Charles made these statements.

Only a revolution in the way the global economy and financial markets work can save the planet from the climate crisis and secure future prosperity, Prince Charles warned on Wednesday.

"We can't go on like this, with every month another record in temperatures being broken," he told CNN in an exclusive interview at the World Economic Forum in Davos, Switzerland. "If we leave it too long, and we have done, just growing things is going to become difficult."

The heir to the British throne and lifelong environmentalist was speaking to CNN after he threw down a challenge to the global business and finance elites in Davos to lead a "paradigm shift, one that inspires action at revolutionary levels and pace" to avert the approaching catastrophe.

"Do we want to go down in history as the people who did nothing to bring the world back from the brink in time to restore the balance when we could have done? I don't want to," he told the audience at the WEF's 50th annual meeting.

We must change our awareness and consciousness. We are nonchalantly sawing the branch we are sitting on. Every human on earth holds a particular piece of the puzzle.

Inside Outside

The Indengious people all around the world have a reference point of Inside, outside, and the state between inside and outside.

The western world reference point is always external. We always desire something external. The world around us is built on consuming and conquering. Companies battle for your buying products from them. We take precious resources from the living earth as they are infinite amounts.

The Aboriginals have existed upon the land for over a hundred thousand years. They are custodians of the land. Even if culture could hear the grass grow they have incredible perception. They live in the state of the inside, outside, and between worlds.

The earth is alive. The universe is alive. The western concept is inanimate objects have no awareness.

Recently I read an incredible article that describes the nature of consciousness. It was talking about a term called Panpsychism. During the 1920s Bertrand Russell came up with this term. It's kind of like what came first the chicken or the egg. What comes first a human body and mind or is there an awareness beyond that?

Is the universe aware and conscious? Is there a cosmic quantum soup of consciousness? Does a rock or a flower aware? Does consciousness require a form? How big or how small can the form be to be aware?

Is dark matter aware? Is the sun in the sky aware? What denotes awareness?

Some people think which I also do that the foundation of the universe is consciousness. The entire universe is aware. Before the big bang consciousness existed.

This is not the first time a universe was created nor will it be the last time. Like the incoming of breath and the outflow of breath, the universe comes and goes. Granted it takes billions of years. But still, that is a blink of an eye for eternity.

In this article, they described that even particles are alive and aware. These are part of a cosmic soup where everything is tied together. The entire universe is comprised of this soup.

Imagine making a homemade soup. You blend it all and combine milk or cream. Your family loves it.

Now can you take out a single ingredient? You can't. In the same way, there is a universal soup of consciousness of which we are a part. It is quantum. It is beyond time and space. We always think linearly.

In the quantum world the past, present, and future are melded together. There is a whole set of chaotic laws that we can't even conceive. Man thinks that by using logic that they can understand the quantum soup. But it's beyond logic and rational thinking.

I think the great mystics got a piece of the puzzle. Not the entire puzzle. But a piece of the puzzle contains the whole puzzle. It's like a hologram. A small piece contains the entire piece of the puzzle.

What if a person who meditates can be in a place where they are receptive to the inner light inside? Imagine this light is the same light as the quantum universe. Everything is a part of this light. E=Mc2. Everything is energy and light. Everything is alive and aware.

It seems like the western world is slowly catching up to the awareness that the universe is alive. The Aboriginals have known this for thousands of years and we call them primitive. During the period that western man thought the world is flat, the Aboriginals knew the earth and universe is alive.

Sound of the grass growing

Over time when one learns to enter the Dreamtime state one gets extremely sensitive to nature. So sensitive that one can hear the sound of the grass growing. So sensitive one can hear the sweet melodies of the earth and the universe.

Deep listening is essential. One must be focused on both the external and internal. The sense must be heightened. Only when the mind is calm can one have this type of experience. It's our true nature but we are completely removed from it.

It seems impossible because we are so far removed from it. Our awareness is focused on our 9 to 5 existence. Our goals are different. We want a car, a big house, vacations and all sorts of things. Thereby we don't pay attention to Gaia, the Dreamtime state, and the universe.

The Aboriginals have been doing this for over a hundred thousand years.

Dreaming ears dreaming eyes

Palace in the sky

0 seeker of truth, I have witnessed such a great wonder:

A well, suspended in the sky, from which ambrosia ceaselessly flows.

A lame person climbs to it without any ladder and drinks jugs of that nectar.
Gongs, conches, and kettle drums ring out without being played by anyone.

The deaf hear them and become ecstatic: they lose track of body and mind.
Up there is a palace without foundation, which is radiant with light.

The blind see it and are so overjoyed they can't stop talking about it.
In that place a person dies, yet continues to live, and has strength without eating food.
Brahmanand says that only a rare soul can understand his tale.

Commentary

I first heard this poem when I was 18 years old in India. It made a precious memory inside of me. There is a jewel inside that mankind can discover. Only a wise man understands what I'm talking about.

[4]

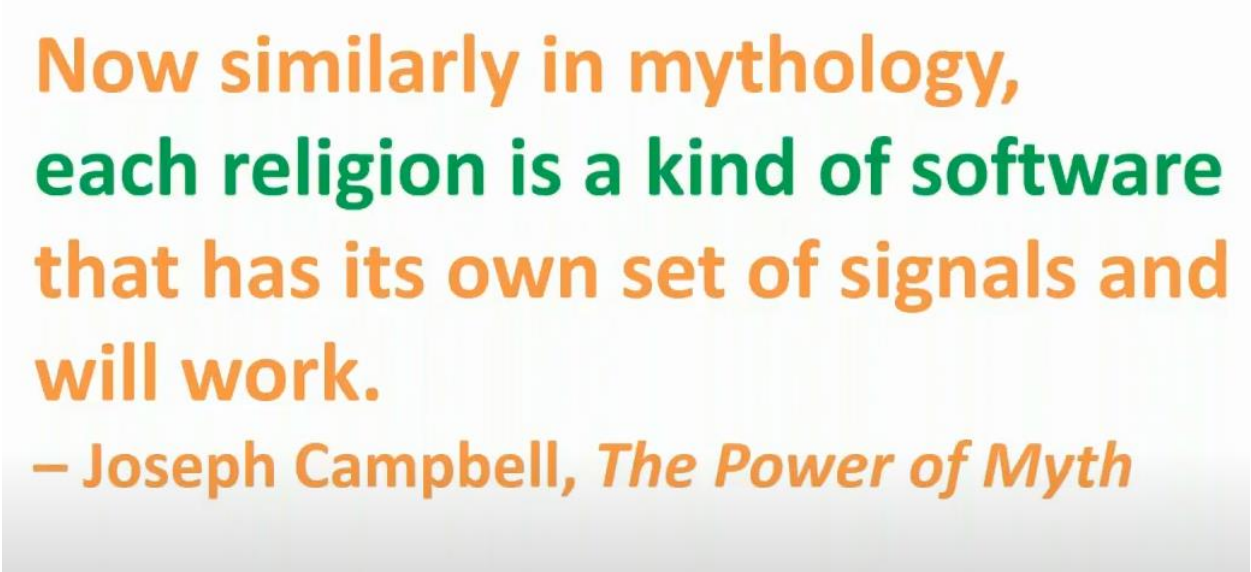
[4] http://www.prem-rawat-bio.org/library/hj2000/sh_brahmanand.html

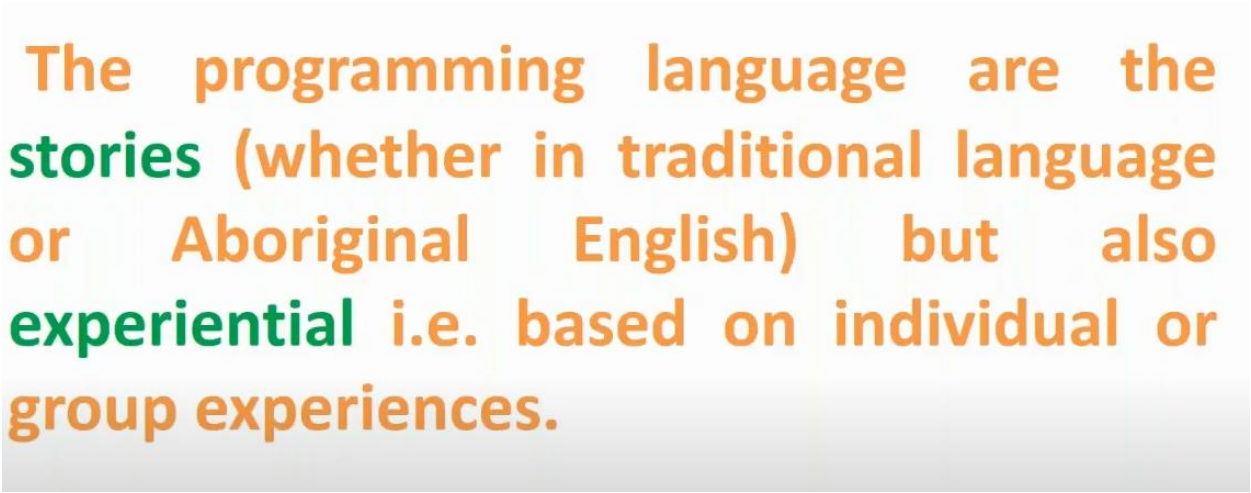
The Aboriginals have talked about this for thousands of years. This is not a foreign concept for Indengious people and mystics through the land. We have internal senses just like we have external senses.

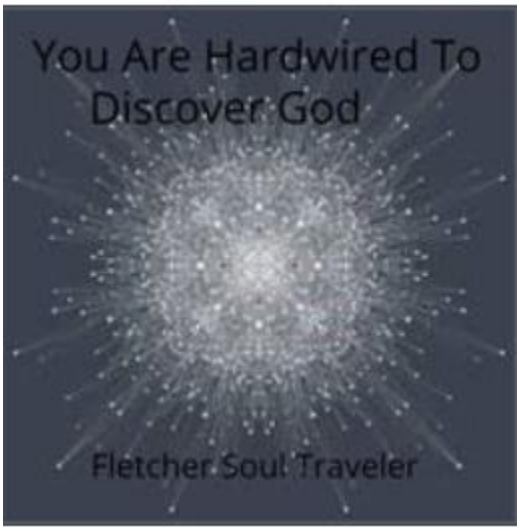
I say the more you pay attention to something the more attention it pays to you. In the beginning, one meditates upon the universe. After some time the universe meditates upon you. Big difference.

We have everything set in place when we are born. Humanity must flip the switch to understand this riddle.

The hardware and software is preinstalled







PDF

The aboriginals have been in synch with the operating system of life for over 100,000 years. This is an excerpt from my book “You are hardwired to discover God”.

You are hardwired to discover God. Come and sit around the campfire for this incredible tale. It’s all about you on this journey in life. We were never taught this in school yet all the great masters talked about this. The signposts of God are all around yet we don’t have the eyes to see.

This book will talk about the present-day people who are discussing how we are directly hardwired to find God. It will also go into the scripture where the evidence is provided on where to find the kingdom of heaven.

All the major religions are talking about the same thing. They just have a different way of expressing it for the particular time ad culture. Yet the essence is the same.

I believe that today we as humans are at a major turning point in our evolution. With the advent o the internet almost 30 years ago we are at the forefront of really communicating and understanding each other. We are a global village. Yet we see the chaos in the world and think is there any hope left in this world?

The sun is rising on the horizon. Darkness has nowhere to hide. We are seeing this in all areas of life. Darkness is being exposed. Look at the news today and you will

see in every area of life a scandal has been exposed. I see great hope in humanity. Granted it will take a while. Remember this is a journey. What would a journey be without having a grand adventure? We are on the journey of going from darkness to light.

In a million years we will see how far we have gone. Yet each decade going forward we will witness the consciousness of man going towards the light. Humanity takes two steps forward and one step backward.

That's how we grow. From an individual to a nation, to the world we learn by taking baby steps. We learn from our mistakes.

This is how we grow. I hope this book will help you on this journey. It's has a different point of view yet millions of people are waking up from their slumber. It doesn't matter what religion or non-religion you believe in. Each one of us has our unique way to discover our true nature.

I believe that it's by your will alone that you take your steps to understand your true nature.

The farmers restoring Hawaii's ancient food forests that once fed an island

Maui is a hub for GMO research is a hub for GMO researIndigenous farmers are trying to bring back the abundant and thriving landscapes of their ancestors

by Nina Lakha

[5] Kaipo Kekona, an Indigenous Hawaiian farmer, has adopted traditional methods. Photograph: Bea Oyster/The Guardian

Rain clouds cover the peaks of the west Maui mountains, one of the wettest places on the planet, which for centuries sustained biodiverse forests providing abundant food and medicines for Hawaiians who took only what they needed. Those days of abundance and food sovereignty are long gone.

Rows of limp lemon trees struggle in windswept sandy slopes depleted by decades of sugarcane cultivation. Agricultural runoff choking the ocean reef and water shortages, linked to over-tourism and global heating, threaten the future viability of this paradise island.

[5] https://www.theguardian.com/environment/2022/jun/17/hawaii-traditional-farming-methods-ancient-food-forests

Between 85% and 90% of the food eaten in Maui now comes from imports while diet-related diseases are soaring, and the state allocates less than 1% of its budget to agriculture.
Downslope from the rain-soaked summits, there is historic drought and degraded soil.

“We believe that land is the chief, the people its servants,” said Kaipo Kekona, 38, who with his wife Rachel Lehualani Kapu have transformed several acres of depleted farmland into a dense food forest on a mountain ridge.

Kaipo Kekona’s farm has been transformed from depleted farmland into a dense food forest. Photograph: Bea Oyster/The Guardian

The soil there is once again full of life, with wriggly worms and multi-colored insects busy among the layered roots and mulch. This food forest provides a glimpse of the ancient forests that for millennia thrived on these slopes until being burnt multiple times to create cropland – a cultural and ecological tragedy documented in traditional songs, chants and stories.

The couple are Indigenous farmers – ancient knowledge keepers – and part of a wider food and land sovereignty movement gaining momentum in Hawaii.

It’s a huge challenge. Traditional Hawaiian farmers have to contend not only with historic drought, erratic rainfall and deadly natural pathogens but also the dominance of industrial agriculture and foreign capital in Hawaii. The state became the biotech GMO capital of the US after agrochemical transnationals were welcomed to open research fields with fewer restrictions on potentially toxic pesticides.
In Kekona and Kapu’s food forest in Maui there are no pesticides or synthetic fertilisers. Cover crops and tilling are also out. “Traditional farming is about facilitating natural processes in order to feed the soil so that the land can feed us,” said Kekona.

Indigenous farming practices in Hawaii are guided by the lunar cycle and wind patterns, knowledge which was also passed down orally over generations, and even documented in newspaper articles going back to the 19th century. These oral histories and archives have played a crucial role in how farmers like Kekona, who didn't grow up speaking the Hawaiian language due to forced assimilation policies, steward the land today.

Kaipo Kekona holds fruit from a milo tree that produces a bright yellow-green dye. Kaipo's children used the dye produced by the fruit as paint at their summer camp. Photograph: Bea Oyster/The Guardian

The whole island was once a giant thriving food forest until colonial settlers in the 18th and 19th century stole the land, water and labor to create industrial monocrop plantations – mostly sugar and pineapples for export. This depleted the soil of its nutrients, carbon and water, and the Maui people of food and climate security.

"The goal is to knock the empire down and replace those corporate ag guys with something more environmentally sustainable which reflects our values," said Kekona, who is part of the Indigenous sovereignty movement reconnecting Hawaiians with their lands and traditions.

Organised chaos

A canopy system is central to a food forest. On Kekona's farm, sugar cane, papaya, coconuts, mangoes, coffee and candle nut trees provide shade and absorb water, nutrients and leaf litter, while mosses and ferns help suppress weeds and distract insects. In between are the cash crops such as the starchy root vegetable kalo (taro) – a traditional Hawaiian staple revered as an ancestor – sweet potatoes, breadfruit, turmeric and peppers, while other nutrient rich crops are mostly used for mulching or fertiliser.

Papaya trees help create a canopy system that is central to a food forest. Photograph: Bea Oyster/The Guardian

It looks chaotic compared with orderly monocropping but each plant takes what it needs to thrive, while contributing to the growth and development of its peers and future generations. The 30 moon phases used in the traditional Hawaiian calendar dictate when to plant, weed, water and harvest.

Cardboard, compost and organic mulch are layered like lasagne to regenerate the soil, while beds made from logs create inviting nooks for microbes to

thrive. Fish carcasses, seaweed, shells and other ocean scraps are mixed with fermented plants such as coffee husks to make organic fertiliser – a Korean technique adapted for Maui.

Unlike industrial agriculture, diversity is key: there are nine varieties of avocado and coconuts, three native bananas, six sweet potatoes and 27 types of kalo in orange, purple and brown. Some are coveted for the starchy sweet roots used for porridge, others produce tastier leaves and stems for stews, and one variety smells and tastes just like popcorn. Drought-tolerant varieties are becoming increasingly important.
Non-native species such as passionfruit, lemongrass, papaya, perennial peanuts and coffee are cultivated to enrich the soil with nutrients such as nitrogen, provide shade or wind cover or just because they taste good.

“It’s a constant cycle, everything existing together at the same time, with crops always feeding the soil and nurturing each other,” said Kekona. “This is the essence of the forest food system, which our ancestors passed down to us over centuries.”

Maui is one of the largest islands in Hawaii, a Polynesian archipelago located 2,500 miles from the west coast of the US mainland, making it one of the most remote populated land masses on the planet . It’s a subtropical biodiversity hotspot, where flora and fauna adapted over millennia to a wide range of ecosystems and microclimates, but ecological destruction over the past century or so has also made it the extinction capital of the world.
At its heart, the traditional Hawaiian farming vision is about creating a sustainable relationship between community and agriculture by re-establishing the connection between culture and land. It isn’t just about looking back, but rather mixing ancient regenerative farming practices with modern tools and technologies to meet the climate and food challenges facing Hawaii in the 21st century.

