

HOW TO SAVE 50% ON YOUR FOOD BILLS



TAKE THE  
EARTH DAY  
CHALLENGE!  
— PAGE 8 —

# MOTHER EARTH NEWS

THE ORIGINAL GUIDE TO LIVING WISELY  
APRIL/MAY 2014

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PESTS, WEEDS, DROUGHT & MORE

## GUIDE TO URBAN HOMESTEADING

Sustainable City Living

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Underground Food Storage

PLUS:

- Craft Simple, Fresh Cheeses, P. 18
- Passive Solar vs. Passive House, P. 77
- Why Your Garden Soil pH Matters, P. 66
- How to Grow Dry Beans and Peas, P. 24

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A smiling woman with dark hair and a colorful headband is holding a large bunch of fresh, bright orange carrots. She is wearing a blue top. The background is softly blurred, showing what appears to be a market or farm stand setting.

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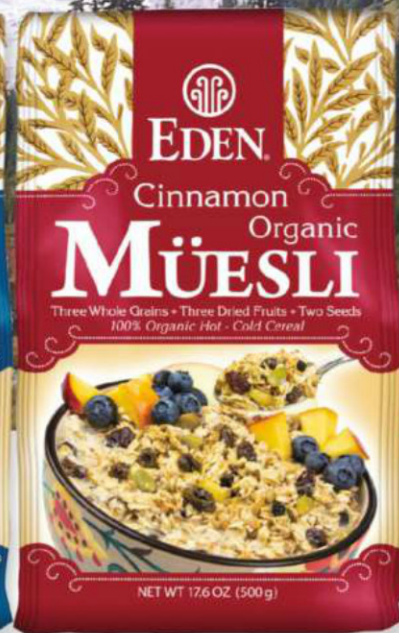
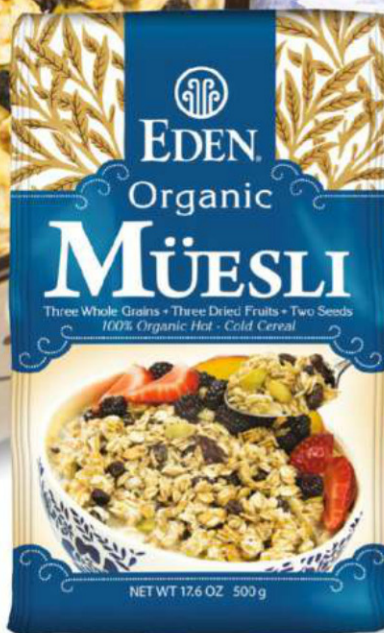
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TERRY WILD; COVER: SAXON HOLT



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LINCOLN JOURNAL STAR; RIGHT: JASON HOUSTON



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FLICKR/BEN SCHUMIN



TIM NAUMAN



KEITH WARD



LAURA HUSAR GARCIA; BELOW: RICK PHARAOH PHOTOGRAPHY



MORE THAN A MAGAZINE ... A WAY OF LIFE

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### EarthWords

Roy Rolfe Gilson

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Circle #53; see card pg 97





# Grow Your Garden Skills

Seeds sown are just the start of the adventure! Let our Garden Know-How series be your trusty companion all season long as you navigate the parade of post-planting endeavors necessary to cultivating healthy, tremendous-tasting food. In this online guide, browsable by topic, you'll find comprehensive, authoritative information on watering, weeding, mulching, crop rotation, season extension and dozens of other tasks, all with an eye toward sustainability and efficiency. Explore the ins and outs of new skills and strategies, including making your own fertilizers and coaching climbing crops into vertical spaces. Glean gardener-to-gardener, tried-and-true tips for troubleshooting peak-season challenges, such as relentless heat, pernicious plant diseases and even keeping up with overabundant harvests. You'll also learn how to enlist the services of other inhabitants of the natural world to benefit your garden: Attract native bees for improved pollination, and bring in chickens for organic pest control and free, nitrogen-rich fertilizer. Access this one-of-a-kind trove of practical gardening advice at [www.MotherEarthNews.com/Garden-Know-How](http://www.MotherEarthNews.com/Garden-Know-How).



## EXCLUSIVE ONLINE ARTICLES

### [A Tour of Heirloom Tomatoes](#)

No garden is complete without tomatoes, and among this beloved crop's innumerable varieties, many heirlooms stand stem and vine above the rest in both flavor and beauty. Discover the unique heritage and prized characteristics of 20 heirloom tomatoes, plus how to grow these old-time fruits in your home patch and use them to their full potential in your cooking. Go to <http://goo.gl/HTDxQk>.

### [Maple Syrup, From Tree to Table](#)

Few North American food traditions are as treasured as maple sugaring, few tastes as sweet as home-processed maple syrup. Tap this tutorial to master the maple-makin' process—from securing the sap to boiling it into matchless syrup—and snag our collection of maple-imbued recipes for optimally savoring your finished product. Maple fudge, anyone? Go to <http://goo.gl/c9Hxkr>.

### [Make Dyes Via Nature's Palette](#)

Color your textile projects dazzling (and chemical-free) using natural, plant-based dyes extracted from your homegrown stock. This guide details how to plan a pigment-producing plot and then harness the hues within flowers, fruits, leaves and roots of vibrant crops such as marigolds, blackberries and rhubarb. Go to <http://goo.gl/YMxmkm>.

### [Joel Salatin on Healing the Earth](#)

Self-dubbed "lunatic farmer" Joel Salatin describes how sustainable living and more conscientious agricultural practices can mend and revive a planet pushed near the brink. Read commentary from Joel and many of the other speakers you can catch at this year's MOTHER EARTH NEWS FAIRS by following our FAIR Blog at <http://goo.gl/WeNHcy>.



## EASY WAYS TO LIVE ON LESS

MOTHER EARTH NEWS readers have long been a creative, resourceful and frugal lot, and we recently asked our Facebook community to share their best tips and tactics for everyday economizing—be it repurposing, using less, doing more themselves, or just good old-fashioned thriftiness.



We turn our **old clothes and sheets** into rags. We haven't bought paper towels in years. —Allison Moon

Prepare meals with **dried beans**. There's hardly a cheaper way to eat. Meat is a luxury in our house. —Teresa Hicks

When waiting on water from the faucet to warm up, catch all of the **cold water** and use it for watering your garden and houseplants, filling up pets' bowls, and more. —Emily Kelley

Invest in multipurpose goods. I use **vinegar** as a household cleaner, hair rinse and fabric softener, and **baking soda** as deodorant, shampoo and toothpaste. —Tammy Apitzsch

Learn how to **make bread**. You'll save money, and you can include only the healthful ingredients you want to eat. —Lisa Stich





## MEET OUR GARDENING BLOGGERS

Our Organic Gardening Blog is abloom with advice and anecdotes from notable growers around North America. Get to know two bloggers below, and follow the latest from all of our contributors at [www.MotherEarthNews.com/Organic-Gardening-Blog](http://www.MotherEarthNews.com/Organic-Gardening-Blog).

**Who:** Andrea Cross

**Where:** Keremeos, British Columbia

**What:** A garlic grower by trade, Andrea digs into the details of cultivating and preserving these mighty bulbs, as well as how to play up their delectable pungency in your culinary pursuits. Read Andrea's posts at <http://goo.gl/D3f6Hh>.



**MOTHER:** Garlic is famous for its terrifically transformative flavor, but you grow many less common, distinct-tasting varieties. Which top your list?

**Andrea:** Spicy, creamy 'Georgian Fire' and 'Yugoslavian' are unbeatable in marinara and other sauces—but their heightened kick definitely isn't for the garlic-shy! 'Music' is my favorite for roasting. Its large cloves turn incredibly rich and buttery—delicious on crusty bread along with a soft cheese, such as Brie.

**MOTHER:** Given the right conditions, garlic is a superb storage crop. What are your tips for successful stowing?

**Andrea:** While the most important factors are proper air circulation, humidity and temperature, softneck garlic varieties tend to be the best for storage thanks to their several layers of tight, protective skins. Hardnecks have only one layer. Because they lack the woody central stem of hardneck garlic, softnecks are also the best varieties to braid, and braided garlic can keep up to nine months.

## WATCH + LEARN

Most self-sufficiency skills are far easier to pick up if you can see the steps in action, and we're at your service with our new Wiser Living Video Collection, which brings our editors and other experts to your screen to demonstrate many of the projects and concepts covered in the pages of the magazine.



View videos that guide you through raising backyard chickens, making seed-starting pots, testing seeds for viability, preparing nutritious meals using a pressure cooker, and more. We've even tossed in footage of cute heritage breed animals, just for good measure. Want to learn more? Don't miss our new Wiser Living DVD, which features extended workshops on everything from whipping up healing salves and tinctures to turning out perfect loaves of homemade bread. Find it all at [www.MotherEarthNews.com/Videos](http://www.MotherEarthNews.com/Videos).

**Who:** Melodie Metje

**Where:** West Chester, Ohio

**What:** Limited space? Less-than-stellar soil? Lots of shade? Grow on! Melodie writes of ideas and how-to for creating a bountiful, diverse garden via containers and other small-space gardening tactics. Read Melodie's posts at <http://goo.gl/xck53K>.

**MOTHER:** What are the biggest differences between growing in the ground and growing in containers?

**Melodie:** Small-space growers should be mindful to select varieties described as "bush," "compact," "dwarf" or "patio." Some bush tomato plants don't reach more than 2 feet tall, but they still produce hearty, full-sized fruits. To maximize returns from a petite garden, opt for varieties with a shorter number of "days to harvest." Plants in containers are more responsive to temperature changes—but you can use this to your advantage! In spring, the soil in pots will warm up more quickly than that in an in-ground garden, giving you a jump-start on the season. You'll also have the perk of being able to relocate crops to the most favorable conditions—full sun, a shadier spot—and tailor container-confined soil to be each fruit or vegetable's ideal growing medium.



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# Take the Earth Day Challenge

Every day, we hear from you about how MOTHER EARTH NEWS has helped you change your life. Now, we'd like to help you assist your friends in changing theirs. Some of you write about planting your very first garden. Some report on raising your first flock of chickens or hive of bees. Many of you describe how you've found new common ground with your neighbors as you share skills and work on projects together. You tell us how excited you are to have discovered MOTHER EARTH NEWS—and you tell us you feel empowered and happier as your lives become more sustainable and self-reliant.

We share your lifestyle and we know the joy it brings. Wouldn't it be rewarding to share some of that joy with people you care about? To celebrate this Earth Day, we're challenging you to help us change the world by giving a MOTHER EARTH NEWS subscription to a friend or family member so they, too, can experience the satisfaction of taking positive steps toward a more sustainable, rewarding life. And by doing so, you also double the positive impact these actions have on our great planet.

