Moving Toward a More Perennial Agriculture

by Jenifer Morrissey

We're certainly not suggesting that agriculture should be only perennial, but it's essential that we move towards more of a perennial balance. – *Liz Carlisle*[1]

I was surprised at myself this winter. We went off the ranch several times to other places in our region to help my neighbor shop for bulls. On those trips, I found myself exclaiming whenever I saw a pond or stream or lake. Since I've never lived through drought before, I thought that five years into drought I would stop seeing and feeling new things. I was wrong.

I had seen, and somewhat expected, seasonal streams to quit running and seasonal ponds to no longer fill. There were, though, two ponds that "had always" had water and continued to have water in them. This winter, though, they too dried up. Since

The first flowers of spring always bring joy. This year they also brought a sense of astonishment that they had survived our droughty winter. They weren't as numerous or vibrant, but they had survived. I am awed by the resilience of perennials.

Food-producing perennial canes such as blackberries are common features of a permaculture design, often planted within easy access to the family residence so all members of the family can participate in harvest.

Photo courtesy Matt Hundley

January, we have already had too many days of fire weather watches, and there have been fires all around us before Easter. I guess it's no surprise I was elated at seeing water in other places.

As winter has moved into spring, I have been elated by different sightings. Before losing those ponds, I had seen pine trees die up on the canyon top last summer. During the winter, I walked on increasingly crunchy pasture not from ice but from dryness. So this spring, I have marveled to see the first wildflowers and the first bits of green grass. How resilient they are to still have the resources to come alive again! I can't fathom taking a chance on putting seeds in the ground when precipitation is so scarce and our water resources are stressed. Thank goodness for the perennials that endure.

Liz Carlisle is co-editor with Aubrey Streit Krug of the new book *Living Roots*: The Promise of Perennial Foods.[2] Published in March 2026, the book collects the stories of contributors about their work with perennial food crops. Carlisle says, "If you want to have fruit at some point, you've got to plant that tree and take care of it. That's what impresses me most about the folks in this book — their ability to engage in deep, long-term processes."

Perennial systems can be designed that can produce prodigious amounts of food and other resources for human beings. Fruit trees and nut trees, trees with edible leaves, fruiting shrubs, perennial vegetables, herbs and spices, edible flowers, seeds, roots and tubers ... there are numerous yield-producing plants that can be included, depending on the climate and local conditions, within a perennial planting scheme.

– Elizabeth Waddington[3]

Elizabeth Waddington is a permaculture designer in Scotland. Perennial plantings are a central feature of permaculture design. Waddington continues, "Fruit and nut trees and berry bushes are of course very familiar perennial food sources for most. But other non-woody perennial food sources are often much less well known. Many people will also be familiar with perennial herbs that can be grown for culinary or medicinal use, or for other uses. And most will also be familiar with perennials like strawberries and rhubarb, and perennial vegetables like asparagus and artichokes, perhaps. But there is a huge list of perennial herbs, vegetables and edible flowers that might be considered for inclusion in permaculture planting schemes. Embracing perennial edibles native to or suitable for growth in your area is a wonderful way to grow your own in a lower-maintenance and more sustainable way."

Matt Hundley is a permaculture designer in Oregon. Hundley says, "Permaculture is a set of principles that help to guide a farmer towards regenerative decision-making on their land. By faithfully learning to apply permaculture principles, my soil grows with me. As I learn my land and the economy of my farm a little more every day, I can better apply these principles to rethink how I grow, with techniques like mob grazing, livestock integration, chicken composting systems, integrated annual and perennial cropping, agroforestry, cover cropping, companion planting, swaling, building diverse low-tech water catchment systems, etc."

Why might permaculture designers, like Waddington and Hundley, and Carlisle of the book *Living Roots* feel we need more perennial crops? Reviewing the six principles of soil health can give us some insight. As you may remember, those principles are: keep living roots in the soil as much of the year as possible, keep the ground covered, minimize disturbance of the soil, utilize diversity above and below ground, integrate livestock, and remember that every place is unique.