It’s not easy. Access to land, water, credit and housing remains disproportionately controlled by the economic and political elites, namely big ag and tourism.

One firm, Monsanto, now owned by the German pharma giant Bayer, operates on Oahu, Molokai and Maui – where it develops genetically modified corn varieties used in cooking oil, processed foods, alcohol and animal feed, testing new seeds with an unknown combination of potentially toxic agrochemicals.

Bayer is among four agrochemical corporations that control 60% of the global seed market, and more than 80% of pesticide sales.

Dark red dirt from Maui's research and development fields, which are surrounded by three types of metal fencing, spread across the downwind residential areas, with fine particles coating furniture even when the windows are kept shut.

Last year, the company was fined $22m after pleading guilty to multiple criminal charges for the illegal use, storage and disposal of hazardous and banned chemicals. Monsanto was described as "a serial violator of federal environmental laws" by a Department of Justice attorney.
The Guardian's request to visit the Maui research facilities was denied.

Over the past decade agrochemical companies like Monsanto have used lawsuits and political lobbying to delay and limit regulations on GMO crops and pesticides in Hawaii, convincing many farmers and lawmakers that without them, agriculture would collapse.
But the pandemic exposed the dangers and fragility of the global industrialized food system, triggering an almost existential crisis for island communities like Maui which depends on imports and tourism for economic and food security.

The Maui Hub, co-founded by Autumn Ness, right, is the island's first farm box service connecting small farmers and producers to residents. Photograph: Bea Oyster/The Guardian

"Letting a chemical company pollute the island to feed the world while we suffer food insecurity is beyond ironic," said Autumn Ness, the Hawaii program director of Beyond Pesticides and co-founder of the Maui Hub, the

island's first farm box scheme which connects small farmers and producers to residents.
"What's stopping Hawaii feeding its own people is not lack of knowledge or skills, it's the power structure, the ongoing plantation mentality which tips the scales in favour of big ag and developers while rubbishing traditional knowledge. We need to change this narrative because, without radical changes, what will be left of this place in a hundred years?"

A Bayer spokesperson said the company's research "diligently complies with federal and state pesticide laws … We place the highest priority on the safety of our products and on the sustainability of the land where we live and work."

Forest families

At Hōkūnui farm in the central valley, 37-year-old Koa Hewahewa and his family of foresters mix generational Indigenous knowledge and modern technologies to repair the damage caused by intensive cattle ranching and decades of pesticides and synthetic fertilisers.

Kahaku Ritte-Camara, forestry assistant manager at Hōkūnui, waters plants on the farm. Photograph: Bea Oyster/The Guardian

The restoration project is fundamentally about cooling the climate to return the rains and pollinators – the forest birds that were wiped out or forced to higher altitudes to evade avian malaria-transmitting mosquitoes. (The mosquito line, the altitude at which the insects cannot survive because it's too cold, has risen drastically due to deforestation.)

The forest is considered akin to an extended family, somewhat unwieldy and unpredictable but resilient and stronger together than apart. The lofty flowering acacia and myrtaceae trees are natural-born givers, capturing fog and rain to distribute moisture outwards like a lawn sprinkler and down to recharge aquifers. While the groundcover plants such as mosses and ferns act like a living mulch and create a healthy ecosystem for all sorts of useful micro-organisms.

Hōkūnui farm has become 25 acres of thriving edible and non-edible codependent plants, a technique called Polynesian agroforestry. Photograph: Bea Oyster/The Guardian

So far they have transformed 25 acres of lifeless land into a thriving, organised jumble of edible and non-edible co-dependent plants, a technique the family call Polynesian agroforestry.

Hewahewa said: “Our yields cannot match industrial farming but our return on investment is the healthy land and water we’ll leave for our kids … this isn’t just about bringing back the rains, it’s the right thing to do as Hawaiians.”

And we avoid the trap that befalls much US media – the tendency, born of a desire to please all sides, to engage in false equivalence in the name of neutrality. While fairness guides everything we do, we know there is a right and a wrong position in the fight against racism and for reproductive justice. When we report on issues like the climate crisis, we're not afraid to name who is responsible. And as a global news organization, we're able to provide a fresh, outsider perspective on US politics – one so often missing from the insular American media bubble.

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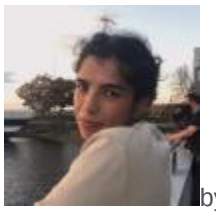
If you can, please consider supporting the Guardian today. Thank you.

Betsy Reed

Editor, Guardian US

Restoring Hawaiian fishponds revitalizes food systems and cultures

[6]Loko iʻa, or fishponds, in Hawaiʻi are a chance to wrest food security and culture back from American colonization

 by Ray Levy UyedaOctober 3rd, 2022

[6] https://prismreports.org/2022/10/03/restoring-hawaiian-fishponds-revitalizes-food-systems/

(iStock)

People Over Plastic's co-founder and host Shilpi Chhotray and Prism's climate justice reporter, Ray Levy Uyeda, examine how local Hawaiians are taking back food security and culture from American colonization, and the ongoing threats of climate change, militarism, and tourism.

Most days, Laʻa PoePoe rides his bike a quarter of a mile from his home in Molokaʻi, Hawaiʻi, to the nearby Kupeke loko iʻa, or fishpond in English, where he's the kiaʻi loko, the guardian. Fishponds are created by an ancient Hawaiian ecological and food production practice that involves fostering a healthy and safe carve-out within the ocean. However, fishponds have faced years of neglect and disrepair, evidencing how decades of colonialism and forced assimilation by the U.S. government have separated Hawaiians from their culture.

In recent years, Hawaiians have been leading an effort to honor and reimplement land practices and foodways that kept the Hawaiian islands healthy and Hawaiian peoples fed. And in the years since the pandemic began, developing a food system that's independent from colonial and mainland U.S. imports and adaptive to the impacts of climate change has proved even more important. Those who care for fishponds and lead their restoration efforts insist that while colonial history can't be undone, its impacts can be healed if the land is healed.

Restoring fishponds and traditional foodways

PoePoe was raised in the traditional style of Hawaiian fishing: when he was young, older men brought him to the ocean to observe their practices. There was no talking, just careful observation and development of his own intuition, both of which are vital parts of caring for and restoring the Kupeke loko iʻa. In Hawaiian language, observation is called "kilo," a skill that needs to be honed over years of working directly with the land. It's so second nature that PoePoe can't exactly describe what goes into it, but he can say what he's looking for.

He's looking for invasive species like algae, gaps in the rock wall, and native fish swimming around. There are different types of loko iʻa, most of them built 800-1,000 years ago, but most have the same main features: a rock wall made of pieces of lava or other found rock, a gate in the wall that allows small and mid-sized fish to come and go but prevents larger fish from swimming out into the ocean, and a bountiful ecology of algae, phytoplankton, and coral—anything the fish might want to feed off of.

In 2018, PoePoe and his wife, Mahina PoePoe, founded a nonprofit organization to formalize the restoration of the Kupeke loko iʻa, one of many efforts across the Hawaiian islands to return the loko iʻa to working order. It was also a response, PoePoe said, to the growing grip of tourism on the islands, changes that climate change was bringing to the land, and lack of action in response to those pressures.

"The politics of the island seemed like we have to provide more examples on Molokaʻi that we mean business when we're saying that we don't want more tourism. We don't want development," PoePoe said. "We need more dirt on our fingers."

Now, PoePoe leads the restoration of the loko iʻa. Volunteers help repair the rock wall, which is "always floating away, so you got to put them back up," he said. Day to day, the work changes, between clearing pollution, doing kilo, and following up kilo with water monitoring that can offer an empirical data point about water health and quality. There are plant pollutants, like invasive algae and mangrove, which prevent fish from swimming into the loko iʻa and disrupt the pH balance of the water, and there are other pollutants, like sediment runoff and oil from the highway when there's a heavy rain.

The Hawaiian islands sit in the Pacific ocean gyre, which spits out pollution and plastic from thousands of miles away. PoePoe said that he's found plastic baskets, fishing nets, toothbrushes, and mylar balloons caught in the loko iʻa. But even then, these are the kinds of

pollution that PoePoe and volunteers can remove easily, even if the work is tedious. What's less easily navigable are the changes that worsening climate change is bringing, like rising sea levels and a loss of shoreline.

"We are more sensitive to changes in the environment [and] the climate," PoePoe said. It's a question of "if we're going to be able to beat the clock, between now and 3.2 millimeters," PoePoe said, referring to the predicted sea level rise per year. "There's a height where the fishpond will cease to exist."

Getting off the system of imports

The counts of loko iʻa differ depending on who you ask. Some studies say there are 255 across the Hawaiian islands now, while others point to 500 different fishponds. Peleke Flores, the Kū Hou Kuapā Coordinator at Alakoko fishpond in Kauaʻi, estimates there might have been over 1,000 at some point, but many of them were either washed away by tsunamis and never restored or intentionally destroyed by plantation owners and colonists in the 18th-20th centuries.

Until the contact with colonialists in the late 1700s, Hawaiʻi had a robust and self-sustaining food system. From the land and small farms, Hawaiians ate a variety of fish, root vegetables like taro, and fruits. Over the next 100 years, colonizers would introduce pigs, cattle, and goats, which tore at the landscape and decimated forested areas. The overthrow of the Hawaiian Kingdom by the U.S. military in 1893 gave way to the plantation era, which razed thousands of acres of land to create sugarcane and pineapple plantations.

After WWII, the tourism industry ballooned, and as more non-Hawaiians started to frequent and settle in the islands, food imports increased to meet their dietary demands. In the 1960s, over 6,000 farms were operational in Hawaiʻi, with locally grown foods seeing a rapid decline over the next 10 years. Now, Hawaiʻi imports more

than 80% of its food at a cost of $3 billion annually, and nearly 90% of the small farms on the islands earn less than $50,000 annually.

This method of food production, or rather, food procurement, is expensive. A family of four is expected to spend an average of $14,000 annually on food; while imports are plentiful, a third of it goes bad before it reaches actual customers, and the high price of food helps to absorb the losses. The land is rich enough to feed all Hawaiians and people who live on Hawai‘i, but nearly half of Hawai‘i’s families with children say that they don’t have enough food. A survey from the University of Hawai‘i found that 27% of Native Hawaiians are food insecure.

Flores said that on the Kaua‘i, where he lives, residents have two days worth of supplies to sustain themselves if imports don’t arrive. “Once we start feeding ourselves we [can] get off the system,” Flores said. “That’s what the system is really relying on—that everybody zombie out.”

Flores hopes that when the fishpond is fully restored in four years, Hawaiians won’t be dependent on the shipping containers that get unloaded in Kaua‘i’s ports each day. Flores and others with the nonprofit Malama Huleia are working quickly to heal the fishpond along the Huleia River on the island, which is overgrown with invasive red mangrove, harmful algae, and layers of sediment. The team is working in phases to address each of the contaminants, and Flores is hopeful that in the long run, the fishpond can be a self-sustaining system that feeds people and supports the ocean’s fish populations.

“We were on the brink of being able to tell our next generation that, oh yeah, we’ve seen this pond die in our generation,” Flores said. According to the organization’s calculations, the mangroves would have enclosed the whole fishpond in two more decades and blocked all water flow.

Even in this beginning phase of clearing mangroves, baby fish are starting to return to the fishpond, which he said is an indicator of freshwaters becoming a healthy habitat, full of phytoplankton and good minerals.

“A healthy fish pond can be considered an indicator of a healthy system,” Flores said. Planting native plants like taro in the more mountainous parts of the island can heal the soil, which in turn creates a healthy river for the fish to return to. When the fish come back, the birds come back, and the cycle continues.”

Though the fishpond isn’t a working farm yet, Flores said that working with young Hawaiians has brought to the forefront the other importance of restoring an ancestral food system. “I see restoring these kinds of systems a little more than just a fishpond,” Flores said. “Learn the system, and from the system learn our culture, and from the culture learn about politics and slowly get people to be more confident and relearning history that hasn’t been taught to us in school.”

Restoring Community Health

As a valued patient of Hāna Health, you have the opportunity to participate in our exciting new program ***“Mai e’ Ai – Come let’s eat Hawaiian style!”***

Prior to colonization, Native Hawaiian were very healthy, with hardly any chronic health conditions.

The goal if this program is to restore your good health by moving away from the unhealthy western diet to the traditional Hawaiian diet.

Eat like your life depends on it!
The traditional Hawaiian diet is one of the most wholesome diets in the world, consisting of:

- Taro
- Poi

- Fish
- Sweet Potatoes
- Ulu
- Fruit
- Leafy Vegetables

By participating in the Mai e‘ Ai program, Hana Health is responsible for:

1. Providing you with a weekly grocery bag containing traditional Hawaiian foods
2. Education on the cultural importance of the traditional Hawaiian diet to the health of you and your ‘Ohana

You will be responsible for:

1. Signing a consent to participate in the program
2. Completing and submitting a weekly food log
3. Obtaining an annual wellness exam and lab work

By removing barriers and increasing access to traditional foods, the expected outcome is a healthier you and a healthier Hana.

For more information, contact: Sassie Keaulana at 248-7515 #41

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Hana Health Awarded ANA Grant

The Administration for Native Americans has awarded Hana Health a $1,161,343 grant over three years for the project “Restoring Community Health”. Project support is also provided by Honu‘apo, a Native Hawaiian Organization and long-time partner in Hana Health’s wellness programs. The goal of the project is to reduce the number of Hana District Native Hawaiians with poorly managed diabetes and hypertension, or who are high risk overweight/obese through

a transition to a more traditional diet. Hana Health intends to expand its Hana Fresh farm operation to include the cultivation of traditional food crops – kalo, sweet potato, ulu and others – for distribution to Hana Health's diabetic patients and those patients who are high risk overweight. Hana Health will also be looking to source product from local kalo farmers and fishermen when project implementation gets underway in February 2021. Poor access to traditional Hawaiian food crops is an important factor influencing food choice, especially for low-income consumers. Food insecurity is associated with poor physical health, diabetes, and hypertension. Nearly half of Hawai'i residents with diabetes are food insecure and 42% of those with heart disease or a history of stroke are food insecure. The COVID-19 pandemic has further impacted food security as job losses negatively impact household income while the cost of most food is increasing. It is expected that improving access and transitioning back to a more traditional diet will help to restore good health to the Native Hawaiian community.

“We are Kanaka. We are of this place. We are Hawai‘i.”

Other farming adaptations that combine ancestral foodways with modern technologies are emerging to meet the food security needs of Hawaiian families and the challenges brought by a changing climate.

“Aquaponics is a really unique opportunity to utilize ancestral technologies,” said Josh Mori, the executive director of Iwikua, an educational and cultural organization that sells direct to consumer via farm stands, maintains contracts with 11 restaurants on the island and teaches young people aquaponic farming. He said that this summer has presented challenges he hasn’t seen before, particularly with hotter water temperatures.

The farm produces lettuces, arugula, watermelon, and other fruits. Manure from fish, typically tilapia, is later used as fertilizer. The system is holistic, and Mori said it mimics how fishponds are a part of the continuous water cycle that flows from the mountain to the ocean to the sky and back again.

Because of the heat this summer, water temperature hovered around 84 degrees, which Mori said makes it difficult for plant roots to absorb any nutrients. Water diversions from rivers on the west side of Kaua‘i by contractors and private companies for later use by the U.S. military also pose a long-term threat to sustainability of the island’s ecosystems.

For now, Mori is hopeful that Iwikua is demonstrating that food production can be regenerative and offer healthy food that has a low carbon footprint, as Hawaiians “continue to reclaim traditional farming and traditional farming practices.”

Other efforts are working to bring regenerative aquaculture systems directly into Hawaiians’ backyards. Ilima Ho-Lastimosa, a third-generation Native Hawaiian resident of Waimānalo, Hawai‘i, and co-

founder of the Waimānalo Pono Research Hui, piloted a project in 2018 to install aquaponic tanks in residents' backyards so that they could grow their own food and raise their own fish. In the four years since, she said that they've installed hundreds of aquaponic systems, which mimic the workings of a traditional loko iʻa.

What she's noticed more in the past years, though, isn't just a desire to wrest control of food systems away from the Matson containers, but a drive to heal community and the ocean, together. Tourist slow-downs brought by the pandemic allowed the beaches to rest for a few months, and Ho-Lastimosa said that gave way to a big limu—or algae—bloom. Her father, who's 77, didn't think he would see something like that in his lifetime. She and others are still seeing positive growth and the return of native fish populations.

"The abundance of life in the ocean is beautiful. It's amazing. It's transformative," Ho-Lastimosa said.

It's also allowed for the newest generations of Hawiians to know the ocean and their Hawaiian heritage from a young age. Ho-Lastimosa said that she, and many of her generation, wasn't raised knowing the Hawaiian language, just one of many of the ways ongoing colonization has spliced Hawaiian culture from its people.

"There was a time that people were ashamed of being Hawaiian," Ho-Lastimosa said. There's a movement now, she said, to take back what it means to be Hawaiian by learning language, history, culture, and traditions. In other words, there's a movement to resist the Americanization that the tourist industry and system of food imports are implicitly advocating for.

Now, Ho-Lastimosa said, "All of the practices come alive again. That generation are now in their 30s, and they are raising their children from birth in all of our practices. We're just closing the gap." She added, "We are Kanaka. We are of this place. We are Hawaiʻi."

Restoring Our Limu Practices; Restoring Ourselves

By

Sylvia Hussey

-

April 1, 2022

Hoʻihoʻi (vt. To return, send back, restore.)