If each one of you takes the challenge, think of the goodwill we will spread! Together, we can help thousands more people savor the benefits of wiser lifestyles. The MOTHER EARTH NEWS community

has the power to help our society take a huge leap forward this Earth Day.

To make it easy, we've enclosed an order form and self-addressed, postage-paid envelope on Page 33.

MOTHER EARTH NEWS is a community of like-minded, conscientious folks who choose to build more sustainable, satisfying and secure lives. Much of the advice and many of the tips we share in the magazine come from you, our readers. With every new subscriber you recruit, you're making the magazine better for all of us.

Earth Day and MOTHER EARTH NEWS were founded in the same year, 1970. We share similar goals: bringing together people of diverse backgrounds around crucial issues that affect us all, and coming up with practical, personal actions that address those challenges.

Giving MOTHER EARTH NEWS is a very easy way to make a very big difference—in the lives of the people with whom you share this magazine, in the vitality of our communities, and in the future of the planet.

Are you up to the challenge? Do you know someone whose life you'd like to enrich? Go to Page 33 and do your part to change the world.

—MOTHER



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EDITORS' PICK

## Pickin' Heritage Chicken

Seeing the cross section of breeds featured in your story about heritage chickens (“Heritage Backyard Chickens,” February/March 2014) was terrific! I was amazed to realize that, at one time or another, I’ve owned practically every fowl profiled in the article. Raising poultry can become addictive, and it’s an addiction that is practical and so satisfying and fun.

I’d like to add, though, that some of the breeds highlighted, while being great-looking novelty breeds, are just that—a novelty. Campines, Dorkings, Hamburgs, Minorcas and Polish aren’t traditionally raised for high egg production, and—if feed prices are a concern—these breeds may not be practical for homesteaders looking to cost-effectively maximize their supply of farm-fresh eggs.

*Carolyn Schuster  
Port Orchard, Washington*

*Ready to dive into the world of heritage poultry? Peruse more than 80 breeds to find the ideal birds for you with our Pickin’ Chicken app. Learn more at [www.MotherEarthNews.com/Apps](http://www.MotherEarthNews.com/Apps). —MOTHER*

## A Small Plot of Plenty

I recently reread Joel Salatin’s article about urban farming (“Supporting Farmers, Eating Local Food,” June/July 2012), and

the piece hit a great deal closer to home this time.

From 2008 to 2012, I was able to convert my third-acre urban lot in Boise, Idaho, into a prolific, food-producing landscape that provided

the majority of my food. Had I needed to, I could have completely stopped relying on the grocery store.

The transition was a slow process that included building a chicken coop, replac-

## ‘Disgusting,’ or a Welcome Dialogue?

### Balancing Both Sides

MOTHER EARTH NEWS readers march to the beat of a different drum and are free spirits who set out to reach goals that may not align with those of the general public. We’re a very diverse group of people, which makes for an interesting magazine. Most of us want the best life for ourselves and our families, and to make the world a better place.

Lisa Hymas’ article about choosing to have no children (“Making a Green Choice: Childfree Living,” February/March 2014) is one of those variances in viewpoints. Being in the great-grandmother stage of life, I could add a few more pages as to why one is crazy to have children. I could also write a long retort from the other side, about the rewards that come from having children.

I commend Hymas for addressing the overpopulation of the Earth, and for being candid. She makes it plain that she desires few constraints on her life in the financial, material and self-fulfillment areas.

*Susan Sanford  
Windsor, Missouri*

have to be assumed, correct? What are Hymas’ credentials, anyway? Should all of your readers take advice about children from a woman who has none?

I think this is about something far beyond sustainability or carbon footprints. I hate politics and don’t take sides politically, but it’s quite plain to me this article is an attack on the worldviews of people who want freedom from the very subject of Hymas’ article.

Thank you for giving me the opportunity to write to you and be heard.

*Lance Battenfield  
Dublin, Texas*

### The Adoption Alternative

I applaud the decision to publish “Making a Green Choice: Childfree Living.” This is a conversation that needs to be had more often, as the Earth’s population is spiraling to an unsustainable level.

I was disappointed, however, that the author didn’t mention the choice not to bear children doesn’t mean a person or couple must remain childless. Fostering and adoption are humanitarian and environmentally conscious vocations that support and nurture children already on this planet.

*Allison Post  
Farmington, Connecticut*

### MOTHER Without Child?

“Making a Green Choice: Childfree Living” caught me off guard and was incredibly offensive to my family and me. After all, the magazine is MOTHER EARTH NEWS. Children

ing the front lawn with a garden filled with perennial and annual vegetables, and growing fruit trees in pots on the driveway.

Part of my garage became a greenhouse, sheltering my crops from the area's cold, cold winters. The greenhouse produced year-round, but it was of course most valuable in winter, throughout which I harvested fresh carrots, celery, herbs, lettuce, peppers, tomatoes and more. The greenhouse was also a quiet place that insulated me from the work and worries of the outside world.

At the end of 2012, after a long struggle to keep my business afloat, I lost my home and business. Now, as a renter, I am struck every day by what was possible on just that little piece of land in Idaho.

I encourage you to continue to teach new and experienced gardeners the possibilities we have with even the smallest of spaces. I would have loved tending a large farm, but even without it, I was able to supply produce and eggs for myself, my extended family, my neighbors and even food

banks. Thank you, MOTHER EARTH NEWS, for reminding me how much I loved all of it, and that I can begin it again. And I will.

Bonnie Ingram  
Covington, Washington

## Gardening in the Burbs

I would love for MOTHER EARTH NEWS to address issues that suburbanites face with gardening—ordinances, homeowner restrictions, small spaces, close proximity to neighbors, and

(CONTINUED ON PAGE 90)

## 'Tasteless'

I became acquainted with MOTHER EARTH NEWS a little more than a year ago, and I had been very impressed with the magazine's content until the February/March 2014 issue. The article "Making a Green Choice: Childfree Living" was very tasteless and had no business in such a great, informative publication.

I totally respect the author's right to choose childfree living, but I disagree with her being allowed to promote her personal lifestyle in MOTHER EARTH NEWS.

Mark Herron  
Aiken, South Carolina

## 'Disgusting'

Shame on you, MOTHER, for running the anti-child article "Making a Green Choice: Childfree Living." No matter how carefully you green-coat it, it's still disgusting.

Josh Voorhees  
Amity, Oregon

## (Eco)Guilty by Association

I'm fine with people who choose to have children and those who choose not to. Everyone has their reasons, and no value judgment should be made either way.

But Hymas calling childfree living "a green choice" was a value-laden insult that, if not retracted by her, should have been retracted by your editors.

I feel guilty enough for not owning a wind turbine, hydropower and other green trappings. Please don't attach guilt to my decision to have children. Childlessness is a choice—not a better value.

Deac Manross  
Edinboro, Pennsylvania

## Time to Break the Silence

Thanks to Lisa Hymas for her article "Making a Green Choice: Childfree Living." My husband and I decided back in the '60s, early in our marriage, to do just that.

What's scary is the silence surrounding this issue. Experts assume our beleaguered planet's human burden *will* get worse, that arable land and wilderness *must* be lost to more development, that we *must* consume more fuel and other resources, and that we *will* extinguish other life-forms as we expand. Who will finally open a dialogue that challenges this head-in-the-sand attitude? Kudos to Hymas and MOTHER EARTH NEWS for giving us a small start.

Nancy Sefton  
Seattle, Washington

*Our thanks to everyone who sent in thoughtful responses—both for and against—to the article "Making a Green Choice: Childfree Living." We believe it's crucial to encourage a civil discussion on the topic of choosing to have or not to have children.—MOTHER*

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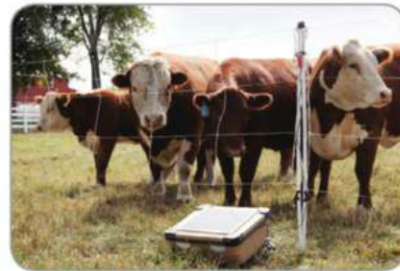
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Circle #55; see card pg 97



# 10 Organizations That Are Changing the World

As we celebrate Earth Day this April, we salute some of our favorite environmental nonprofit organizations protecting the health of people, wildlife and our planet.

**350.org** ([www.350.org](http://www.350.org)). An international campaign dedicated to fighting climate change, 350.org gets its name from the maximum level of atmospheric carbon dioxide—350 parts per million (ppm)—that climate scientists agree will maintain our planet's long-term ecological health. Now, the level is 400 ppm, and it's rising by 2 ppm each year. This group organizes in 188 countries and strives to revolutionize the climate movement.

**Cornucopia Institute** ([www.Cornucopia.org](http://www.Cornucopia.org)). This plucky nonprofit, headquartered in Cornucopia, Wis., supports sustainable agriculture and often challenges Big Ag and even the USDA—and wins. On Cornucopia's website, you'll find the latest updates regarding toxic pesticides, genetically modified foods and more, along with "score cards" that rate the sustainability of different food brands.

**Earth Policy Institute** ([www.Earth-Policy.org](http://www.Earth-Policy.org)). This group, founded by internationally renowned environmentalist Lester Brown and based in Washington, D.C., produces authoritative reports on global issues, as well as detailed roadmaps for how to solve interconnected environmental and social challenges. The Institute's thorough reports on climate, energy, population, agriculture, transportation and more are clear and compelling.

**Friends of the Earth** ([www.FOE.org](http://www.FOE.org)). Whether via exposing corruption in Keystone XL pipeline proposals or persuading thousands of grocery stores not to carry genetically modified salmon, this nonprofit is a hard-hitting voice pressing for change locally, on the global stage, and politically in the halls of Congress.

**Natural Resources Defense Council** ([www.NRDC.org](http://www.NRDC.org)). The NRDC uses law, science and the support of 1.4 million mem-

bers and online activists to protect wild places and foster a safe and healthy environment for people and wildlife alike. With a staff of more than 350 lawyers, the Council is one of the most powerful groups fighting to create a clean-energy future, protect endangered species and revive the world's oceans.

**Nature Conservancy** ([www.Nature.org](http://www.Nature.org)). Since its foundation in 1951, this global conservation group has safeguarded more than 115 million acres of land from development. The Conservancy works with landowners, communities and businesses to achieve conservation goals.

**Organic Seed Alliance** ([www.SeedAlliance.org](http://www.SeedAlliance.org)). The leading organic seed institution in the United States, this group conducts organic plant-breeding and seed-production research, educates farmers, and advocates for national policies that strengthen and protect organic seed systems.

**Pew Charitable Trusts** ([www.PewEnvironment.org](http://www.PewEnvironment.org)). The Environment Group branch of the Pew Charitable Trusts is a global organization that advises international policymakers on many crucial environmental issues, which it divides into three categories: ocean, land and energy.