Perennial plants are generally considered those that live for at least two years, growing from the same root system each year. Obviously, then, perennial crops help out with the first principle of soil health about keeping living roots in the ground for as much of the year as possible. Living roots are crucial to nurturing the microbiome of the soil. Carlisle and Streit Krug say in their book's introduction, "Perennials stay in place for decades — and sometimes centuries — precisely because their roots are so active .... Year after year, perennial plants allocate a quarter to a third of their solar harvest to their microbial mutualists, pulling carbon down out of the atmosphere and building up the terrestrial life support system commonly known as soil."

What I came to realize is that perennial grains are the amazing intersection of my deepest joys with some of the world's deepest needs. Here was a single change to agriculture that could enhance food production, improve farmer incomes through reduced expenses, and address environmental problems ranging from water pollution to climate change.

– Lee DeHaan in Living Roots

Kernza, a patented form of intermediate wheatgrass, at The Land Institute in Kansas. Kernza is a perennial with value as both food crop and forage.

Photo by Lee DeHaan and used via Creative Commons Attribution-Share Alike 3.0 United States license.

A prairie strip at Neil Smith Wildlife Refuge in Iowa. Prairie strips, a technique for reducing soil disturbance, are proven to mitigate nutrient and sediment runoff from crop and grazing systems. *USDA NRCS/SWCS photo by Lynn Betts.*

Lee DeHaan is a researcher at The Land Institute in Kansas and a contributor to the book *Living Roots*. DeHaan continues about the joy of his work with perennial grains: "... I have come to see another joy, working to improve the overall system of agriculture rather than focusing on individual problems. Often our solution to one problem makes another problem worse. For instance, many techniques to address environmental issues in farming result in reduced yields or reduced farmer incomes. Perennial grains are so compelling to me because they offer a means to improve the system as a whole."

I want something growing in the ground at all times, even if it's a weed.

– Matt Hundley

Hundley the permaculture designer continues about plants we often consider unwelcome: "Your average weed such as a dandelion is immediately sending about one third of the sunlight it converts into sugars and other root exudates straight into its roots where it is taken up by soil microbes that create that complex web of soil life we want. And when the rest of that plant dies when I'm ready to put in a crop, it breaks down and gives the rest of the accumulated carbon and other nutrients to the soil that will support my crop."

Over the course of the past century, agriculture and trees have had an uneasy relationship with each other. As tree cover has been removed around the world to make way for row crops and plantations,

catastrophic emissions and loss of wildlife habitat have followed.

– Carlisle and Streit Krug in Living Roots

Keeping the ground covered, the second principle of soil health, is often accomplished with annual cover crops or mulch. However, perennials can also have a role. The article "Silvopasture: Revisiting Trees and Grazing" in the December 2022 issue of this magazine discussed the integration of trees and grazing as one example of perennials being used to keep the ground covered.

The Forest section of the book *Living Roots* includes chapters about other types of agroforestry based on poultry, fruit, nuts and medicinal plants. In their introduction to the section, Carlisle and Streit Krug continue, "The climate case for agroforestry is a powerful one. A global synthesis of research on the subject found that soil organic carbon increased 40% in the top foot of soil when land transitioned from annual agriculture to agroforestry." As we have learned in past articles, soils with higher soil organic carbon are valuable because they tend to be more resilient in times of stress and are more productive.

Hundley says, "One of the permaculture principles is, 'Catch and store energy.' " This means that you try not to let a drop of sunlight, water, or organic matter escape your land. This means I'm not leaving bare soil, because that means I'm losing all three of those things. So, that one permaculture principle caused me to make a decision to leave my soil in a cover crop until the last possible second, causing it to have little 'solar panels' pumping nutrients and organic matter into my soil. That principle also helped me avoid compaction of my soil – and the resulting water and nutrient loss – by keeping roots in the ground. And it kept more pollinators and beneficial predatory insects alive, balancing out the entire system so my pests are better managed. Now I don't need pesticides and don't have to suffer from those negative effects to my soil."