Aloha mai kākou,

[7]Like most Hawaiians, I grew up eating limu. In our blended Hawaiian-Japanese household, limu was a normal part of our diet.

I remember my mother preparing miso soup with wakame (a Japanese seaweed) and pickling manauea (which the Japanese call "ogo") with onions as

[7] https://kawaiola.news/ceo/restoring-our-limu-practices-restoring-ourselves/

a side dish. Family friends on Maui would often send us wāwaeʻiole – the seaweed also known as "rats' feet" – which mom chopped up fine and used sparingly.

But my favorite was always limu kohu. To this day, whenever my husband goes to Young's Fishmarket to buy Hawaiian food he will make sure to buy a few of those little balls of limu kohu for me.

In this issue we celebrate the state's proclamation of 2022 as "Year of the Limu." The designation is the result of years of effort by limu practitioners from across the pae ʻāina united under the Limu Hui, a network supported by nonprofit Kuaʻāina Ulu ʻAuamo (KUA). For 20 years, KUA has pursued a vision of ʻāina momona – abundant and healthy ecosystems in Hawaiʻi that contribute to community wellbeing.

In many ways, I see the work of limu practitioners to restore to abundance across our pae ʻāina the many varieties of native limu – depleted by a combination of over-harvesting, development, invasive species and climate change – as a metaphor for the larger work of restoring abundance to our lāhui.

It's all connected: restoring ʻohana practices, restoring cultural practices, restoring mālama ʻāina practices. A restoration of and return to practices that will sustain us physically but also spiritually.

The ʻike that our modern limu practitioners carry, and their efforts to ensure this ʻike continues to be carried forward to upcoming generations, is a reminder that our people were experts at mālama ʻāina – resource management. Kānaka Maoli have always been scientists. We observe and then we analyze that data and act on it. We combine theory with pono action and a consciousness that transcends human needs and desires.

The near-extinction of some varieties of native limu is also a grim reminder that when the structures of our society are disturbed, whether environmental, social, cultural or spiritual, we are endangered. We must be makaʻala (alert) to what is happening and intentional about our responses to those risks lest we wander too close to extinction ourselves.

There is no denying that this world is often chaotic and frequently unpredictable. We have challenges to address here at home but at the same time we are connected to world events outside of our pae ʻāina.

I find that, in those moments, there is beauty in simplicity and a return to basics. Our ʻohana, our moʻomeheu and our ʻāina are foundational for our lāhui.

These are our basics. When we return to our foundation, there is an alignment that helps calm the spirit. It allows us to breathe, to see clearly, and to stand strong and surefooted against the tempest, allowing us to navigate our ʻohana, our kaiāulu, our lāhui through turbulent times.

Sylvia M. Hussey, Ed.D.
Chief Executive Officer

In a bid to help Hawaii feed itself, scientists are using modern technology to revive 2000-year-old fishponds

by Kaila Yu

12.01.2020, 12:37pm

Environment

Nearly 90 percent of Hawaii's food is imported from the mainland. Restoring ancient fishponds could help the state achieve food sovereignty.

Knee-deep in the still waters of the Loko ea fishpond on the northwest coast of O'ahu, a group of sixth-graders work side-by-side, laughing and chatting cheerfully as their gloved hands pull invasive grass weeds from a 12-acre brackish pond encircled by banks of neatly trimmed green grass. The students are part of the Explorations Program at Hawaii's Kamehameha Schools, and they aren't just having fun. They are learning how fishponds—*loko i'a* in the Hawaiian language—are vital to the survival of the community and, possibly, the future of the islands.

Pictured above: Loko ea Restoration Phase 1—floating grass removal. MLEF staff and interns removed 1/2 acre of floating grass during the spring and summer of 2020.

All across Hawaii, there is a growing movement to restore Hawaii's ancient fishponds—managed, natural ponds used in fish farming, most of which have fallen into disrepair since colonization. For an archipelago so blessed with natural resources, Hawaii currently imports up to 90 percent of its food annually, making it vulnerable to natural disasters—pandemics included. In fact, only 10 days of fresh produce would be available across the islands if shipping was disrupted.

The solution, it's hoped, combines the traditions of the past with the technology of the future. Although fishpond restoration is both expensive and underfunded, an alliance of community groups and scientists are dedicated to this arduous project. The goals are self-sufficiency and food sovereignty, increasingly urgent as food insecurity in Hawaii is exacerbated by the coronavirus pandemic. At full capacity a restored fishpond could produce up to 300-500 pounds of fish per acre annually, in perpetuity.

Mālama ʻĀina continues! ʻOhana education pods visit Loko ea for hands-on learning and restoration projects.

Mālama Loko Ea Foundation

How fishponds work

Brenda Asuncion, the loko iʻa coordinator for KUA—a community-based initiative to restore and protect the natural resources of Hawaii—says the organization is working to restore about 60 fishponds across the islands.

Hawaii's history with aquaculture dates back 2000 years. Kūpuna, Hawaii's ancestors, had a deep connection to the land and understanding of tidal flows and oceanography, were expert fishermen, and understood the role of nutrients in streams. Loko i'a were strategically built in locations designed to enhance the abundance of an existing area. It was an integrated food production system that stretched from the mountains to the oceans.

Loko iʻa are models of sustainability. Algae is cultivated in the pond to feed the fish; no additional feed is required. Once established, the ponds are largely self-sustaining, needing minimal management and maintenance. In the 1700s, there were at least 360 fishponds in Hawaii, producing almost 2 million pounds of seafood annually.

Invasive baby tilapia are relocated from Loko ea to partner schools‘ aquaponics systems.

Mālama Loko Ea Foundation

Starting with the arrival of British Captain James Cook in 1778, sugar, pineapple, papaya, and rice cultivation became big business in Hawaii. As a result, there were fewer hands available to tend to fishponds, and they fell into disuse. Other factors such as sediment accumulation, invasive mangroves, change of land use, and lava and tsunamis also contributed to fishpond decline.

There are several common types of fishponds in Hawai‘i. Loko kuapā are the most common style, featuring wooden sluice gates, or mākāhā, which allow small fish such as mullet to enter the pond and feed until they are too large to pass through the gate and return to the ocean. At this point they are easily harvested with nets.

Loko ea’s style of fishpond is the Loko pu‘uone—isolated, natural shore ponds connected to the ocean via a manmade sandbar channel. Other varieties include the Loko i‘a kalo version, built next to streams that flow into a cultivated, flooded terrace growing taro. The fish live and feed in between the taro patches, optimal habitats that are abundant in food. And in still another version of fishponds, the Loko wai, streams divert into natural depressions to make inland freshwater ponds.

Ancient techniques for modern use

Loko ea’s goal is to be a fully functioning fishpond by the end of 2021. The next goal will be to get Uko‘a, a much larger fishpond about a mile north, up and running. These follow the commercially successful Moli’i Fishpond next to Kaneohe Bay and the ongoing project at He’eia—an 800-year-old pond with a 1.3-mile lava rock wall.

Adapting ancient fishponds to the modern world is possible but challenging, according to the Oceanic Institute at Hawaii Pacific University and Conservation International, which conducted a three-year study to determine the fish production capacity of three separate fishponds.

“What was once suitable for the past few hundreds of years is probably not suitable for the future,” said Chatham K. Callan, professor at the College of Natural and Computational Science at Hawaii Pacific University and director of the Oceanic Institute’s finfish research program. “Because of changing climate and rising sea levels these ponds are going to have to be reinforced and built to withstand the changing environment.”


Nohona
Kai

MLEF Staff showing students an example of i‘a—fish, found in Loko ea.

Mālama Loko Ea Foundation

And that’s going to cost money. Thus far, it’s in short supply. No state funding was appropriated for the purposes of rebuilding fishponds beyond 2007, according to an audit of Hawaii’s 2050 Sustainability Plan by Leslie H Kondo, state auditor for Hawaii.

This makes ongoing fundraising efforts crucial. At Loko ea, for example, $250,000 was spent on a refurbished dredge, and up to $500,000 is still needed for labor. The funds were raised via a combination of donations from community events and individual and local business donations through the group’s website. They also received a 2020-2021 grant from the Office of Hawaiian Affairs Community Grants Program for $75,000.

Other potential funding sources for fishpond projects “leverage funding from a mix of sources” including private, state, and federal dollars, according to Kevin Chang, co-director of KUA. Many restoration efforts rely on the sweat equity of volunteers since much of the restoration work is hands-on. And federal agencies like NOAA have competitive grants that also support aquaculture projects, including indigenous and community-led projects, Chang said.

Olonā Media

The payoff to reviving fishponds could be a noticeable dent in Hawaii’s massive food imports, said Peter Vitousek, professor of population and resource studies at Stanford University. “As with other forms of agriculture, technology could allow fishponds to be even more productive in modern times,” he said.

Replacing just 10 percent of the food imported by Hawaii would amount to approximately $313 million remaining in Hawaii annually, according to a report from Hawaii’s Department of Business Economic Development and Tourism. In addition to fishponds, this would require additional food self-sufficiency efforts such as increasing local agriculture production,

infrastructure, and distribution. Ultimately, this could add almost $188 million in sales, generate earnings upwards of $47 million, $6 million in taxes, and more than 2,300 jobs, according to the report.

Navigating the red tape

Another challenge to refurbishing the state's fishponds is the convoluted permitting process. "We have to get up to 17 permits from federal, state, and city, and they often all require different plans, applications, etc," said executive director of Loko ea, Rae DeCoito. "Just a minor strategy change, such as deciding to use fishpond sediment for building the banks instead of removing it, could set the project back six months because of permitting."

The spirit of togetherness is helping somewhat. Loko ea's staff is using its knowledge and resources to assist other fishpond projects. After they finish dredging the pond, they are in talks with at least four other fishponds to lend out the dredge machine—a state-of-the-art metal beast that will remove the sediment that is choking the pond. "We're definitely priming them with the knowledge of the permitting processes," DeCoito said. "We have a 10-year plan of other loko i'a on Oahu and Molokai that we're going to next."

While the foundation of the restorations may be ancient, modern technology is playing a key role. After five years assisting several fishpond projects, Brian T. Glazer, associate professor at the University of Hawaii's oceanography department, noticed the recurring need for low-cost, hyper-local tide gauges. Without these instruments, users would be dependent on "NOAA tide gauges, which are over one hundred thousands dollars of instrumentation", he explains. "They're large infrastructures that are set up for years and years before the data is released and if you aren't located very close to a tide gauge, then the relative accuracy of time and space of when the prediction is for when you have high or low tide can be way off.

“Because of changing climate and rising sea levels these ponds are going to have to be reinforced and built to withstand the changing environment.”

“What we did was invent a low-cost affordable water level sensor that we can give to non-experts and distribute at scale,” he said.

But for all the modern flourishes and discussions of “scale” and “supply chains,” the fishponds also offer an opportunity to strengthen Hawaiian native culture and “build a meaningful connection to community and place,” said Glazer.

DeCoito agrees. “We’ve gotten more and more disconnected from the land,” she said. “Fishponds are considered sacred places and the kids don’t even realize that they are learning when they volunteer…a reconnection to land, understanding sustainable cultural practices from Hawaiian indigenous ancestors that developed over generations, and learning how to feed ourselves again.”

Climate change

Hunger

Also tagged

climate change,

fish farm,

food shortages,

food sovereignty,

hawaii

Kaila Yu is a writer based in Los Angeles, she has also written for VICE, Extra Crispy, Fodor's, and mo

Hawaii was once a local milk mecca. On Oahu, there’s just one dairy left

How Oahu's last dairy, Naked Cow Dairy, beat the odds—one wheel of squid ink brie at a time.

“We’ve been having boys,” says Monique van der Stroom, pointing to a posse of animals at Naked Cow, the final remaining cow dairy on the island of Oahu, in Hawaii. “But we don’t need them.” She means she needs only the cows, on whose milk her business is built. But looking around the farmyard, she could also be referring to the goat, whose triplet kids nuzzle gently at her swollen nipples, the excited flock of more than 50 screeching chickens, or the ewe and her sister (that’s Laverne and Shirley to you), whose lambs don’t even seem to be able to tell them apart. Or, she could be

referring to the farm itself—an all-female organization, except for one accountant.

Naked Cow Dairy, located just inland from Waianae on Oahu's leeward coast, about 45 minutes from Honolulu, sits on a flat patch of land dwarfed by lush green cliffs. At the far end of the property, past the clucking and bleating, sits the creamery. It's the key to how Naked Cow continues where no other dairy does. A few small rooms, a guava-wood smoker built from a converted restaurant display fridge with clear doors, and an aging room adapted from a 1963 freezer box truck form the cheese- and butter-making operation. "You have to recycle in Hawaii," laughs van der Stroom, hinting at the difficulties of doing business on the island. Today, diners at 20 restaurants around the islands and shoppers as far away as Colorado buy the 600 pounds of cheese and 800 pounds of butter produced by Naked Cow each month. But the path to survival for Oahu's last dairy required a hefty amount of bushwhacking.

Naomi Tomky

When van der Stroom moved to the island 25 years ago to run a different dairy, there were 17 others in operation. But one by one, they were priced out by a system in which the Legislature set milk prices that didn't fluctuate with inflation or changing costs. At the mercy of the single processor on the island, they each gave up. When van der Stroom was handed severance pay and tasked with closing down the final dairy on the island, she looked for a way to soldier on.

"There weren't a whole lot of options," she says. She had gone to school in dairy science: if she wanted to stay in her field and stay on the island, she had to create her own opportunity. At the same time, if she hoped to avoid fighting the same battles against prices limited by the Hawaii Milk Act and hampered by the Jones Act's import and export restrictions and inflated shipping costs, she knew she would have to process the milk herself.

"Milk supply chains for Hawaii differ from those in the continental United States," wrote Claire Gupta in her 2016 article, "Dairy's Decline and the Politics of 'Local' Milk in Hawaii," published in the journal *Food, Culture & Society*. That's because of the extreme distances the perishable product needs to travel. "The trajectory of milk production in Hawaii has precluded the survival of such regionalized milksheds," Gupta continued, making it cheaper to import milk from the U.S. mainland than to source it from within the islands. The imported milk, though, unlike the local milk or most milk on the mainland, is all double-pasteurized.

Hawaii's first commercial dairy farm opened in 1869. By the early 20th century, dairies were thriving. Gupta noted that there were as many as 86 in 1955. But the growth of production wasn't met by the capacity of local processors, leading the state to step in and create the Hawaii Milk Act in 1967. Establishing quotas and fixing prices, the act was originally intended to ensure that enough milk was produced and at an affordable price for the dairies.

Monique van der Stroom (center) inspects a wheel of squid ink brie—made locally with milk from her herd and aged in a converted freezer box truck

This worked, for a time, until 1982, when the industry was dealt its first death blow. Until then, Hawaii had been supplying all of its own milk. But that year, heptachlor—a pesticide sprayed on pineapple plants—was detected in the state's supply (later, tests confirmed that farmers had been using shredded pineapple leaves as feed). Oahu farmers had to dump 3.2 million pounds of product, at an average of $1.67 per half-gallon. After five recalls of milk that had been produced locally, consumers became accustomed to imported milk instead. Once that Pandora's box was opened, it never closed. At first, imported product filled in only when local supply was low. But eventually—by the mid-1990s—it became the more affordable solution, year-round.

"Dairy farms went the way of poultry farms," laments Catherine Toth Fox, the food editor at *Honolulu Magazine*, listing off the myriad problems that both industries face: transportation expenses, lack of a slaughterhouse, and the price of feed. Naked Cow estimates that it pays 2.5 times the cost of mainland dairies, since it imports all of its feed.

"The local food trend is the only reason we are in business."

But the geographical consequences are matched by political ones. Gupta and van der Stroom both emphasize the effects of the Milk Act. Inflation, retail pricing, and sales all fluctuated, but the fixed prices that processors paid for milk from the dairies didn't—and still don't.

"If I sell to a processing plant in Honolulu," says van der Stroom, "the State dictates what they can pay me." She calls the process outdated and blames the Act for many of the island's dairy closures. That's why, when faced with her employer's own closure, van der Stroom knew she'd have to find a way around the Act by processing her own milk. "On the mainland," she says, "you can have a small farm and ship your milk to one of 20,000

processors.” But on Oahu, she had one option and it wasn’t good. So, instead, she learned how to process the milk, transform it into consumer products, and market it.

Left, the view from Naked Cow. Right, butters and cheeses laid out in the tasting room.

“Butter was the easiest thing to start with,” she says. She began by producing 10 to 20 pounds each week and taking it to the local farmers’ market. But she always wanted to do cheese. So she made a few pounds of feta every week, too, and people started talking. Gradually, van der Stroom added more cheeses, getting one variety at a time to the quality she wanted, then developing a new product. For the first few years, she sold mostly at the farmers’ market, but as she expanded her offerings, she acquired more buyers—grocery stores like Foodland, Safeway, and Whole Foods. Eventually, in 2011, she transitioned away from farmers’ markets entirely.

But the market ethos of making and buying local dairy has continued to be Naked Cow’s driving force. “The local food trend,” says van der Stroom, “is the only reason we are in business.” So, she plays that up in the dairy’s cheeses, which include particularly Hawaiian twists. Take the Vog, for instance, a gouda smoked with guava wood in the converted beverage cooler and named for Hawaii’s famous volcanic fog. Or the pink peppercorn version, which helps to eradicate an invasive plant species when it’s used to spike the wheels. The butters incorporate local honey, Hawaiian sea salt, and even Kona coffee. That makes them unique, but also commands a price point that works for a farm whose milk costs $8 a gallon to produce.

“We don’t just put in regular salt or chiles that you can buy,” van der Stroom says. “We put in good ingredients, nothing that can be bought for a dime a dozen.” She eschews categories like cheddar or mozzarella, which would require Naked Cow to compete with producers aiming to make cheese for the lowest price.