**Sierra Club** ([www.SierraClub.org](http://www.SierraClub.org)). The Sierra Club, founded in 1892, has an impressive, storied history and is one of the

oldest and largest grass-roots environmental organizations in the United States. The group's website is a hub of opportunities to participate in all sorts of environmental campaigns, from rallying against fracking to opposing carbon pollution.

**Union of Concerned Scientists** ([www.UCSUSA.org](http://www.UCSUSA.org)). This alliance of more than 400,000 citizens and scientists uses scientific analysis—not political calculations or corporate hype—to push for responsible changes in government policy, corporate practices and consumer choices. This nonprofit's victories include helping establish higher fuel-efficiency requirements for vehicles and pass renewable-energy standards in many U.S. states.

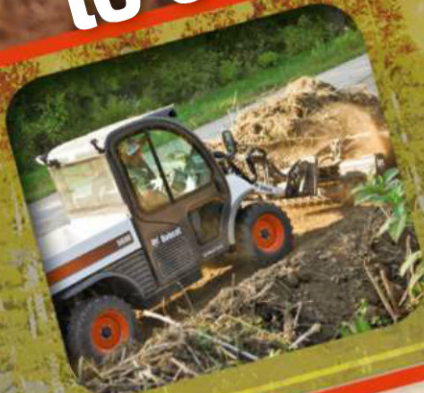
—Shelley Stonebrook



350.org and the Sierra Club organized the Forward on Climate rally—attended by an estimated 40,000 people—held in Washington, D.C., in February 2013.



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Circle #9; see card pg 97

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# Number of Female Farmers Triples

Grant Wood's iconic *American Gothic* painting portrays an austere farming couple, the man with pitchfork in hand as the woman gazes on. But as current trends in farm ownership reveal, we need a revised painting wherein the wife wields a wheel hoe. A 2013 report by the U.S. Department of Agriculture shows the percentage of farms and ranches where a woman fulfills the role of "principal operator" has nearly tripled over the past three decades—from 5 percent up to nearly 14 percent of all U.S. farms. In 1982, women-operated farms totaled 121,600; by 2007, that number had climbed to 306,200 farms. (Read the full report at <http://goo.gl/hV6DKX>.)

If you add in the women who are "secondary operators," the sum of female farmers reaches beyond 1 million. This growth



Farmer Beth Hoinacki owns and operates Goodfoot Farm in Corvallis, Ore.

has occurred as the tally of men leading agricultural operations declined by about 220,000.

For women interested in farming, an abundance of new resources are cropping up. Annie's Project (<http://goo.gl/bfxxZZ>) is a series of classes available in 34 U.S. states that teaches women about

farm management and product marketing, as well as provides a friendly, open space for questions (many women in agriculture tend to feel ostracized). Sustainable-farming advocate Temra Costa published a collection of stories profiling women in ranching and horticulture in her 2010 book *Farmer Jane* (see Page 81 to order). The accompanying website, [www.FarmerJane.org](http://www.FarmerJane.org), has additional resources for female farmers.

—Jennifer Kongs

# You Can Help Save the Monarchs

How can one not be enthralled by a fluttering flock of monarch butterflies landing in a hedgerow full of flowering milkweeds nestled on the edge of a farm or garden? But these butterflies' annual migration—one of the greatest spectacles in nature—has become an endangered phenomenon.

The number of monarchs reaching their overwintering grounds high in the oyamel fir forests of central Mexico has hit a record low. One of several factors that has contributed to the monarch's steep, decade-long population plummet is the loss of milkweeds—the monarch's host plant—as a result of herbicides used on fields of genetically modified crops. Some scientists suspect the largest contributor to the milkweed die-off is the herbicide glyphosate (the active ingredient in Monsanto's Roundup brand, among other products). This problem, along with drought and habitat lost to farmland, is a perfect storm of natural and human-caused

factors that has spurred the loss of many milkweed species, numerous monarch butterflies, and an estimated 130 other insects common to milkweed patches.

Milkweeds are the *only* host plants monarchs use. Without milkweeds, there are no monarchs—and throughout Midwestern

herbicides, or by employing minimal, targeted use of weedkillers.

Beginning with the 2014 spring equinox and continuing through National Pollinator Week in June, thousands of people will be participating in events to get Moving for Monarchs (M4M). The M4M initiative will also host an event at the National Mall in Washington, D.C., in June. Colleges and garden clubs will advocate for the recovery of monarchs and will also host workshops on how to grow milkweed. A valuable perk of monarch protection is that schoolchildren across North America will be able to continue to study and enjoy the stunning monarch migration.

You can join in: Grow native milkweeds in your garden (you can

collect the fluffy seeds from roadsides in fall), count caterpillars on milkweeds in or near your yard, record monarch migration dates, and turn your data into Monarch Watch at [www.MonarchWatch.org](http://www.MonarchWatch.org).

—Gary P. Nabhan



Monarchs are disappearing, as are milkweeds, their host plants.

farmscapes, milkweeds declined by 58 percent from 1999 to 2010.

Fortunately, some farmers and gardeners have found ways to manage weeds and pests—as well as maintain soil tilth and pollinator abundance—without using



# The Evolution of Earth Day

The idea of Earth Day began as a seed in U.S. Senator Gaylord Nelson's mind, firmly planted after he witnessed the destruction left by the 1969 oil spill in Santa Barbara, Calif. Nelson appointed environmental activist Denis Hayes as the day's first coordinator to bring the idea to fruition. Bold and bipartisan, Earth Day debuted on April 22, 1970, with 20 million participants taking to U.S. parks, streets and auditoriums to publicly push back against unsustainable practices and rally for environmental protection. The events brought together two key branches of environmentalism for the first time on such a large scale: conservationism and environmental health. According to Hayes, the first Earth Day was at least five times larger than any anti-war rally and 20 times larger than any civil rights rally that had come before it. It was a catalyst for the passing of the landmark Clean Air, Clean Water and Endangered Species acts.

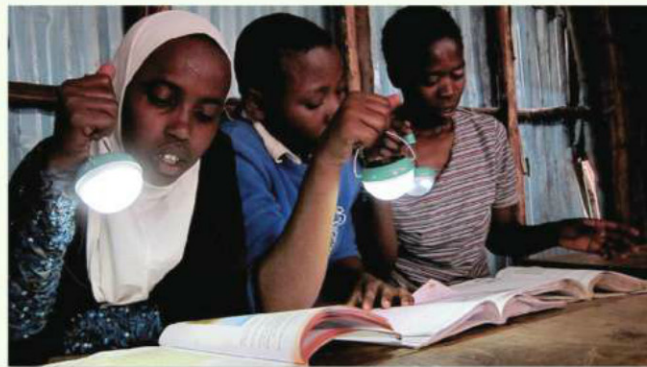
The Earth Day movement has since grown in scope and structure, and participation has gone global. Though its evolution has come under criticism—some argue the day is now a prime stage for corporate “greenwashing”—Earth Day has helped spread environmental awareness to all corners of the planet. In 1990, 200 million people in 141 countries participated in Earth Day events. In 2000, concerned citizens the world over came together in person and online to demand clean energy. And in 2010, the Washington, D.C.-based Earth Day Network led 225,000 people in a rally at the National Mall for Earth Day's 40th anniversary, aiming to re-establish the day as a launching pad for environmental engagement.

Current Earth Day activists face many of the same challenges and are pressing for many of the same changes as the very first Earth Day participants. Multigenerational environmental problems demand ongoing attention and innovative initiatives. Earth Day still encourages our global community to rise above political and regional differences to unite for a common cause. To learn more about Earth Day's history and find Earth Day events in your area, go to [www.EarthDay.org](http://www.EarthDay.org).

—Amanda Sorell



Thousands gathered in New York City on the first Earth Day in 1970.



Students in Kenya use Nokero solar lights to illuminate their homework.

## Brighter Lights

Globally, 1.3 billion people live without electricity. At night, they have to burn costly, dangerous, dirty fuels just to generate light. Enter Nokero. Its name a portmanteau word of “no kerosene,” Nokero manufactures solar products at prices that make them accessible to impoverished communities, and it works with nonprofits around the world to solve energy poverty. Its N180 Start is a simple light bulb with a built-in solar charger, and, at \$6, the Start quickly pays for itself. The N222 Huron solar light bulb offers up to 15 hours of light on one charge and has outlets to charge devices. Nokero also makes affordable solar-panel chargers and high-output bulbs designed with both recreation and emergency preparedness in mind. Go to [www.Nokero.com](http://www.Nokero.com).

—Thaddeus Christian

## Cleaner Cars

On the first Earth Day in 1970, cars on U.S. roads averaged just 13 miles per gallon. Thankfully, we leave that number further in the dust each time Congress enacts new fuel-efficiency standards. The 2012 Corporate Average Fuel Economy (CAFE) regulations dictate that cars and light trucks must operate at an average of 54.5 mpg by 2025. The mandate applies to all models sold by an automaker, although an automaker can offset its less-efficient machines with higher-mpg electric vehicles and hybrids. Thirteen major

automakers negotiated with the Environmental Protection Agency and the National Highway Traffic Safety Administration to produce these new standards. Vehicle prices will likely rise, but consumers should save trillions at the pump. Even better: Greenhouse gas emissions and foreign oil imports will decline as the industry meets CAFE goals.

—Rebecca Martin

## Greener Sports

Members of the Green Sports Alliance, an organization of more than 200 professional teams and venues committed to greening their facilities, vie each year to take home awards for top environmental improvements. Managers of basketball arenas, hockey rinks and baseball fields are competing to install solar panels, source ballpark franks from local farmers, and achieve a 100 percent recycling rate. The results have been impressive: The National Hockey League diverted more than 105 tons of food waste from landfills in 2011; Major League Baseball's San Francisco Giants won the 2013 Green Glove for achieving an 86 percent recycling rate; and the sustainability program for this year's Super Bowl champs, the Seattle Seahawks, installed solar panels on CenturyLink Field Event Center that meet 30 percent of the facility's energy needs. You can learn about what your No. 1 team is doing at [www.GreenSportsAlliance.org](http://www.GreenSportsAlliance.org).

—Kale Roberts



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Circle #43; see card pg 97



# Craft These Fresh EASY CHEESES

By Tabitha Alterman  
Photos by Tim Nauman



**L**earning to create fresh cheeses is an art that is far easier than aging cheeses—and you won't have to wait months (or years) to taste the results of your alchemy. Three versatile cheeses that you can create in your own kitchen are paneer, mascarpone and fromage blanc (called chèvre when made from goat's milk). You can save 20 to 70 cents per ounce by producing these cheeses yourself, even if you start with premium milk from grass-fed animals.