Many of the chapters in *Living Roots* discuss alternatives to the monocultures of North American agriculture, crops that are often heavily dependent on tillage. Minimizing soil disturbance such as tillage is the third principle of soil health. Putting some of the Great Plains back into prairie or perennial strips is a strategy that is showing benefit for soil, water and farmers. Carlisle and Streit Krug write, "One study in Iowa analyzed the impact of perennial strips on mitigating nutrient runoff and found that crop fields without strips lost eight times more nitrogen and 35 times more sediment. Another study assessed grassland buffers at the edge of a grazing system in Missouri, which reduced nitrogen loss by 68% relative to grazed land without a buffer." The benefits of intact soil with high organic matter, biological activity and perennial roots are measurable.

When you have external disturbances – like, for example, tillage or chemical triggers – you will clearly see negative feedback: degraded soil structure, plants more prone to diseases, decrease in yield [if you don't have chemical inputs]. All of these are feedback from the system telling you "I don't like what's going on. Change or I'm done."

– Dr. Carla Portugal[4]

Another principle of permaculture involves accepting feedback. Dr. Carla Portugal of the Soil Food Web Foundation continues, "So instead [of external disturbance], you boost up the system with healthy procedures like bringing back soil biology, letting the biology restructure the soil, work with cover crops to avoid any uncovered areas. The system will repay you with beautiful plants, a healthy system, the yield in time you're even going to surpass the traditional treatment. So, give the system time."

I sometimes find myself apologizing or making a disclaimer to visitors who come expecting a farm with a white picket fence and turf like pastures. To most folks, our farm just looks like a jumble of grass and trees until you look and listen closer.

- Wendy Johnson in Living Roots

The fourth principle of soil health is to utilize diversity above and below ground. Wendy Johnson, a contributor to the book *Living Roots*, has slowly been converting her family's farm in Iowa to have more diversity, including perennials. She says, "Perennials give me so much hope, because I know they will continue on. If we plant them, it feels like pieces of ourselves are within them, as

if we will continue on too … . We can't return to the climate of the past, and there's no guarantee we'll succeed at stopping the worst impacts of the present climate crisis. But at least we'll know that we believed in something that will return year after year after year, that will provide food and help clean water for many. And that is all we may need to feel at peace."

Another contributor to the book *Living Roots*, Valentin Picasso, points out: "Natural ecosystems have two important features: diversity and perenniality. They foster many different plant species that regrow every year. A truly sustainable agriculture, one that regenerates itself, must mimic the natural ecosystem in those two aspects." Perennial agriculture, then, can be a more natural and sustainable choice.

Permaculture emphasizes diversity. *– Dr. Carla Portugal*

Permaculture has numerous meanings, one of which is permanent agriculture. Perennials and a well-designed and diverse plant community are crucial for that permanence. Dr. Portugal says, "Diversity reduces vulnerability and maximizes resources. You need to reduce the vulnerability points in your system to keep the system resilient."

Permaculture designer Waddington points out that a resilient permanent system depends on layered perennial plantings. Those plantings are also "easier to maintain because all the elements

As in any regenerative system, livestock also have an important role to play in perennial agriculture.

Photo courtesy Matt Hundley

are carefully chosen to aid one another and to contribute to the ecological function of the system as a whole." Permaculture as a design system can help us move toward a more resilient, perennial future.