Throughout the start-up process, van der Stroom felt that she was just doing what she needed to do to survive in her industry, where she lived—that it was just another venture. But as the dairy started to garner attention with articles in magazines and a television appearance, she came to a realization: “Maybe this is kind of special.”

Naomi Tomky

Naked Cow owner Monique van der Stroom poses with an employee outside the aging room, a converted freezer box truck

It is, says Toth Fox of *Honolulu Magazine.* Oahu is primarily a tourism-focused island. “Agricultural land is shrinking,” she says. It’s considered more important to use available land for development and tourism, and that has forced a boutique-farm trend. “We can’t have a large dairy here,” Toth Fox says, “but can have something like Naked Cow, doing dairy and dairy products.” Though, she also points out that most of these boutique farms straddle the line between tourism and agriculture by offering yoga classes, meditation, and (as at Naked Cow) classes and tours.

She’s always looking for that place—a spot where she could open a cheese shop closer to the island’s population center in Honolulu.

The added activities bridge a gap in Naked Cow’s capabilities, but while it thrives on the movement toward support for farms and local food, there are limits. The cost of living in Hawaii is high to begin with, so making the decision to spend more on expanded offerings is a tough one. “The state has run campaigns to push local products,” says Toth Fox, and eaters are savvy and receptive to that push. But the added support isn’t always enough. Hawaii imports an estimated 80 to 90 percent of its food, and “mainland milk is crazy expensive,” says Toth Fox of the double-pasteurized imports. “Then you look at local milk and it’s twice or four times more than that.”

In order for local producers to see a marked difference in their bottom lines, both Toth Fox and van der Stroom say the state bears some responsibility. “I want to support local,” says Toth Fox. “But the *state* needs to support local.” While van der Stroom hesitates to advocate specifically for government interference, she does add that small concessions—offering incentives to ease costs for producers of local food—would allow local dairy to at least approach the price of imported products, rather than continue to be double. “I would need help to get my $8-a-gallon milk to be more competitive,” she admits. And with a little boost from the state, or even without, van der Stroom hasn’t completely ruled out trying to sell her

milk for drinking. “I still believe there’s a place for milk on this island,” she says.

And she’s always looking for that place—searching for a bigger location for the farm and a spot where she could open a cheese shop closer to the island’s population center in Honolulu. She’d move the creamery there, as well, to provide both a convenient pick-up location and the opportunity for eaters to see the cheesemaking process in person. In the meantime, she continues to find new ways to move the business forward—and keep her place-specific, niche cheese offerings unique. She emerges from the box-truck aging room holding a few wrinkly gray rounds. “Squid ink brie!” she grins. “I call it ‘Ocean Brieze.’”

Farms

Places

Also tagged

dairy farms,

oahu,

tourism

Naomi Tomky is an award-winning food and travel writer who uses her unrelenting enthusiasm as an eater, photographer, and writer to propel herself around the world. Follow her on Instagram @the_gastrognome

One year after Native-owned Tanka Bar had lost nearly everything, the buffalo are on their way back

by Marilyn Noble

01.24.2020, 8:00am

This weekend, Niman Ranch and Native American Natural Foods (NANF), maker of the Tanka Bar, will announce a unique collaboration. The aim: to restore the buffalo to its revered place in Lakota society and regenerate prairie, while helping

Niman create a new source for bison and organic and grass-fed beef.

[8]Last year, The New Food Economy explored what had happened to Tanka Bar, the originator of the buffalo and berry snack bar based on an ancient indigenous recipe. The Native-owned company was small, but successful, until corporate competitor Epic Bar/General Mills, with its huge bankroll, media-attractive creation tale, and inflated sustainability story jumped into the niche.

As a result of the article, Tanka Bar's founders say they saw sales explode in the last month of 2018, more than 300 percent in Whole Foods alone. But the sales increase had an unexpected and negative effect on the already cash-strapped company. It couldn't keep up with demand, and eventually Whole Foods ended their relationship.

[8] https://thecounter.org/tanka-bar-niman-ranch-bison-grassfed/

Bison graze on the Buffalo Gap National Grasslands, just north of the Pine Ridge Reservation

Arlo Iron Cloud

After it was published, the Tanka Bar story reached Jeff Tripician, at the time the general manager of Niman Ranch, a network of more than 740 independent family farmers and ranchers across the country. (He's now the president of Perdue Premium Meats, Niman's parent company.) Tripician reached out to Tanka Bar co-founder and president Mark Tilsen, scheduled a meeting, and drove the seven hours from Denver to the Pine Ridge Reservation in South Dakota, home of the Oglala Sioux people—and of the Tanka Bar. Since that initial session, executives at the two companies have spent nearly a year building relationships, brainstorming, and exploring options for collaboration.

In an era when much of the corporate consolidation in food and agriculture is driven either by a desire for a highly marketable story—whether true or not—or, in the case of private equity, a quick return on investment, partnerships based on mutual success and truly aligned social missions are rare.

This weekend, Niman Ranch and Native American Natural Foods (NANF), maker of the Tanka Bar, will formally announce a unique collaboration between the two companies. No money will change hands; it's not a merger or acquisition. Instead, it's an operational partnership. Niman Ranch will provide NANF with technical expertise in marketing, supply chain development, and distribution management, and NANF will help Niman create a new source for bison and organic and grass-fed beef.

"We're bringing the foods back to our people and building an ecosystem, bridging the gap between the brand and the Nation."

In addition, NANF has secured a round of financing that will allow Tanka Bar and its related entities, the non-profit Tanka Fund and Tanka Resilient

Agriculture Cooperative (TRAC), a producer co-op, to explore new ways of achieving the ultimate mission: restoring the buffalo to its revered place in Lakota society and regenerating prairie, while building economic opportunities on the Pine Ridge Reservation. Tilsen calls it a “blended capital solution,” with the three legs of the NANF stool each contributing to the ultimate success of the whole organization. Chris Oliviero, Niman Ranch’s general manager, refers to it as the virtuous cycle, where the closed loop of investments, production, profits, and savings all feed each other and create a strong, thriving operation.

Dawn Sherman, NANF’s CEO, says Tanka Bar is more than just another brand marketing a product. “We’re bringing the foods back to our people and building an ecosystem, bridging the gap between the brand and the Nation. Niman Ranch is helping us keep the ecosystem going.”

“The mission is everything for these two companies,” adds Oliviero. “If we can help Tanka Bar regain their momentum, then they can take it from there.”


HARDY

Tanka Fund helps with more than just financial support. Here, Mark Tilsen (left) and Dawn Sherman work with Ed Iron Cloud (right foreground) to rig a makeshift device that'll help them get water from the top of a hill to the buffalo down below

Arlo Iron Cloud

The importance of the buffalo and the Tanka Bar to the Pine Ridge community can't be overstated. In a study released early last year, the Federal Reserve Bank of Minneapolis detailed the present-day consequences of the federal government's 19th century extermination of bison and the near-genocide of bison-reliant indigenous people. Once some of the tallest and richest people in the world, the Northern Plains tribes are now some of the shortest and poorest. Per capita income is 20 to 40 percent less than that of other Native American tribes.

Much of the land on the Pine Ridge Reservation is leased to non-Native cattle ranchers

Arlo Iron Cloud

The Pine Ridge Reservation sprawls over 2 million acres of mostly virgin prairie. It's an iconic landscape of the West—ragged, forbidding buttes; horizon-to-horizon sky; and miles of largely vacant, rolling grasslands. It would seem to be the perfect place to reintroduce the buffalo to its native habitat. But, as with many other things in Indian country, the situation is not so simple.

Native Americans in general capture only about 10 percent of the agricultural revenue generated on their lands.

Most of the land on Pine Ridge and its neighboring reservations is tied up in a hodge-podge of allotments, leases, and trusts overseen and administered by the federal government. Much of it is leased to non-Native cattle ranchers, and has been for generations. According to David Bartecchi, executive director of Village Earth and lead researcher for The Lakota Lands Recovery Project, Native Americans in general capture only about 10 percent of the agricultural revenue generated on their lands, based on data from the USDA Agriculture Census in 2012 and 2017. The other 90 percent goes to non-Native farmers and ranchers, a situation he terms "agricultural apartheid."

Related How USDA distorted data to conceal decades of discrimination against Black farmers

NANF CEO Dawn Sherman and her family are a perfect example. They own allotments on several Pine Ridge parcels, but they're not adjacent, and they're "landlocked"—that is, leased to a third-generation, non-Native cattle rancher as part of a larger surrounding tract and inaccessible to her family. Also, as allotments have been passed down through generations, some parcels may have dozens, hundreds, or even thousands of owners. That fractionation makes the land essentially worthless in a capitalist system and

precludes access for would-be tribal buffalo ranchers. Land issues aren't unique to Pine Ridge—most of the tribal lands in the country are tied up in similar knotty situations—but Bartecchi says there's a lack of will on both the part of the federal government and the tribes to fix it, and it makes NANF's goal of restoring the buffalo and building a thriving bison economy on the reservation difficult, at least in the short term.

Monica Terkildsen, tribal liaison to the World Wildlife Fund, recently conducted a survey of tribal members regarding land use on the reservation. She says that, overwhelmingly, respondents want to see buffalo restored to the land, but it's hard to define what that looks like. She's convened a working group to deal with the politics, history, and rumors and to begin the conversation about how to bring the buffalo back. "When the buffalo come back, so will the people," she says.

The Knife Chief herd escaped from their pasture, so they're temporarily confined to a holding pen on the ranch until the fence can be repaired

Arlo Iron Cloud

Tilsen and his business partner, Karlene Hunter, are social entrepreneurs committed to making life better for the Oglala Lakota people. Before they began NANF and Tanka Bar in 2006, Tilsen had founded KILI Radio, the largest reservation radio station on the continent, and the pair had built Lakota Express, a successful direct marketing business on Pine Ridge that raised more than $21 million dollars for Oglala Lakota College. Even though they were successful, their efforts weren't enough to spur substantial economic growth across the reservation. Their intentions with NANF were to not only respectfully and appropriately restore the buffalo and grow the Pine Ridge economy, but to introduce other tribal foods to a national audience as well.

With no background in the food business, they were admittedly naïve. "We were too dumb to know we couldn't do it, and we learned lots of hard lessons," says Hunter. "But we had some really good triumphs when the product went national and got national media and exposure. It wasn't just our company. It was a Native product, and Native people were so proud. And that's what we wanted. We wanted people to take ownership and to really participate in it."

"We didn't know we were going to be fighting off major conglomerates. I mean, we're a small Native company."

Business was good the first few years, but then the big corporate guns rolled into town. "We didn't know we were going to be fighting off major conglomerates, I mean, we're a small Native company," says Hunter. "And these conglomerates came in full-force. We didn't know that would happen. We were naive."

The cultural synchronicities between Niman and Tanka lend an air of predestined inevitability to their story: both were founded by entrepreneurs who saw not only a business opportunity, but a chance to do social good. Both have struggled financially, and both are mission-driven, committed to rebuilding rural communities and successful family farms. Both believe in good stewardship of the land, animals, and people, and in bringing young farmers back to agriculture. And both have new, younger leadership at the helm—Sherman as CEO of NANF, and Oliviero as GM of Niman Ranch.

When Niman Ranch was acquired in 2015 by Perdue Farms, one of the largest vertically integrated poultry companies in the world, its financial challenges came to an end, but the corporate memory of those lean days of struggle to pay employees and distributors is still present. That history appeals to NANF's leadership, who have shared the same set of sleepless-night-inducing difficulties, only magnified by the lack of access to affordable and ready capital typical of Native-owned businesses.

NANF co-founder Karlene Hunter at the Tanka headquarters in Kyle, South Dakota. The company is situated in the middle of the Pine Ridge Reservation

Arlo Iron Cloud

Niman Ranch's Oliviero says the early discussions about collaboration were discouraging. "We were afraid they were too close to the edge of the cliff," he says. Then, NANF started to gain traction with funders attracted by Niman's offer of technical help. So far, the commitments from industry and social impact investors are relatively small, but the hope is that as the partnership evolves and grows, the money will follow.

Hunter says, "A lot of the time people will come in and say, 'Well, sure, we can help you out with money.' But a lot of the time we need the technical expertise. We're excited about all these new opportunities and new partnerships. It's great to see passion, that there's somebody who understands what we're doing in the business."

Niman Ranch has built a network of family farms that produce pork, lamb, and beef. The company offers contracts to its producers, all of whom are Certified Humane, and some of whom have certifications from Global Animal Partnership and/or the USDA organic program. That expertise in building farmer relationships is invaluable for TRAC. With NANF's ability to extend contracts to members of the TRAC producer group and assist them with certifications, marketing, and other best practices, Tilsen hopes that eventually, Tanka Bar will be able to build a 100-percent Native supply chain for buffalo. And because the company uses only a portion of each carcass, the other premium cuts can provide a fresh bison supply to Niman Ranch, which has long been interested in adding bison to its product line.

"We have to pay close attention to the cultural aspects of it all and approach it with respect and mindfulness for the spiritual, ecological, economic, and physical pieces of it."

Last year, Panorama Beef, an organic grass-fed beef program, joined the Perdue Premium Meats group, and working with TRAC and Native cattle producers creates another layer of symbiosis with the NANF/Niman partnership. “Panorama adds to the story,” says Oliviero, “and gives us a chance to do something much sooner to demonstrate [to tribal producers] what it’s like to do business with Niman Ranch.”

Tilsen also sees TRAC as a means of offering other services to producer members. Finding lenders, supply forecasting, ranch planning, and capital investments in equipment and infrastructure could all be benefits of co-op membership. That’s where the Tanka Fund plays a role. Dr. Trudy Ecoffey is the incoming executive director. She says her first steps will be “to do some serious listening and learning what’s needed by producers. We have to pay close attention to the cultural aspects of it all and approach it with respect and mindfulness for the spiritual, ecological, economic, and physical pieces of it.” She’ll then develop a strategic plan and a capital campaign to raise funds. The nonprofit has already provided grants to ranchers for infrastructure, like solar wells and fencing, and contributed to the construction of Charging Buffalo Meat House, the only processing facility on Pine Ridge.


CRAZY HOR

Charles “Bamm” Brewer, Jr. details the challenges of raising buffalo on the reservation

Arlo Iron Cloud

Charles “Bamm” Brewer, Jr. manages the food program for One Spirit, a social services organization on the reservation. He’s also a buffalo rancher, outfitter, and self-proclaimed badass butcher. He runs the processing plant, which was funded by One Spirit. It’s a small facility, but Brewer and his employees butcher beef, buffalo, and game meats for the food program, the tribe, and individuals. The plant is what’s known as custom exempt, meaning it doesn’t yet have a commercial license or USDA inspection, but demand has already outpaced the space.

RelatedTribal food sovereignty for the price of a pickup

Now in its second year of operation, the plant has provided an on-the-job education for Brewer and the crew. He’s learning how to charge appropriately for services, work efficiently (the plant layout has a few issues with the way the carcasses are moved through), and how to provide for the community. But running a processing plant that’s hours from the nearest city is challenging.

Brewer, an effusive bear of man with a hearty laugh, tells us how his walk-in cooler went on the blink the day before. He ended up on a ladder outside the building on a 20-degree day in the frigid wind, Facetiming with a technician in another state and holding his phone over his head so the tech could see the inner workings of the control box. He couldn’t diagnose the problem, so it would be several days before someone could show up to fix it, providing that the unpredictable winter weather allowed somebody to get there.

Brewer is passionate about and committed to raising buffalo. He has what he describes as a sharecropper relationship with the tribe. He gets cows from the tribal herd and he returns 40 percent of the calves back to the tribe. It’s a program that works well on his 800 acres, until he has problems with the fence. A wildfire took out the fence that separates his buffalo from the tribe’s, and he lost all of his animals. His sons encouraged him to start over

with buffalo and not cattle. “I was never so proud of them,” he says. “I took my family back into the buffalo world, and now I want to bring it to the people. I’d rather be known as the guy who brought the buffalo back to the people, instead of the burritos and hotdogs.” The Tanka Fund helped him build a double fence to replace the one that was lost. “Next time we’re gonna build a wall,” he laughs.

One of Ed Iron Cloud's goals is to educate the community about the buffalo's cultural and spiritual significance to their lives

Arlo Iron Cloud

Ed Iron Cloud is another beneficiary of Tanka Fund's grant program. He leases 900 acres for his cultural herd, although he does sell some of his animals commercially to raise money for his nonprofit, The Knife Chief Buffalo Nation Society. His goals are to restore the relationship between *Pte Oyate*, the Buffalo Nation, and the Oglala Lakota Nation and to educate the people about the buffalo's cultural and spiritual significance to their lives. Tanka Fund helped him build solar wells and fencing.

The day we visited, his small herd was in a pen because they had broken through a section of the pasture fence the day before—buffalo are notoriously hard to confine—and he had to round them up from his neighbor's land. Lacking a way to haul them himself, he relied on a friend with a horse trailer who brought them in two loads down the rutted and snow-covered track that euphemistically could be called a road. The cows and their calves seemed somewhat agitated at their fate, but until the fence is made buffalo-proof, they'll stay in the pen. Iron Cloud said it will give him a chance to sort them and decide which to sell.

The trough at the solar well on the hill above the pen was frozen solid, but, using a maul, Iron Cloud broke through the ice to free the pump, and then, using an empty plastic bottle and several miles of duct tape—and the help of the Tanka crew—he rigged a hose system to get water to the animals below.

That juxtaposition of modern technology with farmer ingenuity and teamwork, under the watchful eyes of an ancient keystone species of animal, is an apt metaphor for the restoration of the buffalo to Lakota lands. Technology, ingenuity, and teamwork can help both the buffalo and the people thrive again, but there's still one big obstacle, the 2,000-pound bison in the room, if you will: Access to land, with its attendant benefits, like capital and the ability to build infrastructure, are a critical piece for both TRAC and tribal citizens.