The elementary science of turning milk into any of these delightful cheeses is the same, so below are the main steps for concocting fresh cheeses in detail. Look at the next page for the recipe variations required to turn out each specific cheese.

**1 Heat the milk.** In a heavy-bottom, nonreactive pot, heat the milk over medium-low to the temperature directed in the recipe. Stir continuously to prevent scorching.

**2 Acidify the milk.** Milk separates into curds and whey when it is acidified. The warmer the milk, the less acidic it will need to be to separate. When the milk has reached the proper temperature, remove the milk from the heat and add the recipe's specified acid—lemon juice, citric acid, vinegar or tartaric acid—or bacterial culture that produces its own acid. Stir the acid into the milk a little at a time, pausing after each addition to check for curd separation. When the curds pull away from the side of the pot and the whey around them is mostly clear, you've added enough acid. If the recipe calls for a powdered bacterial culture, sprinkle it over the milk and leave the mixture alone for a minute before beginning to stir gently and continuously for a few minutes. Leave the pot alone for 10 to 20 minutes before draining.

**3 Drain the curds.** Line a colander with damp cheesecloth and set it over a large bowl or in the sink. Ladle curds into the cloaked colander to drain for 30 minutes. After the initial draining, you may salt the cheese by sprinkling salt over the curds and stirring to distribute.

If the directions say to hang the cheese to drain, tie the corners of the cheesecloth into a knot (or use a rubber band) and hang the cheese over the sink or a bowl to catch the whey. Drain until the cheese reaches the texture you prefer.

**4 Optional: Press the cheese.** Pull the cheesecloth ends together at the top, then twist and squeeze the cheese into a disk. Lay the flattened disk down and re-dress the cheese by layering the four corners of the cloth smoothly on top of the disk. (Keep the cheese completely encased in cloth.) Place the wrapped cheese on an upside-down plate that's atop a rimmed baking sheet (to catch the whey). Cover the cheese with another upside-down plate. Set something heavy, such as a cast-iron pan, on top of the top plate to press the cheese.





## Fromage Blanc

Creating fromage blanc or chèvre requires purchasing a direct-set culture (see “Cheesemaking Supplies,” below), and both cheeses will need about 2 days lead time before they will be ready to eat. If you use goat’s milk, you’ll have chèvre; cow’s milk will make fromage blanc. The texture of either ranges from creamy to crumbly; draining longer makes a more crumbly cheese. *Yield: about 1½ pounds.*

*1 gallon goat’s milk or cow’s milk*  
*1 packet direct-set fromage blanc or chèvre culture (or 1/4 tsp mesophilic culture plus 1 drop liquid rennet diluted in 1 tbsp cool water)*  
*1/4 tsp salt, or to taste (optional)*

- 1 Heat milk.** Bring milk to 86 degrees Fahrenheit. Remove from heat.
- 2 Acidify milk.** Add starter culture and stir. Let sit at room temperature for 12 to 24 hours, or until a uniform mass of curd has pulled away from the side of the pot and there is a clear layer of whey over the top.
- 3 Drain curds.** Let curds stand about 30 minutes, then sprinkle salt (if desired) over the surface and stir to distribute. Hang and drain the cheese for 6 to 12 hours at room temperature, or shape the cheese (see next step).
- 4 Optional: Shape cheese.** Spoon the curd into perforated cheese forms after it has drained in a colander for 30 minutes. Allow forms to drain on a rack set over a rimmed baking sheet for 6 to 12 hours. Shaped cheeses may then be rolled in spices or herbs before serving.
- 5 Store cheese.** Cover and refrigerate for 2 to 3 weeks. Because you added a bacterial culture, the cheese’s flavor will develop over the first few days of refrigerator aging. You can freeze the cheese for up to 6 months. If freezing, do not salt in step 3; rather, season the thawed cheese before serving.



## Mascarpone

Simple and requiring no cultures, mascarpone starts with cream rather than milk, and needs a full day’s or night’s draining to be ready to eat. Similar to cream cheese, mascarpone’s richness lends itself to sweet preparations, such as the Italian pick-me-up tiramisu. It’s also good in savory preparations and with fruit. The finished cheese can be soft and creamy or crumbly, depending on how long you let it drain. Tartaric acid is not the same as cream of tartar and the two are not interchangeable; tartaric acid is available from winemaking and brewing stores. *Yield: about 1 pound.*

*1 quart cream (light or heavy); see note below*  
*1/8 to 1/4 tsp tartaric acid dissolved in 1 tsp cool water (or use 1 to 2 tbsp lemon juice)*

- 1 Heat cream.** Bring cream to 195 degrees Fahrenheit. Remove cream from heat and stir for a couple of minutes to cool (to about 190 degrees).
- 2 Acidify milk.** Add the acid and stir. When curds have separated from mostly clear whey, leave the pot alone for 10 to 20 minutes.
- 3 Drain curds.** Drain about 12 hours or until the cheese reaches the desired texture and moisture level.
- 4 Store cheese.** Cover and refrigerate for up to a week.

**Note:** To make a quart of light cream (25 percent butterfat), combine 2 cups heavy (whipping) cream with 2 cups half-and-half.



## Paneer

Ready to eat in less than 2 hours, paneer is the quickest curd you can concoct. Mild-flavored paneer is typically added to highly seasoned Indian dishes, but it can shine in a multitude of recipes. It does not melt when heated. Don’t use colored vinegar unless you want colored cheese. *Yield: about 1¾ pounds.*

*1 gallon milk (cow’s milk is traditional)*  
*1/4 to 1/2 cup lemon juice or distilled white vinegar*  
*1/4 tsp salt, or to taste*

- 1 Heat milk.** Bring milk to 195 degrees Fahrenheit. (If you don’t have a thermometer, heat until it foams but before it boils.) Remove from heat and stir to cool for a couple of minutes (to about 190 degrees).
- 2 Acidify milk.** Add acid and stir. When curds have separated, leave the pot alone for 10 to 20 minutes.
- 3 Drain curds.** After draining 30 minutes, sprinkle salt over curds and stir. (Note: If you refrigerate the cheese at this point, you’ll have queso blanco—break out the taco shells!)
- 4 Press cheese.** Press between 2 upside-down plates. After an hour, check to see whether whey still runs out when you push the cheese with your fingertips. If so, press it longer. If not, get out your cheese knife!
- 5 Store cheese.** Cover and refrigerate for up to a week. The pressed cheese may also be frozen for up to 3 months.

## Cheesemaking Supplies

You’ll find cultures, cheesecloth, thermometers and other cheese-crafting necessities at the following mail-order companies.

**Dairy Connection:** [www.DairyConnection.com](http://www.DairyConnection.com)

**Glengarry Cheesemaking and Dairy Supply:** [www.GlengarryCheesemaking.on.ca](http://www.GlengarryCheesemaking.on.ca)

**New England Cheesemaking Supply:** [www.Cheesemaking.com](http://www.Cheesemaking.com)

**SaltWorks:** [www.SaltWorks.us](http://www.SaltWorks.us)

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# Roast Coffee at Home for an Amazing Cup

Try your hand at coffee roasting for the best cup of joe you've ever sipped.

When I went to work on a coffee farm in the Kona Coffee Belt of Hawaii's Big Island, I already knew how great freshly *ground* coffee could be. What I didn't know until I learned how to roast coffee on the farm was how much more interesting freshly *roasted* coffee could be.

Coffee tastes best 12 to 24 hours after the beans are roasted—numerous flavor compounds begin to dissipate just a few days after roasting. Your entry to roasting your own can be as low-tech (a cast-iron pot) or as sophisticated (roasting machines start at \$100) as you like.

## Judging the Java

Determining coffee doneness strictly by timing is difficult, because many factors, such as humidity, affect how long these stages take. As the beans roast, they transform from pale green to light brown to dark brown to almost black. The green coffee beans make the telltale popping sounds of the “first crack” that comes just before a light roast, as well as the “second crack” that comes near the dark-roast stage.

Some roasters have thermostats to set for each roast. Each stage of the roast has its own name: Cinnamon Roast (385 degrees Fahrenheit), New England Roast (401 degrees), American Roast (410 degrees, at the beginning of first crack), City Roast (426 degrees), Full City Roast (437 degrees, at the beginning of second crack), Vienna Roast (446 degrees), French Roast (464 degrees), Italian Roast (473 degrees) and Spanish



**Top, left to right:** Green coffee beans store indefinitely under proper conditions. Roasting options vary from air roasters to retrofitted popcorn poppers to cast-iron pans. **Bottom, left to right:** Cool the just-roasted beans by stirring them in a colander. Green beans start at pale gray-green and darken from cinnamon to dark brown.

Roast (482 degrees). Many coffee connoisseurs agree that varietal character is lost in roasts darker than City Roast.

As you become proficient in home coffee roasting, you'll trust your senses and learn when the roast you prefer is reached, smell the right aroma, hear the first crack and, depending on how dark you want the roast, the second crack. Best of all, roasting your own joe gives you a deliciously sippable end product.

## Roasting Requirements

**Heat:** To caramelize sugars and release flavorful oils, roast coffee beans at high temperatures. Beans can be roasted through convection (circulating hot air), conduc-

tion (touching a hot surface), radiation (being bathed in heat from a radiating source) or a combination of the three. To get an even roast, keep either the beans or the air around the beans moving.

**Cool:** When the roast reaches your intended point on the spectrum from light to dark, cool the beans quickly to stop the roast where you want it. Specialty roasting machines have a cooling setting. For a low-tech method, cool beans by stirring them continuously in a large colander.

**Vent:** You'll need to be able to vent the oily smoke produced by roasting coffee beans. The traditional and least complicated method is to roast outside. If confined to a kitchen, roast by a win-

dow, use a kitchen exhaust fan or buy a dedicated roaster. To cut down on smoke, roast smaller batches and, because coffee beans become oilier (and thus smokier) as they roast, keep roasts lighter.

## Find Green Coffee Beans

Contact small coffee estates or companies near you that advertise fresh-roasted brews to see whether they'll sell you some green coffee beans. Or, the websites [www.CoffeeBeanCorral.com](http://www.CoffeeBeanCorral.com), [www.CoffeeProject.com](http://www.CoffeeProject.com), [www.HomeRoasters.com](http://www.HomeRoasters.com) and [www.SweetMarias.com](http://www.SweetMarias.com) sell quality coffee beans from all over the world. Store green beans in a cool, dry spot. The more you buy at a time, the



more money you'll save compared with roasted beans.

## Popular Coffee-Roasting Methods

You can improvise a means of roasting coffee with simple equipment or buy a home coffee roaster. Slower roasts result in coffees that are low in acid and sweetness but are full-bodied. Faster roasts retain acidity, sweetness and flavor nuances but are lighter in body.