Before the last 70 years of fossil fuel-driven mechanization, draft animals were essential partners of agriculturalists for millennia. Today, work again may be one of the most important roles that cattle can and should play in American agriculture – the work of restoring the ecological benefits of perennial grassland to our agroecosystems. – *Laura Paine in Living Roots*

The fifth principle of soil health is to integrate livestock. Grasslands and grazing are the focus of the middle section of the book *Living Roots*. We have learned before in numerous articles in this magazine about the benefits of integrating livestock into crop production. Paine confirms the same in her contribution to the book Living Roots by sharing the results of the Wisconsin Integrated Cropping Systems Trial. "It is a University of Wisconsin-Madison research project that has compared the performance of six cropping systems over more than three decades. All the annual cropping systems, including those using no-till and cover crops, have steadily lost soil carbon since the beginning. The forage-based rotations that include two to three years of alfalfa have also lost soil carbon. Only the rotationally grazed cool-season pastures and the restored prairie treatments have gained carbon in the top 12 inches."

Valentin Picasso summarizes the benefits of grazing grasslands in his contribution to Living Roots: "Optimal grazing management can preserve grassland diversity while increasing meat productivity in these agroecosystems ... . Overall, we found that optimally managed beef production based on native grasslands is more sustainable than grain-based feed lot systems." Diverse perennial grasslands can be both productive and sustainable.

A permaculture garden that includes livestock is more diverse and resilient. The interactions between plants and animals create a balanced ecosystem that can better withstand pests, diseases, and extreme weather conditions. – *Brandy Hall*[5]

Brandy Hall is a permaculture designer in Georgia. She continues about integrating livestock: "By carefully selecting the right animals and designing your garden with their needs in mind, you can enjoy the many benefits that livestock bring to a permaculture system. You'll find that these animals will teach you so much about your landscape and will, no doubt, bring joy to your lives." In permaculture, worms are considered a type of livestock that can be integrated. "Composting worms can be considered the ultimate suburban animal. They're quiet, cheap, loyal and useful. They don't need walking, grooming or vets. As a permaculture animal, they excel. They survive entirely on leftovers and waste, and their voracious appetites can reduce landfill contributions by up to half while giving you rich castings and liquid fertilizer."[6]

There is really no way to know [emphasis in the original] what will be useful. – *Omar Tesdal in Living Roots*

The last principle of soil health is often called context. It is the idea that every place is unique, so what works in one place for soil health may be different than what works somewhere else. As Omar Tesdal suggests in the book Living Roots, we often have to make an educated guess about what to try and then see how it works out. There is no way to know in advance whether it will be successful or not.

Paige Stanley gives an example in Living Roots about context and grazing. "What I've come to realize is that regenerative grazing is not a one-size-fits-all solution. Instead, it's a dynamic, context-dependent process shaped by the land, the people, and their goals ... . When we get it right, grazing strikes a delicate balance of ecological give and take, much like the wild herbivores who once called these rangelands home."

Matt Hundley talks about context from a personal and permaculture perspective: "I understand why farmers are hesitant to look to permaculture when they are used to hairline margins, huge equipment payments, and heavy debt loads. Too rapid of an adjustment could result in the loss of a farm if revenue slows even a little. But one of the other permaculture principles is 'Use slow and small solutions.' I'm still not perfectly executing every principle. I have to feed my family and pay my bills,

so the incorporation of permaculture is by necessity a gradual but steady process on my farm. Every day, a farmer can make another small decision that looks to the long-term health of their soil and the long-term value that their land can produce."

Farmers are not just passive recipients of agricultural innovation — they are partners in shaping the future of our food systems. *– Pheonah Nabukalu in Living Roots*

A theme throughout the book *Living Roots* is the integral role that farmers — and by extension gardeners, ranchers and all of us who contribute to the growing of food — have in creating a more resilient agriculture. Contributor Jesse Smith says, for instance, "Our aim is to catalyze a wider transformation in our society that uses agriculture as a forum for engagement, a place for connection, and an arena to find a shared language … . We all eat; it's the great connector." Another contributor calls farmers the keystone species of our landscapes. "Rather than taking land out of agriculture in order to restore its ecological health, we need to restore ecology via agriculture … . we need restoration across the larger landscapes that farmers steward." We all need to be more connected to who is growing our food, how it is being grown and where it comes from.