Aner Ben-Ami is the co-founder of the Candide Group, an impact investment advisor that's bringing funding from the Libra Social Investment Fund to NANF. He cites several reasons that NANF and Tanka Bar are attractive: The management team is small, but dedicated and resilient; the product is the best in the meat snack category; and the story of Tanka Bar is authentic and compelling, with Native ownership, a product based on a Native recipe, and a mission to drive economic revitalization in some of the poorest counties in the country. He also feels that Niman's contribution of expertise, especially in telling the story of the brand, is important to the success of NANF and its three entities.

"We believe Tanka should be able to re-build its market presence and become a strong brand in the meat snack category," he wrote in an email. "TRAC may be a slower process as it implies getting ranchers who are currently raising cattle to start ranching buffalo. I imagine that's not a quick/easy decision for some folks. But, as Tanka Bar grows and is able to show ranchers that it is a reliable buyer/off-taker for their bison, we believe TRAC will grow. This (TRAC's expansion) is one of the most exciting elements of the Tanka's long-term vision from an impact perspective. It means that more bison are coming back to the land and more Native ranchers are participating in the success of Tanka Bar. And, with the way our investment is structured, it also means that TRAC can buy our shares over time and become part-owner of Tanka Bar."

"When people buy bison they become a part of the story, because when they buy it, they help restore it and save the prairies."

Bob Dineen of Rocky Mountain Natural Meats, the largest bison processor in the country and a long-time supplier for Tanka Bar, has also joined this round of investment. “Our hope is that Tanka becomes a bigger part of the grocery landscape as a part of the meat snack niche. We would like to see Tanka on the top shelf. That’s our goal,” he says. He also believes that the success of the Tanka Bar brand will enable the company to achieve its other goals: employment on the reservation, successful bison ranchers, and the restoration of the bison and the prairie. “It’s the greatest conservation story ever,” he adds. “When people buy bison they become a part of the story, because when they buy it, they help restore it and save the prairies.”

The Counter contributing writer Marilyn Noble spent several days in mid-January with Tilsen, Hunter, Iron Cloud, and Brewer, learning about their work

Arlo Iron Cloud

Clearinghouse CDFI was an early supporter and funder in the nascent years of Tanka's existence. CEO Doug Bystry says, "This loan is one of the most important in our portfolio, and our relationship with Tanka Bar is one of our most important. I'm so proud of Mark, Karlene, and Dawn. Most businesses would have thrown in the towel by now, but you won't find people who have worked harder and sacrificed more."

Hunter and Sherman credit the partnerships and relationships they developed along the way with customers like REI and Natural Grocers, vendors like Rocky Mountain Natural Meats, and investors like Clearinghouse CDFI for keeping them afloat and helping them learn the vagaries of the food business. With the addition of the Tanka Fund and TRAC, along with the partnership with Niman Ranch, Hunter believes the company is turning a corner. "We're hoping we can get it rolling," she says.

Oglala Lakota women are learning how to forage for and cook with indigenous foods and butcher bison according to tradition

Arlo Iron Cloud

With a new generation of leadership in place at NANF—Sherman as CEO and Ecoffey as the executive director of the Tanka Fund, Hunter and Tilsen are able to focus on growing the various components of the business.

Everyone I talked with agrees that restoring the bison has benefits both tangible—economic growth, soil restoration, new supply chains—as well as intangible for Pine Ridge. A regenerated and renewed Tanka Bar is one key to that restoration. The efforts of NANF and the success of Tanka Bar have already inspired other young entrepreneurs like Nick Hernandez, founder and CEO of Makoce Agricultural Development, in his efforts to bring farms and food hubs to Pine Ridge to establish food sovereignty. Lisa Iron Cloud is building a business teaching Oglala Lakota women how to forage for and cook with indigenous foods and butcher bison according to tradition. Brandon and Kim Braveheart have created a Rapid City, South Dakota catering business that features local and Native foods.

Sherman sees good things ahead for NANF. As the Tanka Bar regains its place in the retail landscape, she sees the possibility for NANF to market additional Native food product lines, both from Oglala Lakota companies and other tribes. She sums it up: “The buffalo is resilient. It puts its head down and faces into the storm until it passes. The same is true for the people, and the same is true for Tanka Bar. We’ve been facing into the storm, but now it’s passing, and we’re resilient.”

After decades, Native American tribes are regaining their fishing rights. But are there any fish left?

by Tove Danovich

09.11.2018, 8:00am

Politics

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Like many tribes in the Pacific Northwest, the Yurok had to fight hard to gain fishing rights in their ancestral

river. Now they fight to keep it healthy.

Every year in August, the Yurok Tribe of Northern California hosts a salmon festival. Though there's live music, games, and a parade, the real draw is the food: Salmon from the Klamath River, cooked on redwood stakes over a long fire pit. From the outside, this year's salmon festival looked a lot like those before it, but there was one key difference. For the first time since 2015, the salmon actually came from the Klamath River—instead of being imported from Alaska.

Like many tribes in the Pacific Northwest, the Yurok had to fight hard to gain the fishing rights granted to them by government treaties generations ago. The so-called "fish wars" or "fish-ins" (in the style of Civil Rights lunch counter protests) pitted the tribes against police, the United States Fish and Wildlife Service (UFWS), and other government agencies, until the courts finally decreed during the 1970s that Native Americans be allowed to fish the rivers as they had for thousands of years. Yet within a few decades, people began to realize that just because they had the right to fish didn't mean there would be fish in the river. Decades of mismanagement, damming, and over-allocation of water had decimated the fish stocks.

The Chinook salmon population has been so decimated that the Tribe voluntarily stopped commercial fishing.

"From the beginning of time, salmon stood up to feed humans," says Georgiana Gensaw, a member of the Yurok Tribe. "Now is a really critical time for us to stand up for them and protect them." The fisheries department is the Tribe's largest employer, a sign of the cultural and economic importance of these fish. The Yurok Reservation itself mimics the shape of

the river: a thin snake, stretching along 44-miles of the Klamath River, from the fork where the Trinity River joins it, all the way to the Pacific Ocean.

The Klamath is an unusual waterway, one that has often been referred to as "upside down." It begins in the high desert, where it picks up nutrients from the shallow lakebeds that feed it and from farms surrounding the Upper Klamath Basin. It's a warm and polluted river, with blue-green algae at its source, and its water gets cleaner and wilder the closer it gets to the ocean.

The Klamath's problems are more than a century old. In 1906, the Klamath Reclamation Project began draining swampland and lakes to build an agricultural industry out of deserts and marshes. Within a few decades, the first dams were built along the Klamath—none of them with fish ladders—and stocks began to dwindle. By the end of the century, the Klamath and other wetlands were irrigating 1,400 farms in the area, leaving little water left for the fish. In 1996, the dissipation got so bad that Coho salmon, which once coursed through the Klamath, were listed as a threatened species.

And it got worse. In 2002, the river was hit with a fish kill that wiped out over 34,000 adult salmon within just a few weeks. By 2005, they became officially endangered, after the population fell to as little as 1 percent of historic levels.

Flickr / Don Barrett

The Klamath River runs for 230 miles, stretching from Oregon to the California coast. For 44 miles, the Yurok Reservation mimics the river's snake-like shape

The low water levels have allowed deadly parasites like *C. shasta* to thrive, while also making the water warmer, which creates the perfect environment

for toxic algae to bloom. Today, as much as 80 percent of the area's wetlands have disappeared.

The Chinook salmon population has been so decimated that the Tribe voluntarily stopped commercial fishing. "In Yurok Country, two years without a commercial fishing season has an impact that is similar to a plant shutting down in a one-company town," Yurok chairman Thomas P. O'Rourke, Sr. said in a press release last year. "We are doing everything in our power to find ways to help our people to supplement their lost income. We have people who haven't been able to catch up on bills for two years."

"As long as we can keep hope alive that the river can be fixed, we never want to say it's dead," Gensaw says. But over the last decade, it has clung to life through a series of injunctions and legal arguments that both demanded more water for the fish, and the removal of dams along the Klamath once and for all. "My son doesn't know what it's like not to rally and protest for water," Gensaw says. He grew up like she grew up, in the midst of hearings, logging statements, and talking to reporters about why the river and the fish matter. "There's no alternative. What would I do—go to another river? I live 13 miles from my parents on the river, a mile from the same village where my husband's family lived for generations," Gensaw says. "It's our grocery store and playground and now the place has become contaminated." Their only choice is to stay and fight to make it better.

* * *

In 1945, Billy Frank, Jr. was 14 years old—and was trying to stay hidden. He pulled his canoe behind a fallen maple tree and began to collect the writhing Steelhead and Dog salmon from the 50-foot net he'd set in the river the night before. He was butchering the fish when the game wardens came to arrest him. As Trova Heffernan wrote in *Where the Salmon Run,* Frank told the wardens, "Leave me alone, goddamn it. I fish here. I live here!" But the teenager was taken into custody anyway. That arrest was the first of 50 he collected throughout his life for "illegal" fishing on his ancestral river, and it made him one of the major voices in the so-called Fish Wars to come.

When Washington was established as a territory in the 1850s, the government signed a treaty with multiple tribes. On paper it doesn't look like it was a very good deal—2.5 million acres of tribal land traded for three paltry reservations, $32,500, and the right to fish at "all usual and accustomed grounds and stations … in common with citizens of the territory." Without that last clause, many tribes would have refused to sign at all. Like so many who lived in the watery Pacific Northwest or along rivers further south, salmon and fishing were at the center of their culture.

The only catfish native to the Western U.S. is running out of water

by Maya L. Kapoor

Roberto (Bear) Guerra/High Country News

The Yaqui catfish was already going extinct. Then came the border wall.

[9]**In the spring of** 2016, biologists at the U.S. Fish and Wildlife Service came to a terrible realization: The Yaqui catfish, the only catfish species native to the Western United States, was on the cusp of disappearing. After a week of searching, they could catch only two wild fish. They estimated that, at most, just 30 fish remained.

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For approximately two decades, the last known Yaqui catfish in the United States had been kept in artificial ponds built in and around San Bernardino National Wildlife Refuge, on the Arizona-Sonora border, and at a local zoo. Creatures of rivers and wetlands, they had not reproduced. Still, federal and state biologists felt they had to try one more time. In a last-ditch breeding effort, the agency gathered 11 fish and shipped them to a hatchery in Kansas. Within weeks, all of them died. Eventually, even the one geriatric catfish left on display at the Arizona-Sonora Desert Museum had to be put down.

Today, the Yaqui catfish, a whiskery-looking creature that evolved at least 2 million years ago and was once common enough for people to catch for food, is functionally extinct in the United States. There may be a few still hidden in Arizona's ponds, but not enough to keep a population alive. According to the Fish and Wildlife Service's 2019 five-year review of the species, it's on the brink of global extinction; even as the catfish faces ongoing threats in Mexico, scientists don't know enough about its basic biology to save it.

The fact that a native catfish species existed in such a dry place can be surprising. In reality, prior to European colonization, the region

[9] https://thecounter.org/catfish-native-western-us-running-water-border-wall-yaqui/

supported rich waterways and aquatic communities.

To people for whom “Sonoran Desert” conjures up images of steadfast saguaros or sun-struck lizards, the fact that a native catfish species existed in such a dry place can be surprising. In reality, prior to European colonization, the region supported rich waterways and aquatic communities. The current extinction crisis speaks to an uncomfortable truth: In a land of finite resources, every choice, big or small — irrigating an alfalfa field, taking a swing on a golf course, burning fossil fuels — means choosing what kinds of habitat exist, even far away from town. And that means choosing which species survive.

Now, the hunt is on to find more Yaqui catfish in Sonora, Mexico. But as the election season ramps up, the Yaqui catfish faces a new threat: The Trump administration is racing to complete the border wall before the 2020 presidential election, blasting desert mountains, tearing up old-growth saguaros and destroying the ancestral homelands and cultural resources of tribal nations such as the Pascua Yaqui, Tohono O’odham and Hopi. According to Laiken Jordahl, a staff member with the Center for Biological Diversity, wall construction will require 700,000 gallons of water each day.

To be clear, the Yaqui catfish is no jaguar. It’s no beauty; it’s not terrifying; its babies aren’t even all that cute. A reclusive fish, it never swam in more than a relatively small portion of U.S. waters. In almost a year of researching them, I still haven’t gotten a glimpse of one. When I lived in Arizona, my favorite catfishes were different species entirely, probably channels or blues; they arrived before me breaded and lightly fried at a small restaurant just south of the University of Arizona campus, accompanied by iced tea, somehow fitting into my convoluted rationalizations about being vegetarian. And yet the Yaqui catfish’s looming extinction bothers me for the simple truth is represents: The Borderlands can’t have its rivers and destroy them, too.

Biologists know surprisingly little

about Yaqui catfish, dusky animals that live at the bottom of ciénegas and streams, growing up to about two feet long. Only about 2% of their historic range lies within the United States; the rest is in Mexico. Living mysterious lives in gloamy places, Yaqui catfish inhabit a world rich in ways we humans can never imagine. Like many catfish, they are covered with tastebuds instead of scales. Catfish are named for the long, flexible barbels that sprout from their faces like a cat's whiskers, helping them feel and taste their world. Yaqui catfish may communicate with each other through drummings and stridulations, and they may hunt by tracking the electric discharges from other animals' nervous systems.

Thomas Hafen filters water through eDNA sampling equipment in Cajón Bonito. In a few months' time he will get the results: Both Yaqui catfish and introduced channel catfish, which hybridize with them, are present.

Roberto (Bear) Guerra/High Country News

The Sonoran Desert's fishes have evolved fascinating adaptations: Some give birth to live young; others snuggle down and wait out dry spells in the mud. But the past few centuries have been especially rough for them. As the Borderlands' human communities keep growing, and climate change makes the region hotter and drier, streams stop flowing and wetlands vanish. Meanwhile, introduced species, including channel catfish originally from Central and Eastern North America, push out, or hybridize with, native species. Like most of the Southwest's aquatic species, Yaqui catfish have struggled to survive since European colonization.

Today, a *river* in the Southwest often means a dried-out, sandy wash where trash and the skeletal remains of cottonwoods bleach in the sun. But before colonization, networks of riparian areas, wetlands and slow-moving rivers flowed through the region, where Indigenous peoples have lived and farmed for millennia.

A combination of colonialism and human-caused climate change turned rivers and wetlands to dust. Cattle, introduced in the 1500s by the Spanish, overgrazed the land, congregating around and trampling sensitive desert river systems. Farms, mining and the extirpation of beavers all disrupted the Southwest's rivers, which abruptly channelized in the 1800s, changing from meandering ciénegas to deeply etched arroyos. In the 1900s, enormous dam projects began sending the Southwest's water far away, irrigating California's agriculture, even as Sunbelt cities kept growing. By 1973, when the Endangered Species Act passed, such intensive pumping meant that the region's ciénegas were almost all gone, including the tiny fragment of Yaqui catfish habitat in southeastern Arizona.

Generally, the Endangered Species Act protects critical habitat for rare species, the logic being that a plant or animal can't survive if there's nowhere left for it to live. San Bernardino National Wildlife Refuge, designated in 1982, was a different approach to saving species. An

archipelago of manmade pools in a sea of desert shrubland, the refuge was meant to be a place where native fish species could survive, even as their natural ecosystems drained to sand. The Yaqui catfish lived there, some for decades; what they didn't do was reproduce. These fish, creatures of deep pools and flowing rivers, seemed to need something that the artificial ponds didn't provide to breed.

Introduced species, including channel catfish originally from Central and Eastern North America, push out, or hybridize with, native species.

Meanwhile, residents of the Southwest — including me, for approximately half my life — have washed our dishes, cleaned laundry, swum in pools, watered plants, and generally gone about our daily lives by tapping into what water persists, including the Colorado River and underground aquifers. Today in the Sonoran Desert's dry creekbeds, one can sometimes see a black band in the soil wall — all that remains of miles of rivers and wetlands.

Because only a small part of the Yaqui catfish's range lies in the United States, American researchers hope that they can collaborate with Mexico to save the species from global extinction, and maybe even donate a few more fish to the United States. But Mexico's Yaqui catfish, which historically inhabited thousands of miles of river systems throughout Northwest Mexico, are disappearing too, and the race to protect them is hobbled by a basic lack of information.

On the Sonoran Desert's version of a fall day, the afternoon high hovering around 90 degrees Fahrenheit, a binational group of researchers gathered in Cajón Bonito, a canyon that cuts through former ranchland purchased by a wealthy American, Valer Clark, about a mile south of the U.S.-Mexico border. They were there to collect that missing information.

Emerged from their vehicles, the researchers gathered an assortment of buckets, field gear and notebooks and began walking in the creek, stopping periodically to document its condition. The river clattered through the small canyon, carrying dried leaves above its sandy bed. It also carried evidence of living things that had stepped, swam or sprouted in the water, by way of environmental DNA, or eDNA, fragments of genetic material left like microscopic calling cards. It was these cards that Thomas Hafen, a graduate student at Oklahoma State University, hoped to pick up. As they waded in the river, Hafen and his research assistant, Alex Gutiérrez-Barragán, periodically sampled the river. Wearing medical gloves, they gently scooped water into a filter designed to strain out eDNA. After a battery-powered pump had sucked through enough water, they used forceps to peel the filter out of its cup, carefully fold it up, and place it in a container for shipment to a lab in Montana. In several months' time, they would know whether any Yaqui catfish had passed by recently.

A combination of colonialism and human-caused climate change turned rivers and wetlands to dust.