**Rapid roast.** Cooking beans in a cast-iron pan on your stovetop is the simplest form of conduction roasting (see box at right). You must stir the roasting beans constantly and cool them quickly, but judging the sound, color and aroma of the roast is straightforward with this method.

**Medium roast.** Both fluid-bed roasters (sometimes called air roasters) and popcorn poppers circulate hot air efficiently. Fluid-bed roasters have a required capacity (defined in the user manual or on the machine). Air popcorn poppers need to have a thermometer installed (or be retrofitted with one), and you should use the kind in which hot air enters the chamber from the side wall rather than from the bottom. (Don't expect popcorn poppers to have a very long life span, because they're not designed for this task.) Prices range from a \$30 modified Whirley Pop stovetop popper to the \$150 Nesco fluid-bed roaster.

**Slow roast.** The low-tech option here is to roast beans in a gas oven on a perforated baking sheet, such as those designed to turn out crisp pizzas (\$10 to \$30). Most ovens vent smoke effectively, but beware of hot spots. With some practice,

you can get a nice roast from the oven. Nesco also makes a slow-convection roaster (about \$200) with a superior smoke-capturing ability.

Perforated drum roasters rotate and cook beans through

convection, conduction and radiation. Drum roasters can handle more beans than other roasters—up to a pound at a time in some cases—and are considered more durable than fluid-bed roasters be-

cause they don't need high fan speeds to cool the machine. Ranging in price from \$300 to \$1,000, these are for the serious coffee connoisseur or a cooperative of interested home roasters.

## How to Roast Coffee in a Cast-Iron Pan

For the most consistent roast, you can't beat a home coffee-roasting machine. Next best is the hot-air popcorn popper: It'll keep the beans in constant motion, preventing scorching.

However, a simple stovetop setup can turn out reliable roasts with just a few pieces of equipment you likely already have: a cast-iron or heavy stainless steel pan (preferably with tall sides, such as a Dutch oven), a wooden spoon or a whisk, and a large colander. Coffee beans smoke while roasting, so if you don't have a powerful kitchen exhaust fan, you'll want a portable fan to direct smoke out an open window.

Alternatively, perform this process outdoors on a grill.

1 Gather 1½ cups of green coffee beans as well as a few roasted beans to use as a comparison for the color of the roast you hope to achieve.

2 Place the colander in the sink. The larger the colander's holes, the better it will remove the bits of chaff clinging to the beans.

3 Preheat the pan over medium-high heat. You want the pan hot enough that a drop of water will dance across it and disappear quickly, but not so hot that coffee beans will scorch. If you have an infrared thermometer that can be aimed at a surface to gauge its temperature, shoot for between about 500 and 550 degrees Fahrenheit.

4 When the pan is hot enough, pour in the green beans and begin stirring immediately with your spoon or whisk, and don't let up. Keep the beans in constant motion.

5 About 5 to 10 minutes after you put the beans in the pan, you'll hear the "first crack" that signals the beginning of the progression from light to medium roast. It will sound like popcorn popping. When the continuous popping of the first crack begins to fade, you'll

have a light-medium to medium roast. If you continue until a fainter, second crack begins, you're entering dark-roast territory. (Coffee beans expand as they roast. Occasionally, a bean may pop out of the pan, but using a pan with high sides will corral most of them.)

6 While you are listening to the beans, check their color as best you can without pausing in stirring. Work quickly when matching a roasting bean to your comparison bean. A second set of hands can be helpful during this process. In addition to color, Daniel Bowersox, head roaster at Z's Divine Espresso



Smoke is easy to manage if you roast coffee on a grill outdoors.

in Lawrence, Kan., recommends waiting to remove the beans at least until the edges have slightly rounded and the mottled color you observed early in the roast has fully disappeared into an even color all over each bean.

7 When most of the beans in the pan have reached the roast color you're aiming for, pour the beans into the colander and stir, stir, stir. Beans should be free of most of the chaff and cool to the touch within 2 to 3 minutes.

8 Store in an airtight container for use over the next several days, grinding the beans right before you start a pot of coffee. Freshly roasted beans are actually best 12 to 24 hours after roasting.



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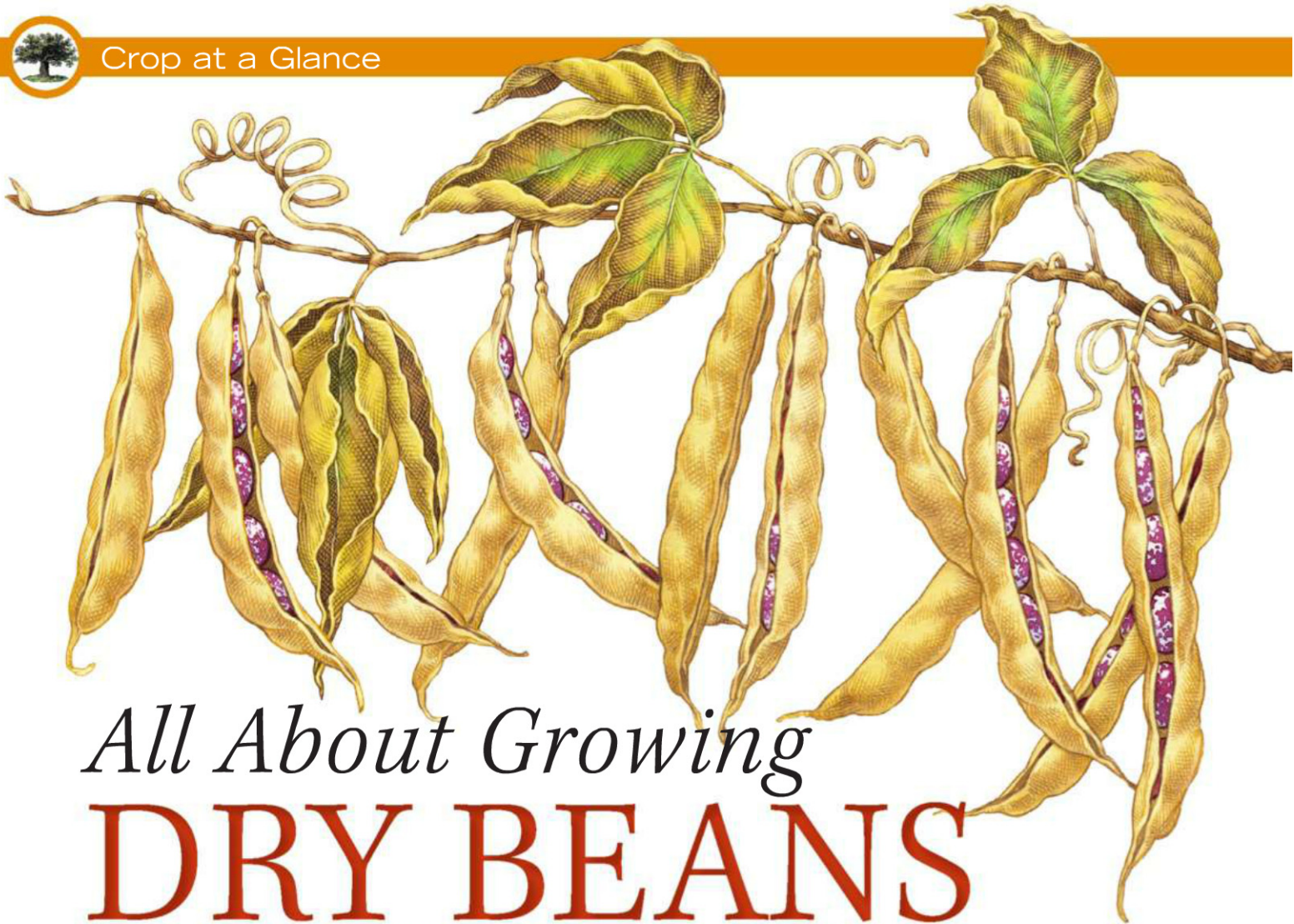
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# *All About Growing* **DRY BEANS AND PEAS**

By Barbara Pleasant

Illustrations by Keith Ward

**D**ry beans and peas provide as much protein per serving as well-known protein powerhouses, such as eggs and cottage cheese, with the added benefits of fiber and an array of minerals. You could eat the dry seeds from any green bean or pea, but certain bean and pea varieties grown for their higher yields of flavorful, nutrient-

dense seeds are a better use of garden space. Many beans can be planted later than spring crops such as lettuce or peas, and this delayed planting means the pods will mature in the drier fall weather when they're less likely to rot. Legume flowers attract beneficial insects, and because of legume plants' ability to obtain much of their nitrogen through partnerships with soil-dwelling bacteria, beans and peas remove fewer nutrients from the soil compared with most other crops.

## Types to Try

Choosing legume varieties that suit your climate is key to a successful crop. Note that all dry bean and pea varieties can be harvested and cooked fresh as the seeds approach ripeness, or you can leave them to mature into their dry, easy-to-store form.

**Soup peas** (*Pisum sativum*) are a cool-weather crop cultivated like green shell peas, but starchy soup peas are smooth rather than wrinkled. These frost-toler-



Bean varieties, from left to right: 'Streamline,' 'Christmas,' 'Yin Yang,' 'Dwarf Horticultural' and 'Pinkeye Purple Hull.' Top: 'Good Mother Stallard.'

## In the Kitchen

Dry beans and peas share an impressive nutritional profile: A 1-cup serving of cooked dry legumes provides about 15 grams of protein plus lots of manganese, fiber, B vitamins and iron. Rinse dry beans well in cool water before cooking. If using a pressure cooker, cook the rinsed beans for 15 to 30 minutes. If you plan to cook dry beans on the stovetop, soak them in room-temperature water for 6 to 12 hours, depending on size. Drain, then cook at a low simmer for 2 to 3 hours. Season slow-cooked beans generously with garlic, bay leaf or thyme. Cooked beans can be simmered for a warm soup or chili, marinated for salads, puréed into dips or spreads, or mashed for filling burritos or enchiladas.



ant peas should be planted quite early, in cool spring weather. Bush-type varieties, such as ‘Gold Harvest,’ form self-supporting blocks when grown in wide beds, but ‘Blue Pod Capucijners’ and other tall varieties will need a sturdy trellis. Soup peas grow best in cool northern climates, in slightly acidic to neutral soil with a pH from 5.5 to 7.0.