Matt Hundley continues in the same vein: "America's wealth, security, population, industry and infrastructure were all built by one thing: topsoil. And all of those things are declining as we lose soil organic matter and life. If we want to stop losing farms and our nation, we're going to have to stop losing soil life. And for the farmer, that's going to mean a lifelong dedication to slow and steady changes that will leave their land measurably more alive and thus more profitable than when they first began to steward it."

We convey a message to the world that anyone can do this. Anyone can be a part of making the world a better place. *– Graham Bell*[7]

Graham Bell was one of the elders of the permaculture community until his death in 2023. The word permaculture is used by three contributors in Living Roots who say it influenced their thinking. Bell wrote, "It teaches you how to look at things and assess opportunities."[8]

An adult male bobolink. The bobolink relies on perennial diverse prairies on multiple continents.

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When you build a homestead around permaculture, soil health happens. *– Matt Hundley*

Hundley was previously in Tennessee where he and his wife crafted a business around "designing productive, sustainable yards and homesteads across the state, with a focus on edible landscapes, soil health, and long-term resilience." Matt says, "Our mission is to empower individuals and families to maximize the practical value of their properties with passive gardens, permaculture food forests, livestock-integrated systems and agroforestry. Our design philosophy is simple: how can we help you get the most out of your land with less effort and, simultaneously, make your piece of the planet better than you found it."

In addition to helping clients, Matt and his wife have proven their mission on four of their own properties in Tennessee, three of which they have since turned over to new stewards. "We have

made examples of how mistreated properties can be turned into economically and environmentally sustainable farms for either commercial or subsistence purposes."

We're relearning what we knew hundreds of years ago. If I build soil life, food will be more nutritious.

– Matt Hundley

Matt says many of his clients have pursued self-sufficiency and homesteading because of health issues. "Their research has shown them that processed food is bad for them, and grocery store food is nutrient deficient. When you start to taste the difference in a homegrown sun-ripened tomato, when you start to see the difference in a farm-fresh egg, people realize they are seeing and tasting the difference in nutrient density." Matt has kindly offered to share more about his work with permaculture in an upcoming issue.

One of the most profound ways societies interact with the environment is through agriculture.

– Colin Cureton in Living Roots

Colin Cureton is one of the contributors to the book Living Roots. His work is with perennial food crops, including helping to scale them to meet market demand. When he attends events where he's promoting perennials, he says, "I watch people have the same realization of deep, dense roots, what they can do for soil and all the life that depends on it. And our collective effort to bring a perennial vision to life continues."

Another contributor, Keefe Keeley, similarly works to make perennial farming a reality, at both large farm and neighborhood scale. He says, "These efforts are rooted in a vision of diversity and abundance, where farms provide more than commodity production and contribute to all that we depend on: clean water, biological diversity, a stable climate, healthy soil, buffers against floods. Many of us also look to farms as pillars of vibrant agrarian communities as we search within our neighborhoods for pathways to a more just and prosperous world."

Sometimes the benefits of perennial crops are shared in ways we don't expect. Contributor to the book Living Roots Valentin Picasso tells the story of the bobolink, a bird that connects his current work with perennial research plots in Wisconsin with the home of his youth in Uruguay. "The bobolink is a familiar friend from the Campos. Like me, it's journeyed here from South America, where it spends the winter. In recent decades, bobolink populations have declined sharply, as intensive agriculture has encroached on their habitat. So, seeing one here [in Wisconsin] always makes me smile. Perhaps this bird, so content in our perennial research plots on a summer day, might have spent the previous January in one of those vast plains I roamed as a child, the national treasures I worked so hard to conserve in my early faculty days in Uruguay. In human terms, these two places are often considered wholly separate. A grassland in Uruguay. An agricultural field in Wisconsin. But in bobolink terms, they are two points along what might one day again be a great grassland corridor, bustling with life."

Jenifer Morrissey writes from the Southern Black Hills of South Dakota where she admires the resilience and promise of perennials.

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