A friendly, quiet worker in his mid-20s, with brown hair and a stubbly beard, Hafen spent two years before college on a Latter-day Saints mission trip in Mexico, becoming fluent in Spanish. Now, he was surveying as much of the remaining Yaqui catfish habitat in Mexico as he could for traces of the elusive animals, hoping, eventually, to be able to identify the best habitat for the species. If Yaqui catfish breed in captivity, Hafen's research will help identify where to release their young, and which rivers to protect.

As Hafen strained water samples, Sonoran Desert fish expert Alejandro Varela-Romero held a bucket and binoculars and peered into a deep, slow pool of green water swirling gently in the lee of a boulder. A thoughtful man in his 50s, with dark hair peppered gray and a mustache, Valera-Romero wore plastic-rimmed glasses and a T-shirt bearing a Spanish translation of the famous quote by evolutionary biologist Theodosius

Dobzhansky: “Nothing in biology makes sense except in the light of evolution.” He called out the scientific names of tiny darting fish I could barely see. He had a feeling that a Yaqui catfish might appear.

It certainly was hard to imagine a location more hospitable to native fish than Cajón Bonito, where smoky-black catfish could float gently above the riverbottom, sheltered by sloping banks and submerged branches. Hawks circled overhead, while songbirds called from the bushes. Earlier that day, a skunk had excavated a small dig below a tree stump no more than 10 feet away from where the researchers were working, and then apparently curled up for a nap. But even here, channel catfish — one of the biggest threats to Yaqui catfish — had infiltrated. When Hafen got his eDNA results months later, they would show that almost everywhere in Mexico where he found Yaqui catfish, he’d found channel catfish, too.

“In the past, there were no exotics in the (river) basins,” Varela-Romero explained. “When the (Mexican) government started building reservoirs, federal officers had a brilliant idea of buying exotic fishes like channel catfish and putting them in the reservoirs, to give to the people the opportunity to eat fish,” even though, he said, everyone already ate the native ones.

United States biologists Thomas Hafen and Chuck Minckley work with Mexican biologists Alex Gutiérrez-Barragán and Alejandro Varela-Romero (pictured from left) to measure the distance to an eDNA sampling site while conducting fieldwork in northern Sonora, Mexico, in September 2019.

Roberto (Bear) Guerra/High Country News

As these introduced species have pushed the Yaqui catfish to extinction at lower elevations, the species survives higher up, in hard-to-reach, isolated mountain headwaters. There, though, illegal drug grows threaten the fish. Varela-Romero said that in the past, while sampling Sonoran rivers for native fish, he came upon poppies growing wild on the banks. Their seeds had washed down from opium growers.

"The problem is that money from the U.S. pays for those activities," he observed. The economics can get personal: Varela-Romero's father's car was once stolen in Hermosillo, Sonora. It turned up months later in Yuma, Arizona, after being used to run drugs across the border.

Because the Yaqui catfish is dying out, Varela-Romero said, "you develop some kind of love. … We call it *cariño* en español." He always got excited when he saw a Yaqui catfish in the wild, wondering each time how many more he might see. Today, though, he had no luck. The catfish, if any were nearby, stayed hidden.

If Hafen and his team represent cutting-edge fisheries research, with fussy portable filters and slick sampling methods, Varela-Romero embodies an older approach to natural history, his expertise earned through hours spent studying different species, counting bent spines, describing the exact color of scales, trying to think like a fish. Another biologist on the trip, Chuck Minckley, was an original member of the Desert Fishes Council, a nonprofit research organization for desert fish biologists in the U.S.-Mexico Borderlands. Minckley missed the first meeting because he was drafted for military service in the Vietnam War, but he hasn't missed one since. Now in his 70s, he waded slowly down the canyon as Hafen's crew sampled the water, pausing to rest at times on an overturned bucket. His ancient black Lab, Shadow, raced happily through the shallows, huffing like a freight train.

Varela-Romero and Minckley are determined to catch and breed Yaqui catfish in Mexico as quickly as possible, even though no one really knows how. It's easy to read their efforts as a comedy of errors, with fish found, lost, misidentified. In reality, with low budgets and improvised tools, the researchers are learning how to work with the species. The problem is that their learning curve has crashed into an extinction curve. After years of neglect, the Yaqui catfish is rare enough that every fish matters, making it hard to experiment with ways to breed them, or even to keep them alive.

After years of neglect, the Yaqui catfish is rare enough that every fish matters, making it hard to experiment with ways to breed them, or even to keep them alive.

One afternoon in Mexico, the researchers attempted to recover eight Yaqui catfish caught in Cajón Bonito, which had escaped from some netting in a holding pond. This involved using a broken kayak paddle to maneuver a rowboat, which Minckley had purchased as a teenager to take duck hunting, out to the middle of the pond, and pulling up yards of soggy netting.

The men excitedly hauled a catfish to shore in a bucket and gently transferred it to a shallow rectangular container. The small, soot-gray animal burrowed into the corners, seeking an escape with its mouth and barbels. We crowded over it, and I found myself getting unexpectedly emotional, looking at what might be one of the last of an under-studied, barely known species, trying to escape from a plastic box. I felt foolish a few minutes later, when Varela-Romero checked its pit tag and announced that it was actually a Yaqui-channel hybrid. I wondered whether the loss of a species that looked just like one of the most common fish species on the planet really mattered.

Only later did it occur to me that perhaps, if I couldn't tell the difference between a Yaqui catfish and a channel catfish, that was because they

communicate in the language of fish, not primates — that their seeming interchangeability said more about my limited understanding than it did about their limited distinctions.

The same economic pressures that push Yaqui catfish toward extinction today have wreaked havoc on local human communities for centuries. Even as American and Mexican researchers try to save the species, tribal nations such as the Pascua Yaqui are working to re-establish control over their natural resources, including the Yaqui catfish.

Even as American and Mexican researchers try to save the species, tribal nations such as the Pascua Yaqui are working to re-establish control over their natural resources, including the Yaqui catfish.

“If we had a tapestry of our history on this side of the border, it would probably be missing a bunch of big chunks,” Robert Valencia, then-chairman (now vice chairman) of the Pascua Yaqui Tribe, told me. Valencia and I met in a conference room at the Pascua Yaqui Tribe’s administrative offices, about 20 minutes away from downtown Tucson. Valencia, who is in his 60s, has dark hair and a thick salt-and-pepper mustache. He wore what he called his “end of summer” shirt — a red Hawaiian-print button-down. To Valencia, the tribe’s history is too important to lose. “We can’t let things go,” he said. “As a matter of fact, we’re doing the opposite. We’re looking at — on both sides of the border — what are important parts of history we don’t know, or we need to know more?”

At one point, Valencia wrote down a Yaqui word for me in my notebook, after I struggled to sound it out myself. “What it means is, ‘In the beginning,’ ” he explained. “We have to always remember what we had in the beginning. To me, that’s number one.”

To Valencia, the catfish ties Yaqui peoples to the Río Yaqui region, in part by embodying the importance of water to the tribes. As the flow of Borderlands water and species has been curtailed, so, too, has the movement of Yaqui peoples across their ancestral lands.

“If we had a tapestry of our history on this side of the border, it would probably be missing a bunch of big chunks.”

Considered Mexican by the United States, the Pascua Yaqui Tribe only gained federal recognition in 1978, despite its presence on both sides of the border since long before the United States or Mexico existed. In 1964, the tribe secured the land in southern Arizona that would become its reservation from the Bureau of Land Management, after surviving the Yaqui Wars, a persistent attempt — first by the Spanish government and more recently by Mexico — to kill off Yaqui tribes and use their land along the Río Yaqui for mining and large scale agriculture. “If you read about our history, there was an unwritten extermination policy against our people in Río Yaqui,” Valencia said. “They killed us, shipped us off as slaves in Yucatán, did whatever they could.” People were sent as far away as the Caribbean and Morocco, never to return.

In the late 1970s, Valencia’s uncle, who was tribal chairman, successfully fought to gain tribal recognition from the U.S. government. Today, the Pascua Yaqui Reservation includes approximately 2,000 acres southwest of Tucson, bordered partly by Tohono O’odham land and partly by the city’s growing sprawl. Yaqui people regularly move back and forth across the U.S.-Mexico border, although that’s been harder since the 9/11 terror attacks, Valencia said. Valencia’s mother, who was born in the U.S., grew up in the Yaqui pueblo of Tórim in Mexico. Valencia remembers her reminiscing about rivers “teeming with fish,” before Mexico built three dams along the Río Yaqui.

On the one hand, the delayed recognition of its sovereignty means the tribe is only now addressing quality-of-life issues that go back decades, Valencia said. But he sees advantages to its independence from the federal government. “Because we weren’t entrenched, we don’t have federal programs that are based here; we didn’t want any,” Valencia said. “We always insist on directing whatever effort it is, whether research, whether programs, because what we found over the years, if we let other people do things for us — it fails, every single instance.” Yaqui catfish conservation seems to fit this pattern: In 2015, after three years of applications, Valencia won a grant from the U.S. Fish and Wildlife Service to create monitoring and educational programs about Río Yaqui fish on both sides of the U.S-Mexico border. Not long after, he found out about the 2016 die-off of Yaqui catfish at the Kansas fish hatchery.

Roberto (Bear) Guerra/High Country News

Using a boat Chuck Minckley has owned since he was a teenager, he and Thomas Hafen check netting for Yaqui catfish that escaped into a holding pond at Rancho San Bernardino in Sonora, Mexico.

Working with the eight Yaqui pueblos in Mexico, Valencia wants to create family-based "microhatcheries." Partly, this is for cultural reasons — the Yaqui catfish is a traditional food — but it would also be part of the Yaqui pueblos' long battle for the Mexican government to honor their treaty rights, which include extensive control of water and other natural resource in the Río Yaqui basin. Currently, Mexico's dams force Yaqui communities in Mexico to rely on water contaminated by agricultural runoff laden with pesticides and heavy metals. According to the *Latin American Herald Tribune*, Mexico defied its own Supreme Court to build an aqueduct to pipe Río Yaqui water to Sonora's growing capital city of Hermosillo, further ignoring Indigenous claims to the watershed and its natural resources, including its fish.

The Pascua Yaqui Tribe has already built microhatchery prototypes. One sunny morning in September, I met James Hopkins (Algonquin and Métis), a law professor at the University of Arizona who directs the Yaqui Human Rights Project Clinic and has legally represented Yaqui pueblos in Mexico, in a parking lot near the Pascua Yaqui Tribe's Casino del Sol. On roads made slick and puddled by recent rain, we drove together to Tortuga Ranch, a former cattle ranch that the tribe now owns, to examine its prototype aquaponics operations. A hoop house held burbling tanks where luminous koi fish swirled under bright green vegetation. Further efforts to raise Yaqui catfish were on hold for now, until more Yaqui catfish become available. But even without the catfish, microhatcheries of fish such as tilapia or channel catfish could be important routes to nutritional independence for Yaqui families in Mexico.

“(Yaqui pueblos) want a clean, sustainable protein source,” Hopkins said. “There’s a huge infant mortality rate (in Mexico), primarily because all their protein from the local area — fish, dairy from local cows, goats, pigs — is going to be carrying persistent chemicals, mainly DDT.”

“Anything you’re trying to return back to nature, your plan has to fit with the larger state plan.”

On the U.S. side of the border, Valencia would like the Pascua Yaqui Tribe to raise Yaqui catfish in captivity, in part for a commercial market. “It’s one of those things I think can be successful,” he said. “The people have some knowledge of the species itself.” Hopkins, though, expressed a more cynical reason for growing Yaqui catfish in microhatcheries. “Anything you’re trying to return back to nature, your plan has to fit with the larger state plan,” Hopkins said. For Arizona to take interest in the Yaqui catfish, there had to be a commercial value, such as a restaurant market for the fish, or an interest in sport fishing.

“I’ve been transparent with people like Chuck Minckley and others, saying, ‘Look, if you bring the fish back, where’s it going to go?’ ” Hopkins told me. “It’s going to have to be a commodity in its own way.”

One warm fall day last September, I visited San Bernardino National Wildlife Refuge, a remote landscape of rolling hills with a backdrop of sharply angled mountains at the Río Yaqui headwaters in southeastern Arizona, where the last Yaqui catfish in the U.S. were caught for the failed breeding effort. Traces of catfish eDNA still turn up in ponds here, although it’s uncertain whether that DNA is from living fish, or the remains of dead ones. This is where the U.S. Fish and Wildlife Service would like to reintroduce Yaqui catfish, if Mexico agrees. Up close, the ponds seemed peaceful: small, cattail-ringed pools rippling in a rising breeze.

But now, the ponds themselves are endangered, collateral damage in the Trump administration's determination to construct a border wall before the November election. Despite the COVID-19 pandemic, wall construction continues at a breakneck pace, using local water to spray down dusty roads and mix concrete. As of this writing, Customs and Border Protection has not provided *High Country News* with requested groundwater use estimates.

"What's that adage about how far you can lean off a cliff before you fall? You don't know until you lean too far."

According to Myles Traphagen, a field biologist and GIS specialist who previously worked at San Bernardino, no environmental analysis has been conducted on the impacts of wall construction on the region's water, or on its fish. "Since there was no NEPA (National Environmental Policy Act review) required, no prior studies, we are essentially navigating in uncharted territory, with no baseline for what the final effects might be," Traphagen said. Refuge staff declined to comment on the impacts of the border wall.

On my drive back to Tucson, the clouds gathered into a gray comforter, trailing rain far to the south. It was my favorite kind of dappled desert weather, the filtered light deepening the green on hillsides and softening the craggy mountains. In the distance I spotted a bright white post — a historic border marker, rising from the shrubs. Past that, the roof of a ranch house in Mexico. Trucks passed me slowly on the dirt road, spraying water to keep down the dust. It took me a few minutes to realize why: They were preparing for the construction crews to arrive, to build the border wall. Perhaps the next time I drove through, those mountain views would be gone. So, too, might the springs that the refuge's fishes relied on. Without water, there would be no future here for the Yaqui catfish.

I later called Bill Radke, who has managed San Bernardino for about two decades, and asked him whether falling groundwater levels in the refuge

might be just one more threat to the Yaqui catfish, or the final nail in its fishy coffin. Radke would not comment on the effects of the border wall construction, but he acknowledged that groundwater levels have always been a big concern for the survival of fish at the parched refuge.

“You almost have to end your story that way, because I don’t know that any of us can say that for sure,” Radke said. “What’s that adage about how far you can lean off a cliff before you fall? You don’t know until you lean too far.”

Climate change

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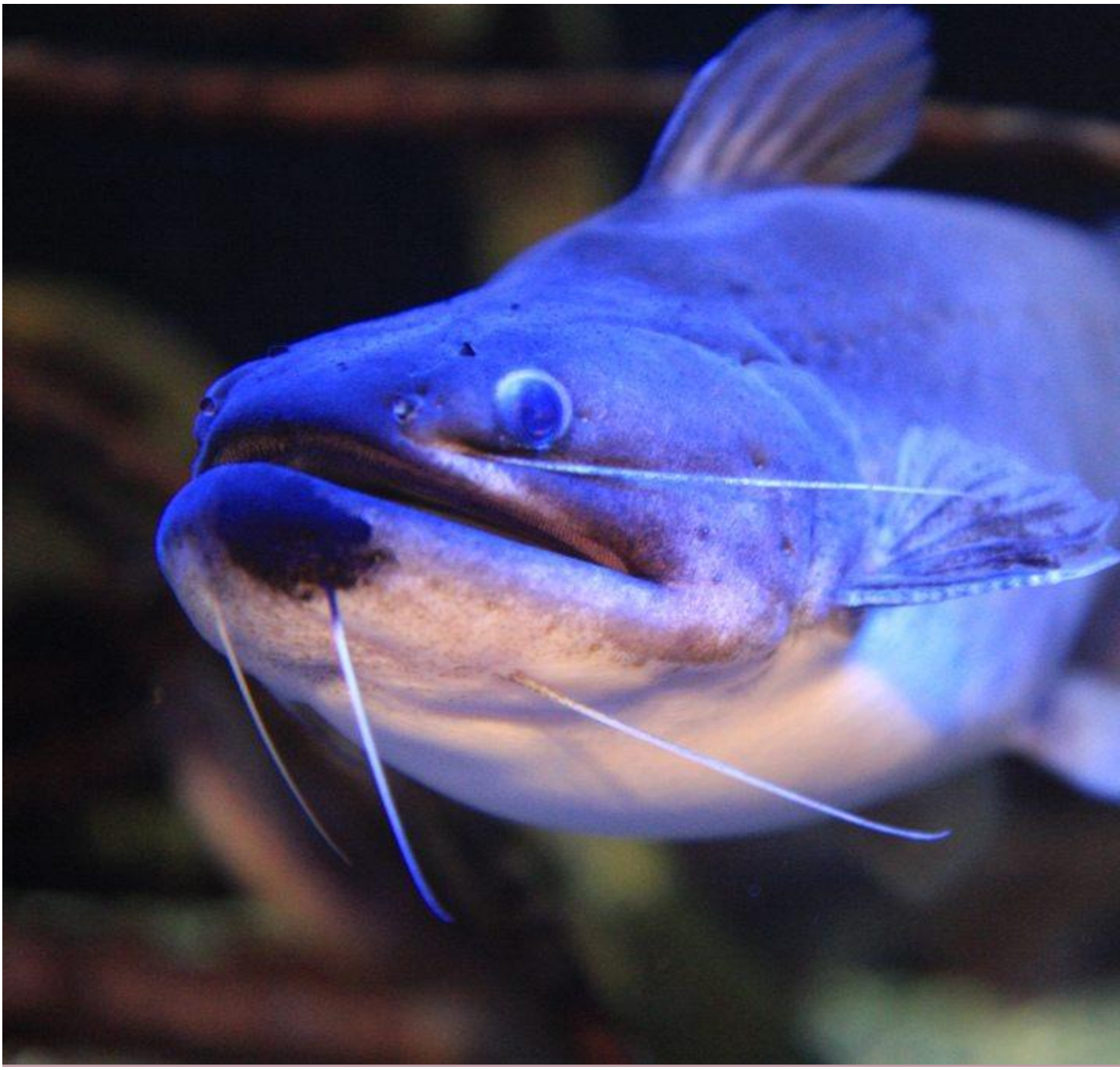
Maya L. Kapoor is an associate editor at High Country News.