**Traditional dry beans** (*Phaseolus vulgaris*) look and grow like green snap beans, but the pods quickly become too tough and stringy to eat. Bush-type New England heirlooms, including ‘Kenealy Yellow Eye’ and ‘Jacob’s Cattle,’ tolerate cool soil conditions, so they are the best beans to grow where summers are short and cool. In warmer areas, bushy, black-and-white ‘Yin Yang’ (also known as ‘Calypso’) beans are as dependable as they are pretty. ‘Dwarf Horticultural’ beans can be sown after spring crops in areas with long summers. These and other true dry beans grow best in near-neutral soil with a pH between 6.5 and 7.0.

Many gardeners prefer to grow pole-type dry beans, which are grown up trellises or sown among knee-high sweet corn or sunflowers. Heirloom long-vined varieties—including intricately marked, brown-and-white ‘Hidatsa Shield’ and maroon-and-white ‘Good Mother Stallard’—will eagerly scramble over drying corn in many climates. Where summer nights are warm and humid, ‘Turkey Crow’ and ‘Mayflower’ make outstanding cornfield beans provided they reach maturity in dry fall weather.

**Runner beans** (*Phaseolus coccineus*) produce sweeter immature pods compared with other dry beans, and the plants’ showy flowers entice bumblebees. Runner beans benefit from cool nights and are easier to grow than lima beans in moderate climates. The dry seeds are big, colorful and meaty, resembling lima beans but possessing a sweeter flavor. ‘Scarlet Emperor’ bears purple-and-black seeds. The seeds of peach-blossomed ‘Sunset’ are almost entirely black, while those of ‘Streamline’ are speckled black and brown. Runner beans prefer soil with a near-neutral pH between 6.0 and 7.0.

You can store dry beans and peas well into winter for hearty meals.

**Lima beans** (*Phaseolus lunatus*) thrive in warm, humid weather and are often resistant to pests that bother regular beans. Pole-type varieties, including ‘Christmas’ (‘Large Speckled Calico’) and white-seeded ‘King of the Garden,’ can return huge yields if supplied with a secure trellis. Bushy ‘Jackson Wonder’ can be grown as a dry bean, too. Dried limas are easier to shell than tender green ones. Lima beans favor slightly acidic soil with a pH between 5.8 and 6.5.

**Cowpeas or crowder peas** (*Vigna unguiculata*), collectively known as “Southern peas” or “field peas,” originated in Africa and have retained their need for warm weather. Glossy cowpea

leaves are of no interest to common bean pests, and the purple blossoms set fruit even in humid heat, making this crop ideal for areas with hot, humid summers. ‘Early Scarlet’ and other bushy varieties set their pods high, which allows for easy picking, but you will get more peas per square foot via semi-vining varieties, such as ‘Pinkeye Purple Hull,’ ‘Mississippi Silver’ brown crowder and ‘Peking Black’ crowder. Small-seeded, almost-white ‘Zipper Cream’ is much-loved for its creamy culinary attributes and grows in a bush form. Cowpeas grow best in slightly acidic soil with a pH between 5.5 and 6.5.

**Tepary beans** (*Phaseolus acutifolius*) are native to the Southwest and Mexico, where they have been part of the traditional diet for thousands of years. Tepary beans are planted during the summer rainy season. They have smaller leaves than regular beans and adapt well to the alkaline soils found in many arid climates. Tolerant of heat and drought, tepary beans can produce well in any climate that has plenty of late-summer warmth and limited humidity. White-seeded ‘Tohono O’odham White’ and more colorful ‘Blue Speckled’ make excellent low-care crops in areas with hot summers. Tepary beans grow best in a neutral to alkaline soil with a pH near 7.0.

## When to Plant

In early spring, sow soup peas in fertile beds four to six weeks before your

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## Crop at a Glance

last frost. All other dry beans and peas are warm-weather crops best sown *in late spring* and summer. Sow these seeds in fertile soil starting no earlier than two weeks after your last frost date. In areas with long summers, later plantings made in June may have the advantage of ripening during the typically dry weather of early fall, when scant rain reduces chances that pods will rot. In any climate, traditional dry beans with a bush habit can be planted up to 90 days before your first fall frost date.

## Harvesting and Storage

Harvest beans and peas for drying anytime after the pods have become leathery up to when they have dried to their mature colors. (For example, the pods of 'Dwarf Horticultural' beans turn ivory with red stripes when the seeds inside reach maturity, while the

Pods of 'Pinkeye Purple Hull' cowpeas turn dark purple.) You can harvest green beans and peas for fresh cooking sooner, but seeds you intend to store must be fully ripe.

Leave drying pods on the plants as long as you can, but harvest them before a period of prolonged rain. If damp weather sets in just when your beans should be drying, pull up the plants and hang them upside down in a dry place until the beans are dry enough to pick and sort. Collect drying pods from pole varieties and runner beans as they change to tan or brown, and let the pods dry until crisp in a shallow tray or box kept indoors.

Threshing, or "shelling," is the process of removing bean seeds from the pods, and you can do it either by machine or by hand. On a home-garden scale, shell a large crop of dry beans or peas by placing the dry pods on a tarp

## How to Plant Legumes

Loosen well-drained soil to at least 12 inches deep. Mix in a 1-inch layer of mature compost and, if you have it, a spadeful of soil from a bed where the same species of beans or peas grew the year before (to help inoculate the soil with nitrogen-fixing bacteria). Plant seeds 1 inch deep and 3 inches apart. Do not thin soup peas, as these grow best when crowded. Thin bush beans to 4 to 6 inches apart; thin pole beans, limas and semi-vining cowpeas to 10 inches apart. Dry beans and peas bear all at once on spreading branches, so they need wider spacing than snap beans do.

When growing dry beans up cornstalks or sunflowers, wait until the support crop is 18 inches tall, and plant bean seeds on the sunniest side of the corn or sunflowers. As the support crop topples from the weight of the beans, you may need to install stakes to give wandering vines a place to twine. Four- or 5-foot-tall stakes placed every 2 feet in rows of semi-vining cowpeas will help support and boost the productivity of the plants, which often reach heights of 4 feet tall. Pole-type lima beans are a full-season crop that require a sturdy trellis at least 6 feet tall.



**Support vining bean varieties with poles, stakes or tall plants, such as sunflowers.**

and crushing them by walking over them. Gather the heavy seeds that drop from the pods, and remove debris by pouring the beans back and forth from one bowl into another in front of a fan for a few minutes. Another option for small harvests is to put the pods in a pillowcase, tie the pillowcase closed tightly, and tumble it in a warm (not hot) clothes dryer.

After shelling and winnowing out debris, place your beans or peas in open bowls, and let them dry at room temperature for two weeks, stirring often. When the seeds are hard and glossy, remove any shriveled beans (dumping the beans over a screen can help), and store your sorted beans in airtight containers. If you suspect bean weevils or other insects may be present in your stored beans or peas, keep the sealed containers in the freezer.

## Saving Seeds

Select the largest, most perfect seeds from your stored beans to keep with your cache of garden seeds for replanting. Because the seeds of legumes are self-pollinating, varieties are not likely to cross provided varieties of the same species aren't grown side by side. When stored in an airtight container in a cool, dark place, dry bean and pea seeds will remain viable for at least four years.

## Pest and Disease Prevention

Brick-colored, black-spotted Mexican bean beetles often lay clusters of yellow eggs on leaves of *P. vulgaris* beans, and the eggs then hatch into yellow larvae that will rasp tissues from leaves. Handpick this pest in all life stages, and try spraying neem on the insects and the leaves they are eating to control light infestations. In large plantings of more

than a quarter-acre, try releasing beneficial *Pediobius* wasps. Mexican bean beetles do not bother cowpeas and are only slightly keen on limas.

Night-feeding cutworms sometimes fell bean seedlings by severing them at the soil line.

Diatomaceous earth (DE) sprinkled over the soil's surface can help reduce losses.

Wait until foliage is dry to pick or weed beans, because bean rust and other leaf-spot diseases can spread between plants when the leaves are wet.

Dry beans and peas are naturally short-lived plants. Promptly pull up and compost any plants that are past their prime in order to interrupt the life cycles of pests and diseases.

## Growing Tips


If you're tight on space, grow dry beans as a succession crop by planting them directly after you harvest spring crops.

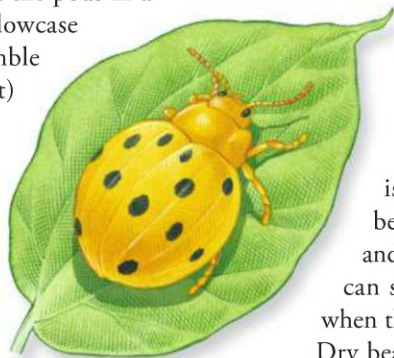
Never soak bean seeds in water to speed germination, as this can seriously damage the growing bean embryo by depriving it of needed oxygen.

Go light with fertilizer, because overfed dry beans grow into monstrous plants that don't produce well. Lima beans are especially sensitive to over-fertilization.

In a Three Sisters garden—which includes beans, squash, and corn or sunflowers—dry beans will work better than snap beans because they can be harvested late, requiring less disturbance of the squash vines.

If legume pods get so dry they shatter when you pick them, lightly dampen the plants with water before gathering, or harvest in the morning when plants are wet with dew.

Locate sources for the bean and pea varieties discussed in this article with our Seed and Plant Finder, available at [www.MotherEarthNews.com/Custom-Seed-Search](http://www.MotherEarthNews.com/Custom-Seed-Search). 



Mexican bean beetles darken in color as they age.



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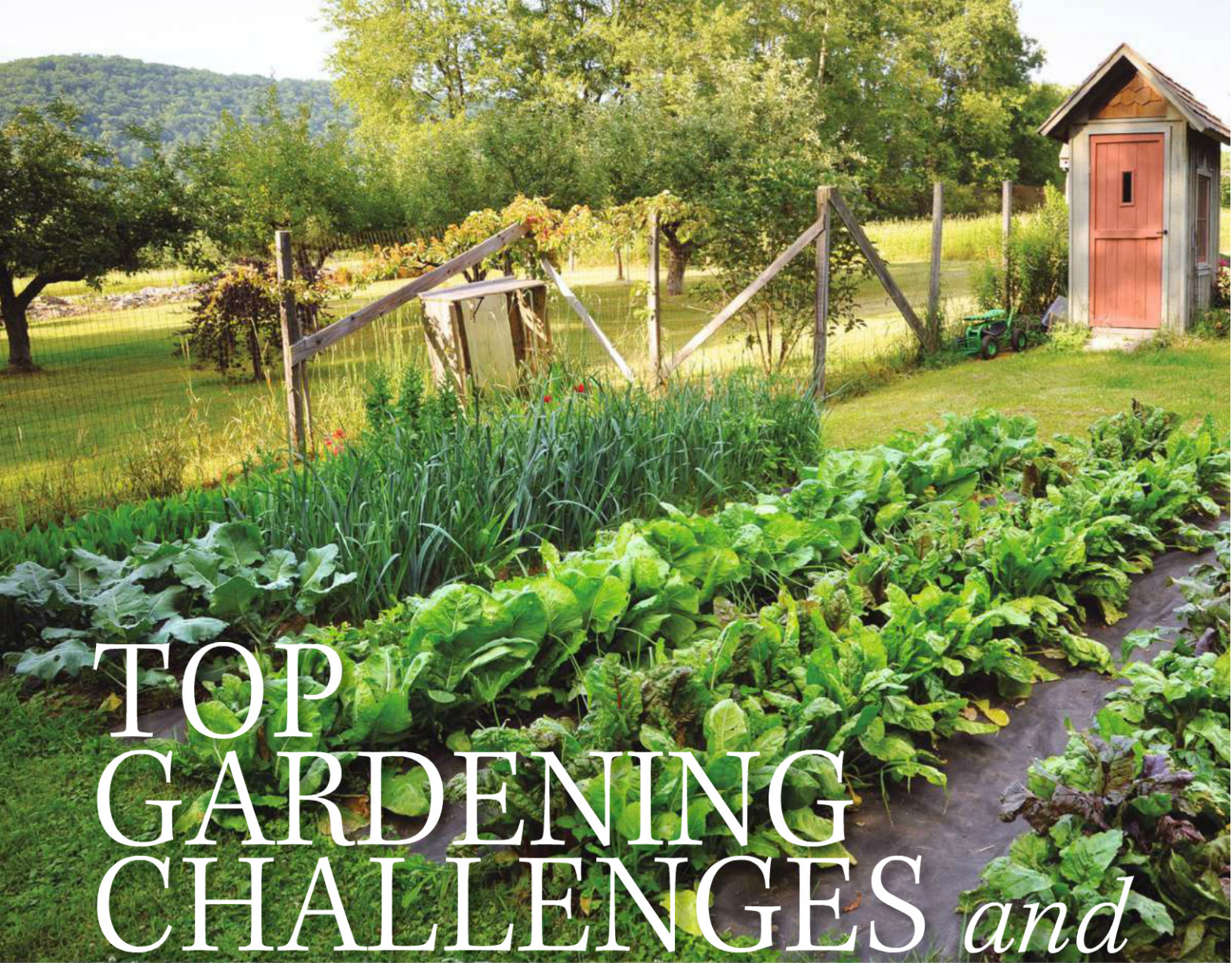
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# TOP GARDENING CHALLENGES *and* *How to Overcome Them*

From rogue rabbits and 4-inch-long grasshoppers to clay soil and summer drought, veteran organic growers detail how they cope with vexing gardening problems.

By Barbara Pleasant

**T**he perfect garden—free of all pests, weeds and weather surprises—does not exist. Nor does the perfect place to garden, because every climate is friendly to some crops and hostile to others. Thankfully, tackling gardening challenges, while frustrating at times, is part of what makes growing your own food such a lively adventure.

Smart garden troubleshooting is often crucial to successful food production, and working out the best solutions may require years of trial-and-error experimentation. To help you get a jump-start, we asked more than a dozen longtime

organic gardeners to share their expertise on tactics for solving common organic vegetable gardening problems. Following is a roundup of their collective wisdom.

## Critter and Pest Patrol

Dealing with insect pests, rabbits, deer, voles and other critters is perhaps one of the most frustrating and ubiquitous gardening challenges. Organic vegetable gardening can make this issue trickier in that you've wisely opted not to use harsh chemicals to keep such troubles at bay. In the case of critters, good fences can make for good harvests (and offer the kindest solution), and diligent monitoring for pests will prove well worth your time.



**Address garden challenges as they come, such as putting down weed-barrier cloth to combat severe weed problems.**

**Irritating insects.** An hour north of St. Louis, in New Douglas, Ill., Carol Lentz aims to check her plants for insect pests at least every other day. “Check the whole plant for signs of trouble, especially the leaf undersides,” she says. Squish any eggs you see, and handpick adult potato beetles, squash bugs and Mexican bean beetles and put them in a pail of soapy water to reduce their damage to plants and prevent a second (or third) generation.

**Those darn rabbits.** In Fargo, N.D., Joe Calvert says rabbits are second only to his short growing season on his list of gardening challenges. “Even in an urban environment, if you don’t have a fence around the garden, you may as well not even plant because the tender young plants are too tempting to rabbits,” he says. To keep rabbits out, add inexpensive poultry wire around at-risk beds or



**Critters covet your fresh veggies. Control grasshoppers, such as eastern lubbers, with diligent handpicking, and keep out raccoons and other wildlife with secure wire fencing.**

around the bottom of a perimeter fence. Folding 6 to 12 inches of the wire out from the bottom will also fend off critters that may try to dig under the fence.

In the piney woods north of Covington, La., Carrie Lee Schwartz says containers are sometimes safer than an open garden. “I hang delicate crops, such as lettuce and strawberries, in planters on my porch to keep them close to the kitchen and away from rabbits,” she says.

**Pesky groundhogs.** When Tim and Mary Ann Kirby began gardening near Pittsburgh, Pa., they had a diligent guard dog that chased away wandering animals. “He has since died, and the critters have been a headache,” Mary Ann laments. “We have a good fence, but it’s not enough to keep out groundhogs and raccoons.” She says groundhogs were the more problematic of the duo, first devouring broccoli and then helping themselves to cantaloupe. In addition to having a guard dog around, a couple of strands of electric fencing low to the ground can help deter groundhogs. On many homesteads with big gardens, growers set up permanent post-and-wire fencing or rigid livestock panels, and then add poultry netting and electric fencing for further protection.

**Grubbin’ grasshoppers.** Grasshoppers can devastate organic gardens, particularly in areas with hot, dry weather. These long-legged leapers are especially damaging to lettuce, beans, corn, carrots, onions and cabbage-family crops grown for fall harvest. Among the best organic controls



for grasshoppers are excluding them via row covers or screen barriers (get free used screen material from hardware stores that repair damaged screens), and employing poultry to patrol garden areas and snatch up the grasshoppers as snacks.

Hundreds of grasshopper species live in North America, and you’ll be dealing with a particular type. Melody Gould has been gardening in the Tampa Bay area for more than 10 years, where eastern lubber grasshoppers are often a food-grower’s foe. For control, gather and drown the hoppers in a pail of soapy water when they’re still showing the black-and-yellow coloring of youth. Gould explains that if you don’t catch them when they’re little, the lubbers will grow into huge, 3- to 4-inch grasshoppers that can clear all of the vegetation off a full-sized tomato plant overnight.

**Oh, deer.** The drought that has caused northeast Texas and other areas to shrivel has led to desperate hunger among wild things. “The shortage of greenery for wildlife has caused our worst gardening problems ever,” says Carole Ramke, who has been gardening organically in Kilgore, Texas, for more than 20 years. She had to build chicken-wire cages around her sweet potatoes—*inside* the garden fence—to protect them from deer. The deer started eating things they’d never eaten before, such as okra, watermelon vines, green persimmons and whole limbs of fig trees. “Our smaller melons even had tooth marks from raccoons, coyotes and deer. We were finally able to put a stop to the



Fencing excludes small animals, including pets, and can pull double-duty as support for climbing plants.

damage by installing an economical double electric fence around the garden and orchard,” Ramke says.

In addition to fencing, consider trying a deer repellent. While no repellent, commercial or homemade, can provide 100 percent protection, some do work well. Researchers in Connecticut found that egg-based repellents and the commercial brands Bobbex and Hinder are your best bets. (Find out “Which Deer Repellents Work Best” at <http://goo.gl/t2mCNY>.)

## Weather Woes and Climate Complications

Chatting about weather isn’t just small talk when it comes to organic vegetable gardening. Weather can make or break a growing season or the success of certain crops, and a savvy gardener should eye the forecast and pay attention to overall climate trends. (Our *When to Plant* app, available at [www.MotherEarthNews.com/When-To-Plant-App](http://www.MotherEarthNews.com/When-To-Plant-App), includes links to long-term weather forecasts.) In Bath, Ohio, Pat Kennedy has spent decades learning and relearning that one can’t control the weather. “We recently had one of

the wettest years in Ohio history. But at least my garden wasn’t flooded, I didn’t feel an earthquake, and no tornadoes or hurricanes came through,” Kennedy says. “Some things grew, some didn’t. The melons had so little flavor that they ended up in the compost pile, but both the hot and sweet peppers made the best crop ever, and I actually had artichokes! Start each season prepared, flexible and hopeful, and remember that there is always next year.”

**Soggy spring soil.** Carol Lentz in southern Illinois says she’s had to delay spring planting of cool-weather vegetables because of waterlogged soil in April, the prime planting month in her region for beets, carrots, lettuce, peas, potatoes and cabbage-family crops. “We construct raised rows in fall, when the soil is warm and workable,” she says. After mixing 2 to 4 inches of compost into the soil, Lentz then rakes it into mounds about 12 inches high and 3 feet wide. “Placing leaves between the raised beds provides a walkway and is a good way to compost the leaves during winter,” she says. Raising your beds or rows in this way will help with soil drainage, and you can also use a broadfork

to loosen wet soil in early spring so it will dry and warm up faster.

**Relentless rain.** “For the past several springs we’ve had record rainfall in spring—like we don’t get enough already! Because of this problem, some seeds will simply rot in the ground, and replanting is the only solution,” says Catherine Miller-Smith, who lives in rainy Vancouver, British Columbia. If you’re facing persistent rains, she suggests planting three sowings to ensure good germination of sweet corn and any other crops proving troublesome to get growing.

**Short springs.** After growing veggies near Baltimore for more than 20 years, Barbara White says gardeners in her area should look for fast-maturing varieties of broccoli, lettuce, peas and other cool-season crops because spring turns to summer so quickly in her region. With lettuce and spinach, she suggests using a portable “salad table”—a simple table-type frame with a recessed top for holding soil (see photo on Page 31)—that can be moved to shade when the weather gets too warm. “I made my first salad table in 2005 after our local Master Gardener coordinator taught

## TECHNIQUES!

For specific advice on many of the techniques in this article, such as indoor seed-starting and building healthy soil, browse our online Garden Know-How series, available at [www.MotherEarthNews.com/Garden-Know-How](http://www.MotherEarthNews.com/Garden-Know-How).

a workshop,” White says. “They cost \$10 to \$15 to make, and even someone with little in the way of carpentry skills can do it. I had the local hardware store cut the wood and then went home with all the supplies and made my first salad table in about an hour.”

Bill Nunes of Gustine, Calif., says gardeners in the Central Valley need to take special care with peas because of short springs, but good returns will usually result from making more than one sowing and using more than one variety. This approach works with other crops, too. “Always hedge your bets, even with your favorite and most reliable varieties of peas, melons, tomatoes and garlic,” Nunes says.