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Millennials Moving Back To Roots Of Indian Cuisine

- Slurrp
- Tavishi Dogra

Do you know Indian cuisine has the most consumed dishes at this hour because of their nutritional benefits?

Image credits: Pexels.com

If you ask your kids about ways to improve immunity, they would suggest a couple of multivitamins must have asked to do some basic yoga or Surya Namaskar at home, or max would have asked to take Chyawanprash. This is what everyone from the millennial generation knew before the pandemic hit us. This is what most of us knew before COVID-19 engulfed us into the horror of falling ill and finding it hard to recover.

Indian Herbs

COVID-19 pandemic brought everyone to their knees, and all of us are still taking our own time to come out of its web. However, most of us are now aware of increasing immunity's easy and natural way. As a result, millennials are moving back to the roots of Indian cuisine. The reason is very straightforward -- Indian cuisines are a natural source of supplements that boost immunity, and as per our Ayurveda, consuming Indian herbs, like turmeric, saffron, walnuts, seeds, can not only improve our immunity but also enhances the taste of our food -- something which millennials these days craves the most!

How a South Indian restaurant in New York honours its roots

Back To The Roots: The Indian Art Of Cooking With Banana Leaves

Why Milk Is Important In Indian Cuisine

Millennials' Indulgence

If you would have thought that only the elders in the family are concerned about the sugar intake, you have to see what millennials are consuming these days! They still prefer to add chocolate to their milk, but these days they are much concerned about how that chocolate is made! In addition, millennials indulge in the practice of eating out and eating right at the same time -- they still prefer to eat pizza or burgers, but these days they prioritize healthy Indian foods and drinks.

Turmeric Milk

This shift is not only seen in the Asian subcontinent, where we already had the correct information about Satvic Foods in general. Even U.S. millennials gradually abandon their fresh and junk food habits and consume fresh and less processed food. Instead of drinking soft drinks, everyone asks for milk. Even the Delhi airport in India started selling turmeric milk which has proven beneficial for all ages. In addition to this, some of the Indian cuisines, like Sambhar,

Lentils, Rajasthani Ker Sangri, and more, are some of the most consumed dishes at this hour because of the nutritional benefits they have.

Food Eating Habits

Millennials have brought much change in their food habits as well. In most urban towns, millennials prefer bread and butter for their breakfast -- some health enthusiasts try to drink smoothies in the morning. However, since organic nutrition is what everyone is currently demanding, the butter is replaced with homemade peanut butter, like almond peanut butter and cashew peanut butter from Satvic Foods. There are tons of benefits of consuming homemade peanut butter or adding them to our everyday routine, like:

- Homemade peanut butter helps lose weight as it has a good quantity of protein and fibre.
- In addition, such peanut butter improves digestion and has anti-inflammatory properties.
- Those who were fitness freaks earlier consumed different protein supplements such as whey powders. Still, since they come with chemicals and many preservatives, millennials have started adding such peanut butter to their shakes.

Conclusion

Unprocessed foods, like fruits and vegetables, are what millennials look for in every diet, and fortunately, our Indian cuisines are filled with nutrients. So even if one takes masala milk or masala chai (tea), they ensure they get the proper nutrients. Indian cuisines are the perfect culmination of taste and nutrients, so they will benefit both worlds when these millennials age. Hopefully, they too have access to the Indian Satvic Foods.

(Inputs By Mrs Jamana Mahajan, Co-founder, Satvic Foods)

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Protein Dosa: Nutritious and Easy to Prepare

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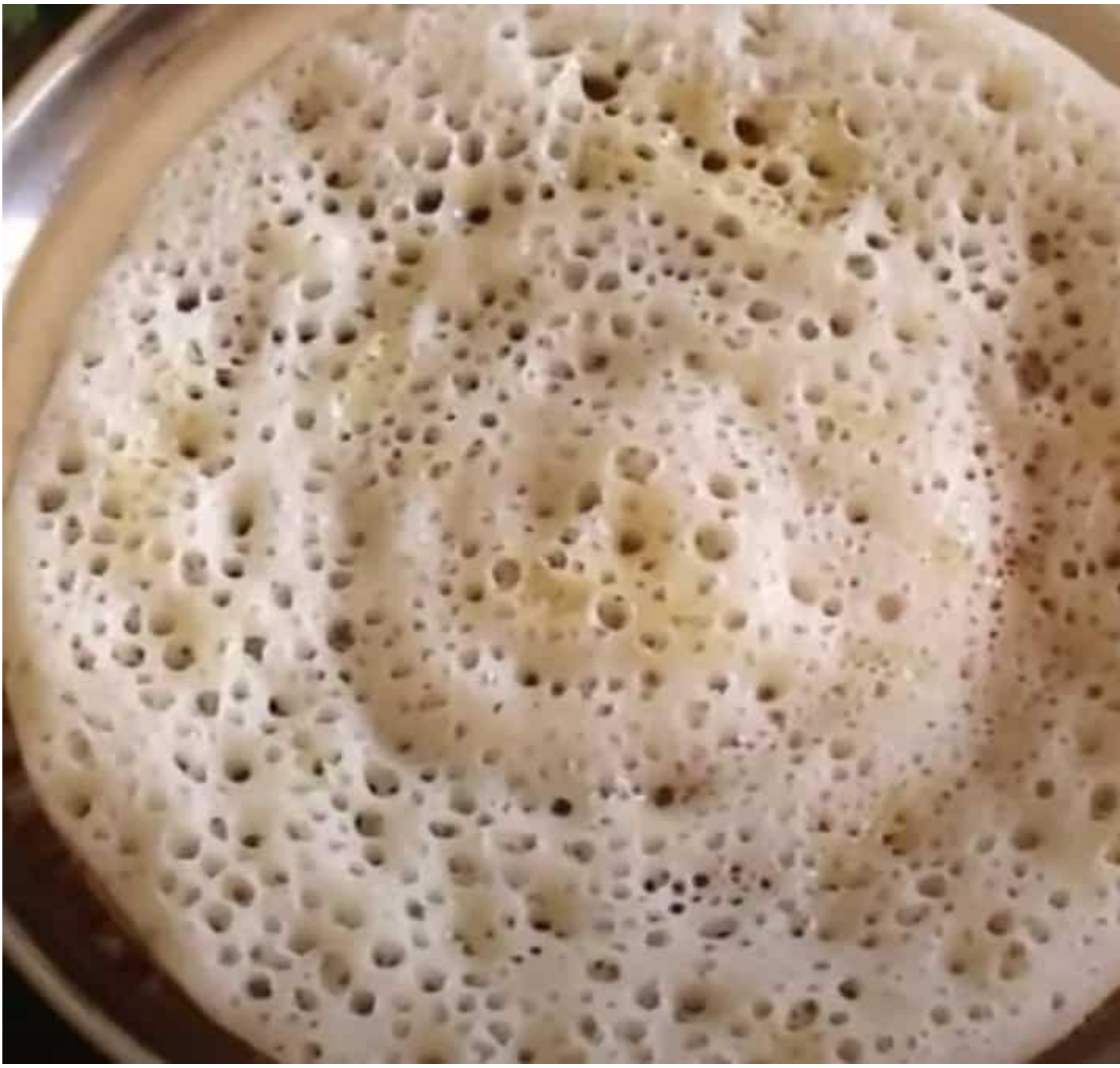
- 

Tuppa Dosa: A Dosa With The Goodness Of Ghee

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Sustainable Food: A return to the roots

Local farming initiatives are revolutionising the food market in France and in India.

[10]An article by Anne-Sophie Garrigou, Editor-in-Chief.
This article was published in The Beam #7.

Our food system is broken; it is unequal, unsustainable, unstable and in need of transformation. International organisations, governments, businesses, entrepreneurs and farmers all around the world are working towards cutting carbon emissions and waste, improving the nutritional value of food, innovating at the farming level and developing city-wide food policies.

But we, the citizens and consumers, are a big part of this equation. It is up to us to make conscious decisions on a daily basis about the kind of production we want to support and the initiatives we want to encourage.

These local farming initiatives are revolutionising the food market in France and in India.

https://medium.com/thebeammagazine/sustainable-food-a-return-to-the-roots-6bb9620e8f4c[10]

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Promoting local and peasant agriculture in France

The AMAP (Association pour le Maintien d'une Agriculture Paysanne) maintains and encourages small and local farming in France by creating a system based on the long term partnership between a producer and a consumer.

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An AMAP usually consists of several local farmers (e.g. a vegetable producer, a cheese producer, a meat producer, etc.) and citizens. The first step is to sign a contract between the self-named 'peasant' farmer and the citizen stating the quantity, diversity, and price of the 'food basket' that will be prepared weekly. The price should be fair for both parties, and be paid by the consumer at the beginning of the contract so that the producer's income is secure and the cost of production is covered. Local citizens and farmers meet once a week to exchange the latest news of the community and the 'food-basket'. The consumer can't choose what will be in the weekly package, a great way to try out different produce, and agrees to receive seasonal products available on

the farm (don’t count on receiving tomatoes in December!), making it a unique experience and perfect way to understand the often tumultuous reality of farming life.

India sows the seeds of revolt to preserve its biodiversity

In India, the seed marketplace if often manipulated by the middleman, making it impossible for local farmers to secure their harvest from one year to the next. Enter Sahaja Samrudha, or Bountiful Nature, a Mysuru-based startup fighting to ensure seed sovereignty for farmers by fixing pre-determined prices for their produce. Originally developed as a farmer initiated to exchange ideas, seeds and share knowledge on

sustainable agriculture, the company now has 98 varieties of organic rare seeds of crops in its repertoire, and counts 480 members, including 58 seed producers or farmers, drawn from places such as Mysuru, Chamarajanagar, Mandya, and Bengaluru Rural.

Andaman and Nicobar Islands, India

Conceived to protect cultivators' collective interest, Sahaja Samrudha promotes open-pollinated seeds that are organically cultivated, patent-free and are in the public domain. The farmers can use them for free, instead of having to use the seeds coming from multinationals and Indian companies who only supply hybrid varieties that contribute to create monoculture, therefore, threaten India's agricultural

biodiversity. It's a win for the producers, the consumer and the environment.

Article by Anne-Sophie Garrigou, Editor-in-Chief

Western Diet A killer in Okinawa

https://www.youtube.com › watch

Western Diet: A Killer in Okinawa - YouTube

The **diet** of young people in **Okinawa** is shortening their lives.

YouTube · Southside Tokyo · Aug 23, 2009

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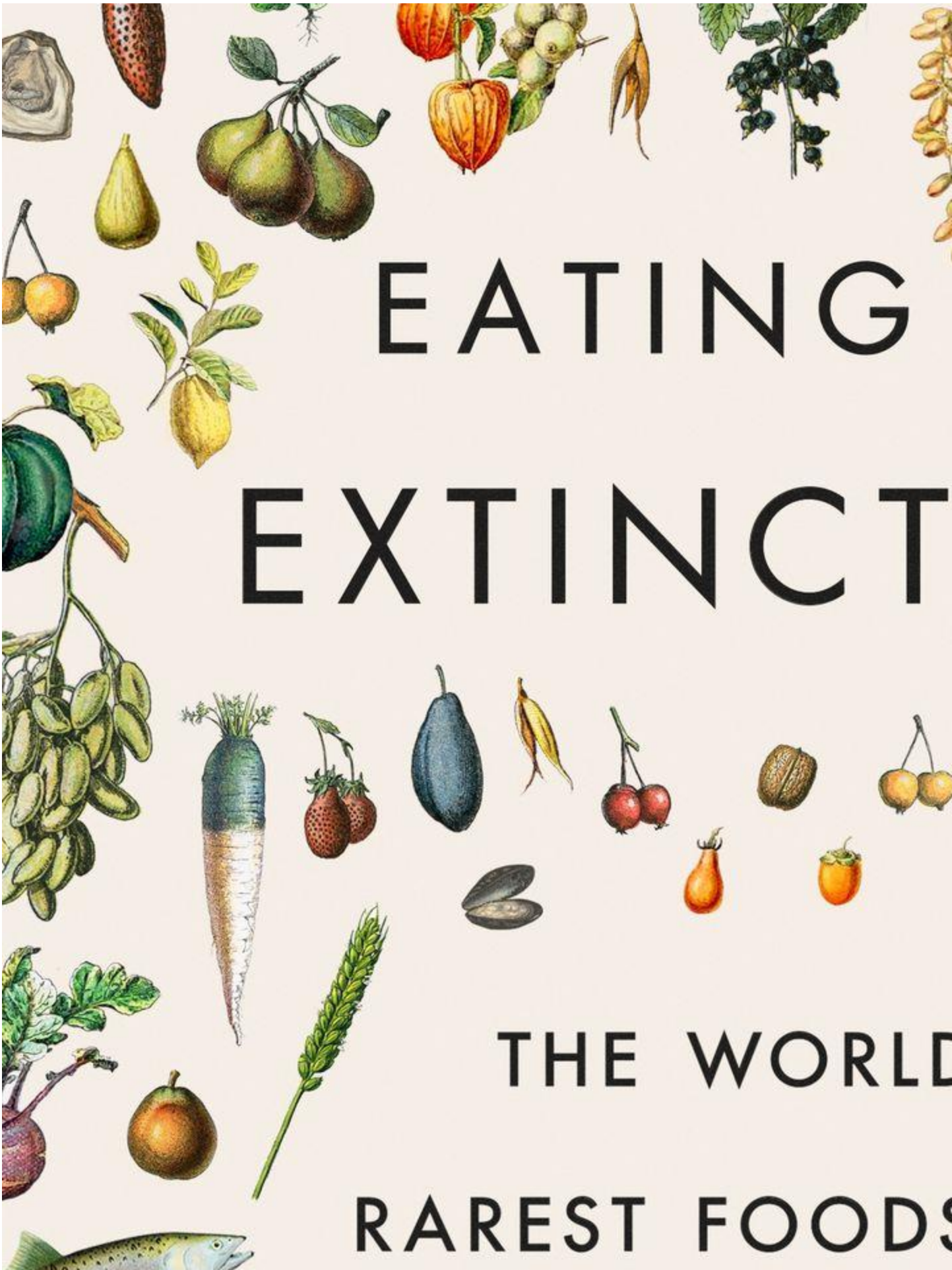
The Lost Soybeans of Okinawa

[11]In an excerpt from "Eating to Extinction," author Dan Saladino visits Okinawa where one farmer is hoping to bring back one of the world's rarest soybeans

by Dan Saladino Feb 18, 2022, 10:44am EST

Our food supply is suffering from a diversity crisis. Varieties of coffee, bananas, wheat, and more foods are at risk of being lost forever; preventing that loss is essential to the health — and deliciousness — of our food system. This is the argument Dan Saladino lays out in his book Eating to Extinction: The World's Rarest Foods and Why We Need to Save Them.

[11]https://www.eater.com/22937910/tofu-soybean-types-dan-saldino-eating-to-extinction-excerpt


EATING
EXTINCT
THE WORLD
RAREST FOODS

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With each chapter, Saladino travels to the communities working to preserve some of the world's rarest foods, from Salers cheese to lambic beer. Most resemble foods that appear commonly on grocery store shelves, and yet these precise methods, breeds, or strains would become extinct if not for the small groups of people dedicated to their survival. A village in eastern Turkey grows Kavilca wheat, a variety related to the wild grasses first domesticated by Neolithic farmers, but is now endangered; in Germany a group of farmers is bringing back the alb lentil, a plant that, when it grew wild in the Swabian Alps, helped to sustain and grow that Alpine community. And with each chapter, Saladino aims to answer the question he presents in the book's introduction: "How can a food be close to extinction and yet at the same time appear to be everywhere?"

In this excerpt, Saladino goes to Okinawa, Japan to visit a single farmer re-growing the soybeans that once made the tofu essential to the Okinawan diet and explains how the soy boom in the West led to that no longer being the case. — Monica Burton

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OneOne thousand miles to the south of the Japanese mainland, right in the center of the Pacific island of Okinawa, Kenichi Kariki, a slight man in his early 70s, tends what might be the world's smallest plot of soybeans. On this one-meter by five-meter clearing surrounded by a tropical wilderness, Kariki is attempting to bring back one of Japan's rarest varieties of soy. Rare soy? How can that be? Newspaper headlines remind us of the problems caused by too much soy growing. Deforestation in Brazil's Cerrado, the Yungas "cloud forest" of Argentina and Bolivia's Gran Chaco is most often blamed on the rise and rise of *Glycine max*, the small, yellow, oval bean we call soy, a legume so packed with protein it's the number one ingredient for most of the chicken and pig feed on the planet. In 2020, demand for the global crop grew at its fastest rate in years.

But Kenichi Kariki's bean is rare. So rare that even though he's been growing it for three years, he hasn't dared to eat a single bean. One day he hopes to have enough seed to share with farmers and bring the bean back for good. And so he saves each one, as if each tiny bean were a precious artifact, which in Kariki's eyes it is.

Before Okinawa was turned into a Japanese prefecture in the 1870s, it had been an independent state, the Ryuku kingdom, for centuries, with its own emperors, dynasties, language, culture, religion, and soybean. This landrace soy was called the O-Higu, and it's the one Kenichi Kariki is trying to grow. What Kavilca wheat had meant to people in eastern Turkey, or the Alb-linse to the inhabitants of the Swabian Alps, the O-Higu was to people on the island of Okinawa: survival, identity and self-sufficiency. Since the 14th century, farmers would plant the bean in the spring, at the first sight of the cherry blossom. O-Higu grew faster than other varieties of soy, which meant that by the time the rainy season arrived, the beans could withstand their biggest threat, the insects brought by the hotter, humid weather. So farmers saved and passed on its seeds.

The origins of soy lie in northern China where, 6,000 years ago, farmers began domesticating the plant. Three and a half thousand years ago, during the Shang dynasty, the bean first appears in written records as fodder for animals and as an ingredient in porridges for humans. Even after hours of cooking, the legume has a tough outer layer and an intense bitter taste.

By the 1960s, the people on Okinawa were still eating tofu, but the O-Higu bean had gone extinct.

Early converts to soy overcame this problem through fermentation, allowing bacteria to break the bean down. First came a basic condiment called jiang which, with the addition of salt, rice or barley, evolved into miso. But the real masterstroke that turned soybeans into the equivalent of "daily bread" for many Asian cultures was the invention of tofu, an almost miraculous seeming transformation of bitter beans into white blocks of tasty food. A mural inside a 2,000-year-old tomb in Henan Province, central China, depicts the steps in tofu making: first, making a "milk" by cooking the beans, then coagulating the liquid by adding sea salt and, when it's sufficiently thick and silky, pressing it into blocks. The expansion of Buddhism and its vegetarian principles out of China into other parts of Asia also spread soybeans and tofu. In the 12th century, Japanese Shinto priests were placing tofu offerings at holy shrines. By this time, soybeans had arrived on Okinawa.

The Ryuku kings governed from the magnificent red-tiled Shuri Castle built in the capital city of Naha, in the south of the island, and this was the destination for the sakuho-shi, China's imperial ambassadors. China, the giant empire across the sea to the west, was the greatest influence on the kingdom at that time; it granted the Ryuku kings their power, provided much of the island's trade, and shared its seeds and culinary techniques. This is how the O-Higu bean arrived on Okinawa, as well as

shima-dofu (island tofu), a softer, silkier form of tofu than is found on the Japanese mainland, closer to the Chinese tofu tradition.

A “Survey of Japanese People’s Diets” recorded in the late 19th century — by which time Okinawa was under the control of Japan’s Meiji dynasty — found that a typical Okinawan meal consisted of tofu and “sweet potato and miso soup with plenty of vegetables” for breakfast, lunch and dinner. Their mostly plant-based, soy-rich diet led to Okinawa later being listed as one of five blue zones — regions of the world in which people live exceptionally long and healthy lives. But, in the mid-20th century, a strange and unexpected shift took place in their diet. By the 1960s, the people on Okinawa were still eating tofu, but the O-Higu bean had gone extinct and the soy they ate instead was grown in the American Midwest.

Of all the seeds humans have domesticated and cultivated for food, what makes the soybean so exceptional is not so much the compounds it contains, but the quantities involved. Roughly 20 percent of a soybean is oil and 35 per cent is protein, high proportions as far as legumes go. Soy had been of interest to American scientists since the 18th century and by the 1850s it was one of the legumes used as a rotation crop in the American South. But it was only in the early 20th century that the real potential of its protein and oil started to be exploited, in most part thanks to an incongruous combination of plant collectors, entrepreneurs and religious leaders.

Soy’s great ascendancy in the West started to build in the early 1900s, when the United States Department of Agriculture began to send botanists, including the legendary seed collector Frank Meyer, to Japan, Korea and China, to build up a collection of soy varieties. The 4,500 soybean samples sent back were put to the test in experimental field trials. Around 40 were approved for commercial use by the USDA and posted to farmers for cultivation.

As the supply of the bean increased, so did demand for soy products. The Seventh-Day Adventist Church endorsed soy as an ingredient suited to the strict vegetarian regime its members were expected to follow. One of these, the food entrepreneur John Harvey Kellogg (of cornflake fame), believed the bean had great potential for improving human health. Kellogg had already developed soy products that had similar textures to meat — precursors of the lucrative meat “alternatives” made today — and launched “Corn-Soya Shreds.” “There’s no other cereal like it!” ran the ads.

Meanwhile, industrialists were also busy using soybeans to make paint, soap, textiles, and plastics. While physicists were splitting the atom, chemists in the USA were deconstructing the soybean, extracting constituent parts and finding uses for its abundant oils and proteins. Henry Ford was an early evangelist of the legume, building the body of a car completely out of chemically processed soy, spraying it with paint made from the bean and stuffing the seats with soy-fiber. The food industry fell in love with soy as well, processing it into ever greater quantities of margarine and cooking oil. Another component of soy, lecithin, became the most widely used emulsifier, and a crucial ingredient in ready meals, salad dressing and chocolate. By the 1950s, the United States was growing so much soy (including American-bred varieties, such as the fattier, higher-yielding Lincoln bean) that it had enough of a surplus to export. One of its biggest customers would be Japan.

In the spring of 1945, US marines and the Japanese Imperial Army clashed in the Battle of Okinawa. The 82-day battle is known on the island as tetsu no ame ("the rain of steel") because of the ferocity of the bombardment. Ninety thousand combatants died and Okinawa's population was halved. Hundreds of farms on the island were left devastated and others were cleared to make way for what would become one of America's largest overseas military bases, with more than 50,000 US troops. Under US occupation, more sugarcane was planted as a cash crop, replacing the diverse foods farmers had grown for islanders. Instead, Californian rice, wheat from Kansas, tinned American pork (Spam), and soybeans grown in Iowa were imported. There was little incentive to save the O-Higu as huge amounts of soy were imported to Asia, not only from the USA but, increasingly, from other parts of the Americas.

But in the 1970s the soy boom really intensified. This boom has a lot to do with a diminutive fish. For decades, vast shoals of anchovy were caught just off the Peruvian coast and used as the major protein source in the poultry and cattle industries. But in 1972, a combination of overfishing and El Niño led to Peru's anchovy harvest dropping by nearly 90 percent. A protein panic rippled out across the agricultural world.

To protect its own industries (and prevent meat prices going up), the Nixon administration restricted exports of American soy. This, in turn, had an impact on Japan, by now heavily dependent on American supplies. Realizing just *how* dependent and vulnerable it had become, Japan began to put a long-term plan in place. There was no other big supplier to turn to, and so it had to create one. Brazil had been a marginal player in the soy business, but with Japanese investment and the clearance of virgin forest, including parts of the Cerrado, it became a giant. In 1960, Brazilian soy production was less than 300,000 metric tons. In the 1980s, helped by newly developed soy cultivars suited to the Cerrado's acidic soil, this increased to around 20 million tons. The 2020 harvest, of 130 million tons, broke all records and exceeded

the size of the American crop putting Brazil on course to become the undisputed world leader of soy cultivation.

As this soy boom was taking place, behind the scenes, transformation of the global seed industry was also under way. The $4 billion soybean seed market became the major battleground. Already, soy grown across the Americas was based on a small number of genetically uniform varieties, all grown in monocultures, making them vulnerable to pests and diseases.

The solution was genetically modified soy. In 1996, Monsanto launched Roundup Ready soy, a plant resistant to the glyphosate-based herbicide (or weed-killer) of the same name. The product had been developed after a chance discovery; a bacterium spotted growing inside one of Monsanto's waste ponds was found to have resistance to Roundup, and genes from this bacterium were transferred to create a new variety of soy. Syngenta followed with its own version, VMAX, then, not to be outdone, Bayer with a variety called Liberty Link. By 2014, more than 90 per cent of all soy grown across North and South America was GM.

Consolidation wasn't only a feature of the soy seed business; the global trade in the bean also became heavily concentrated among a small number of companies. For many years this was the so-called ABCD group: Archer-Daniels-Midland, Bunge, Cargill and (supplying the D from its middle name) Louis-Dreyfus Company. These companies and the soy they trade have helped to turn food production into what a report by Oxfam described as the "complex, globalized and financialized" business it is today. Food prices, deforestation, land and water use are all influenced by their activities. In 2016, the picture changed (slightly); Asian companies, including one owned by the Chinese government called COFCO, started to exert more control over much of Brazil's soy exports and China became the main driver of soy expansion in South America, to feed a rapidly growing population of pigs and chickens. The future of the Cerrado depends to a great extent on Chinese diets.

In 2012, I paid a visit to the C of the ABCD group, Cargill. It owns the biggest soy-processing plant in the UK, the Seaforth refinery, a large, anonymous-looking building on the waterside of Liverpool's docks. There, I met the operations manager who showed me through a network of large open spaces, with a snake of steel pipe winding its way through the entire building, joining up vast, unfathomable blocks of machinery. One of these was sending out a hum as it turned the round beans into flakes.

Apart from the manager, there were only a handful of other people here, as most of the work was automated. Nearly a million tons of soy a year were being processed at the site, the equivalent of three square miles of soy plantation every day. Once a month, a ship arrived from Brazil containing 60,000 tons of beans which needed five days just to unload. Turning it into oil, protein and lecithin took a lot less time, about four hours. This was mostly done through "solvent extraction" in which hexane (a chemical side product of the petroleum industry) dismantles the bean's compounds, putting every possible molecule of protein and oil to use. This happens inside a tower, 40 feet wide and 20 feet tall, and involves a massive piece of equipment that emits an ear-punishing drone.

As we followed the pipe network, we reached the "de-solventiser," which removed the hexane and made the soy edible. From his pocket, the manager pulled a small vial filled with a sample of thick yellow oil to show me what was being made. In the hands of food processors, this product is used to make cooking oil, salad dressing, mayonnaise and margarine. At the end of the production line were big, yellow dumper trucks parked up next to what looked like a sand dune made of yellow powder. Forty-eight percent protein, I was told, and destined to be turned into animal feed.

"It's a food no one has tasted for more than half a century."

Soy protein has made a greater impact on our planet and transformed diets more fundamentally than any other plant material in recent history. Around 70 percent of the world's soybean protein is used to feed poultry and pigs, and most of what remains goes to cattle, sheep and farmed fish. Since the soy boom, the global pig population has more than doubled to a billion, while poultry numbers have increased more than sixfold to more than 22 billion. In the case of fish, feed from soy has helped a new species to flourish: farmed Atlantic salmon.

But what soy has given the world in food abundance, it has taken away in biodiversity, including the loss of virgin forest. A soy moratorium introduced in 2006 reduced deforestation in the Amazon, but since President Jair Bolsonaro took office in 2019, levels have increased again and thousands of square miles of forest cover have been lost. The moratorium was never extended to the Cerrado. Just 20 percent of Brazil's tropical savannah remains undisturbed. Soy also exerts a huge influence on geopolitics. In the summer of 2019, when a trade war broke out between China and the USA, one of the first industries targeted by tariffs was the soybean trade.

On Okinawa, most memories of the O-Higu and its tofu had faded into obscurity and the last known seeds belonged to a farmer who died in the 1970s. At the beginning of the 21st century, Kenichi Kariki started looking for Okinawa's O-Higu seeds. The search took Kariki to a seed collection at Okinawa's Ryuku University where, 50

years before, one of the university's botanists had stored seeds away for safekeeping. It is those seeds that are now growing in Kariki's small soy patch.

I visited Kariki on Okinawa in 2018, when there were just enough seeds to be shared out with farmers around the island. "When we eat island tofu again made with O-Higu soy it will be a big day," he told me. "It's a food no one has tasted for more than half a century." During the Second World War, Shuri Castle, the physical symbol of the Ryukyu kingdom, had been burnt down, but that had been relatively easy to restore. Reviving a lost food culture isn't so simple; it's less tangible, more complicated, but no less important. "Okinawa deserves to have its own crops back," Kariki said. To outsiders, O-Higu might appear an insignificant bean. "But to many Okinawans, after colonialism and occupation, its return feels like an act of resistance and a celebration of who we are."

Excerpted from EATING TO EXTINCTION: The World's Rarest Foods and

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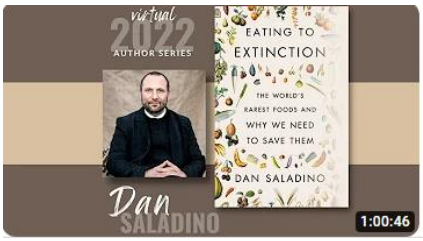

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Improving the Mexican diet

Alan Espinosa, SM '22, is striving to show how food and lifestyle changes could boost Mexicans' health

April 28, 2021 – Alan Espinosa first realized the connection between diet and health as a teenager, when his family moved from his native Mexico City to the city of Mérida on the Yucatan Peninsula. "I encountered a very diverse culture of food," he said about the city, a melting pot of Mayan and Spanish influence. Many residents, however, relied on a diet high in fatty corn oil, sugar, starch, and processed foods, and lived sedentary lifestyles. "There was a high prevalence of noncommunicable diseases, such as obesity, type 2 diabetes, and hypertension," he said.

The lesson was driven home when Espinosa attended high school in Belgium, where the population ate a healthier Mediterranean-like diet, cooked most of their food at home, and walked and biked everywhere. "Obesity was much less prevalent, and people were living longer and healthier lives," he said.

Seeing the stark contrast in health and lifestyle between the different populations inspired Espinosa to study how what he called the "Mexican diet" could create such dramatic differences. At Harvard T.H. Chan School of Public Health, Espinosa is concentrating in nutritional epidemiology, pursuing research into how food and lifestyle changes might improve health outcomes in Mexico.

Over the past few years in Mexico, as an undergraduate studying nutrition at the Marista University of Mérida, Espinosa has published research on the health impacts of using non-nutritional sweeteners instead of sugar; examined the impact of diet on

….erectile dysfunction; studied the prevalence of diabetes among Mayan populations; and analyzed the diets of Mexican vegans. He is now continuing his work at Harvard Chan School, hoping to develop recommendations to improve health both in Mexico and beyond. “Knowing my work is being read and helping people enhance public health nutrition around the world is a fantastic feeling,” he says. “I’m looking forward to continuing on this path and hopefully having an impact on people facing nutritional challenges through their diets.”

A perfect storm

While an undergraduate, Espinosa worked with faculty mentors in Mexico to research the relationship between the Mexican diet and prevalence of chronic disease. While more common in some parts of the country than others, that diet has supplanted much of the native cuisine and, combined with an increasingly sedentary lifestyle and a genetic predisposition to obesity, “is a perfect storm to promote nutrition-related diseases,” he said.

He was first author on two studies published in 2019. In one, he found that even vegans in Mexico were less healthy than their counterparts in other countries, their bloodstreams full of unhealthy triglycerides from an over-reliance on carbohydrates and simple sugars from soft drinks and processed foods. Based on that research, he helped to create recommendations to improve health for Mexican vegans. They included supplementing the vegan diet with vitamin B12, reducing refined carbohydrates, and increasing the use of olive oil and other healthy vegetable oils. He and his colleagues presented the findings at several conferences, as well as in articles and book chapters. In the other study, he found that switching to a Mediterranean diet significantly improved erectile function in men, even without medication.

For his research on non-nutritive sweeteners (NNS), he helped conduct a comprehensive systematic review and meta-analysis of 20 randomized trials that looked at how NNS impacted weight gain compared with sugar, water, and placebos. While people often eat or drink food with NNS in order to lose weight, doctors and scientists have debated whether they might actually lead to weight *gain* by causing people to develop a taste for sweets and overindulge in sugar. In fact, the review by Espinosa and colleagues found that diets containing NNS were associated with a significantly lower body weight compared to diets containing sugar, especially among people who were not consciously restricting calories. The findings indicate that NNS could be a good alternative to sugar to maintain healthy weight—a fact that could be highlighted to patients by their health providers or included on food packaging, said Espinosa.

Beyond conducting research as an undergraduate, Espinosa also started a company. He partnered with two business-major friends to create a low-cost nutritional supplement aimed at helping combat deficiencies in vitamins and other nutrients related to poor diet, especially those related to anemia. The supplement, called Kiikter, is a vitamin-rich

gel that can be eaten directly from the container. Espinosa continues to collaborate in the company as co-CEO today, working to distribute the supplement through both commercial stores and government programs. “I don’t sleep that much,” he confessed.

Espinosa is aiming to continue his research on NNS at Harvard Chan School, working with Walter Willett, professor of epidemiology and nutrition, and using data from the long-running Nurses’ Health Study II, which Willett co-leads.

He plans to go on to earn his PhD and to implement a study in Mexico that’s modeled after the Nurses’ Health Studies—which rely on periodic questionnaires about food and lifestyle—in order to generate data to gauge the long-term effects of that country’s unique diet. “In order to assess the long-term effects of any dietary interventions at a population scale, it’s not feasible to conduct a randomized controlled trial, and instead, we rely on epidemiological studies to understand the relationship between diet and disease,” he said. “Coming to Harvard, and especially to this particular program, has provided me with the tools and training to implement and conduct high-quality core studies.”

Espinosa hopes that his research will continue to highlight dietary recommendations that could help people live longer, healthier lives. “I would love to combine clinical practice with research,” he said. “Promoting health by incorporating the best evidence available from well-designed studies is a unique vocation—that is my biggest passion and my true purpose.”

– Michael Blanding

photo: Kent Dayton

Closing

The world at large has many important lessons to learn. One of the major lessons for the world to learn is that we are custodians of this precious land.

We think we are major consumers. The Earth is reacting to our behavior. I said many times before. We would be sued in court by our father for our neglect.

Somehow we must combine technology and the precious understanding that we are custodians of this land.

We must all be aware that there is a thread of love tying us all together.

There is only one Earth and we must make this place a beacon to the universe.

Our current state is in chaos. Yet we continue to go on texting on the freeway of life and being oblivious to all the damage we are doing to this sacred planet.

I hope you got something out of this book.

Unfortunately most people really don't care one way or the other.

That's the sad part of the story.