**Summer drought.** Weather experts have warned gardeners in many regions of the country—especially Texas and Midwestern states—to expect more droughts in future years. Gardeners should consult their local extension services to get drought-tolerant crop and variety recommendations. (*Watch for a chart of drought-resistant varieties in our June/July 2014 issue.*—MOTHER). Water with drip hose to make sure water reaches plants’ roots. Harvesting runoff water from buildings is another smart maneuver to consider. “I placed a row of rain barrels made from garbage cans behind a storage building,” says Carole Ramke of eastern Texas. “On my sewing machine, I made a cover for each can from a circle of fiberglass screen, with a casing and drawstring on the edge. The covers keep out leaves and even prevent mosquitoes.”

Near Northampton, Mass., Stephen Bond begins collecting rainwater from the roof of his garden shed in spring, specifically for application in the summer dry season when his community is under watering restrictions. “For more efficient watering, I also bury soaker hoses under my tomatoes and peppers so I can hook up my hose when the plants need water,” Bond says. “That way, I don’t lose nearly as much water to evaporation.”

**Fleeting summers.** In wind-swept Cortez, Colo., at 6,100 feet elevation, Fran Marciano says that starting seeds indoors is a priority as summer arrives late and doesn’t last long. “We can have snow



**Top:** Where springs are short, grow greens in a “salad table” that you can move to a shady spot when hot weather arrives. **Bottom:** Drip irrigation is especially apt for drought-prone regions.

or killing frost well into June, followed by many hot days in July and August,” Marciano says. “An early start indoors is essential to making the most of a short, quirky growing season.”

## Soil and Weeds

Healthy soil rich with nutrients and organic matter from compost will go a long way toward thwarting all kinds of gardening challenges. Excellent soil leads to healthy, vigorous plants, and strong plants aren’t as likely to be attacked by pests and can often beat competition from weeds. (Plus, an oft-overlooked aspect of nutrient-rich soil is that it equates to more nutritious fruits and vegetables.) No matter your soil type, weeds are inevitable, but we dig Connecticut grower Michael

Brunetti’s positive spin on the challenge: “You’ll always have some weeds, but if you weed a little bit each day, you can stay on top of them. Just think of weeding as an enjoyable therapy that takes you away from the everyday busyness of life.”

**Disappearing soil nutrients.** Rainfall in excess of 50 inches per year will wash nutrients from the soil, but frequent infusions of organic matter will greatly improve soil’s ability to hang on to them. “A month or more before planting, dig up your garden and mix in some organic fertilizer and at least 2 inches of compost,” advises Ronald Weathersby, who keeps a 2,000-square-foot garden in saturated Leesville, La. If you live in a dry area, this is still sound advice because compost holds in soil moisture, too.



**Top:** Give a big boost to soil health by growing a cover crop such as buckwheat. **Bottom:** Garden netting held aloft with simple hoops is an effective way to protect crops from birds.

**Low organic matter.** Every plot has a different jumping-off point when it comes to soil quality. “Our soil is naturally alkaline and rich in minerals but low in organic matter, so it needs to be enriched with as much organic matter as possible,” says Teresa Ebbe, who gardens just north of Taos, N.M., at 7,000 feet elevation. “Root crops and greens do exceptionally well here, so they are a good place to start if you’re a new gardener,” Ebbe says. “After you gain experience and enrich the soil, you’ll be amazed at what you can grow. Last fall, we packed our root cellar with storage crops—more than 100 pounds of carrots, 75 pounds of potatoes, and smaller amounts of beets, turnips, onions, garlic and winter squash.”

**Woeful weeds.** Michael Brunette, a 30-year organic gardening veteran who lives

in New Hartford, Conn., recommends using permanent beds as a primary strategy against weeds. “I use permanent raised beds and never set foot in them,” he says. “I never let weeds in the paths go to seed, and I use various organic mulches to suppress weeds after the soil warms up.”

Another good strategy, this one courtesy of Bill Nunes in central California: If you can afford the time, sow cover crops before any food crops to build soil tilth and organic matter, and to control weeds. “Buckwheat is great here in summer, and winter rye, peas and fava beans work well in our mild winters to suppress winter annuals and grasses,” Nunes says. “Building the soil food web with cover crops will give you more disease-resistant vegetables.”

**Red clay.** Former Georgia extension horticulturalist Daryl Pulis has long ad-

vocated applying coarse organic matter, such as composted bark or wood chips, to boost the quality of red clay soil, which can prove impossible to dig to more than 10 inches deep. Lifelong organic gardener Joyce Reid of Carrollton, Ga., also advises any gardener to address the soil issue first, but she’s opted to modify her bed design as part of that plan: “My solution has been raised beds. Instead of trying to dig down, I went up. Still, the soil has to be reconditioned every year or it naturally becomes compacted.” (For more advice on how to improve clay soil, turn to Page 79.)

## Timing and Season Extension

When it comes to starting seeds, planting and even harvesting, timing varies not only among general regions but also within microclimates. As you come to understand your exact growing conditions better each year, you can hone in on the best schedule and even discover how to eat at least some food from your garden all year.

**Targeted timing.** In my southwest Virginia garden, I’ve found that the records I keep from year to year are among my most valuable gardening tools. Even with simple crops such as carrots, getting planting dates right is what makes the difference between a good crop yield and an outstanding one.

**Filling up four seasons.** Year-round growing isn’t difficult in many areas provided gardeners plan ahead to make the best, full use of the calendar. Gulf Coast gardener Ronald Weathersby takes full advantage of his area’s generous growing season. “You can start harvesting cool-season vegetables in April and May, harvest summer crops next, and then enjoy a third harvest season in fall and winter,” he says.

**Season extension.** Since they began homesteading in 1999 in Virgil, N.Y., Chris and Bob Applegate have steadily installed features that add months to their growing season, including two small greenhouses. “Our original, unheated greenhouse produces more than 10 months’ worth of produce, with arugula, spinach and parsley making it through even the worst winters,” Chris says, adding that the new greenhouse will provide food for their flock, too. “I have added kale,

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Chinese cabbage and collards to feed the chickens throughout winter. We do all this with a limited income and a lot of sweat equity."

**Crop protection.** Just north of Colorado Springs, Colo., Kay Fisher and her husband use plastic-covered hoop houses to extend their growing season. A bonus of their season-extension setup is that they can then cover the hoops with netting in summer to protect plants from pests. "We put rebar inside the edges of our raised beds, sticking up about a foot. Then we cut black flexible hose used for sprinkler systems to the appropriate lengths and slip the ends over the rebar to form hoops," Fisher explains. "When plastic or row covers are no longer needed, we attach small bird netting to the hoops with zip ties along the bottom, leaving the ties a little loose so the netting can be moved up and down to access the beds for weeding and picking. The netting keeps out deer and most other pests, and it reduces damage from hail."

## Crop Considerations

You likely won't be able to grow *all* crops where you live. Some crops just won't do well in certain regions, at least not without a lot of extra care and attention. "My advice to new gardeners is to amend your soil well, no matter what you're growing, and sow crops that thrive in your climate," says Dave Sexton, who has been gardening in Oregon's Willamette Valley for decades.

**Growing tomatoes.** In her rainy British Columbia climate, Catherine Miller-Smith says the best solution for overcoming the soggy soil and cool rains that delay tomato planting and promote late blight is to grow tomatoes in plastic-covered hoop houses. "My tomatoes have a roof over their heads. I install a head-high hoop house in spring, keeping the sides down. Then, I slowly lift the sides as the weather warms, until only the top of the hoop house is still intact," she says. After cooler weather returns in fall, she begins rolling the plastic back down until it touches the ground again.



Use a broadfork to loosen compacted soil and, in rainy areas, to aerate soil so it dries out quicker for planting.

**Cold-weather crops.** Some crops are just plain miserable in heat. "We have a hard time growing cold-weather vegetables here in Tampa Bay," says Florida gardener Melody Gould. "We could be sweating in shorts and tank tops on a December day that reaches 90 degrees Fahrenheit, and then have lows drop to near freezing for a few days, followed by days when the temperature goes right back up to 90." She encourages sticking with heat-tolerant crops, such as peppers, tomatoes, eggplant and others with tropical ancestry, if you live in hot, humid climates.

**Cool, cloudy climates.** Oregonians are no strangers to gray days, but many crops thrive there. "Cool-season greens and cole crops are easy and do well most of the year here. Many perennials, such as raspberries and artichokes, do well because of our mild winters, and potatoes and blueberries love the acidic soil," says Dave Sexton. Garlic and leeks are easy in the Northwest, too, but Sexton explains that tomatoes really thrive only if you plant stout seedlings that were started very early indoors, insulate the soil with mulch, and

protect the plants with cloches during the beginning of the season.

## You Can Do It!

Growing your own food using organic methods is one of the single best things you can do for the health of you, your family and our environment. Plus, there's nothing like toting a heaping garden harvest into your kitchen to give you that one-of-a-kind satisfaction that comes from self-reliance. So, no matter what gardening challenges crop up for you, don't be tempted to throw up your arms in defeat. The most advanced gardeners—and even farmers who have been at the task for decades—will tell you they never stop learning.

On your path to success, note what doesn't work for you and try new methods, crops and varieties every year. Talk to other gardeners, because if you're experiencing a challenge, you're likely not alone. (An easy way to connect with other gardeners in your vicinity is via our new state and province Facebook pages. Find your area's page at [www.MotherEarthNews.com/Facebook](http://www.MotherEarthNews.com/Facebook).) Today, you may be the one asking most of the questions, but 10 or 20 years down the road, you may be the sage mentor talking over the fence with a newbie gardener, sharing what you've learned along the way. In this sense, "challenges" aren't just troublesome annoyances—they're opportunities to meet your neighbors and add to your bank of gardening know-how. 🌱

MOTHER's gardening guru Barbara Pleasant has been teaching us how to grow fruits and vegetables organically for 30 years. Whether dealing with too much wind in winter or potato-eating voles in summer, she greets gardening challenges with inquisitive optimism in her Virginia garden. Her website is [www.BarbaraPleasant.com](http://www.BarbaraPleasant.com).

### TRY THIS!

Take some of the guesswork out of planting and growing your garden by trying our online Vegetable Garden Planner. It will tell you when to plant each crop in your area and is the perfect place to keep gardening notes. Go to [www.MotherEarthNews.com/Garden-Planner](http://www.MotherEarthNews.com/Garden-Planner).

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Circle #61; see card pg 97

# Guide to URBAN HOMESTEADING

Go “back to the land” on a city lot! Envision what your small-scale homestead could provide and discover 10 steps to get there.

By Rachel Kaplan

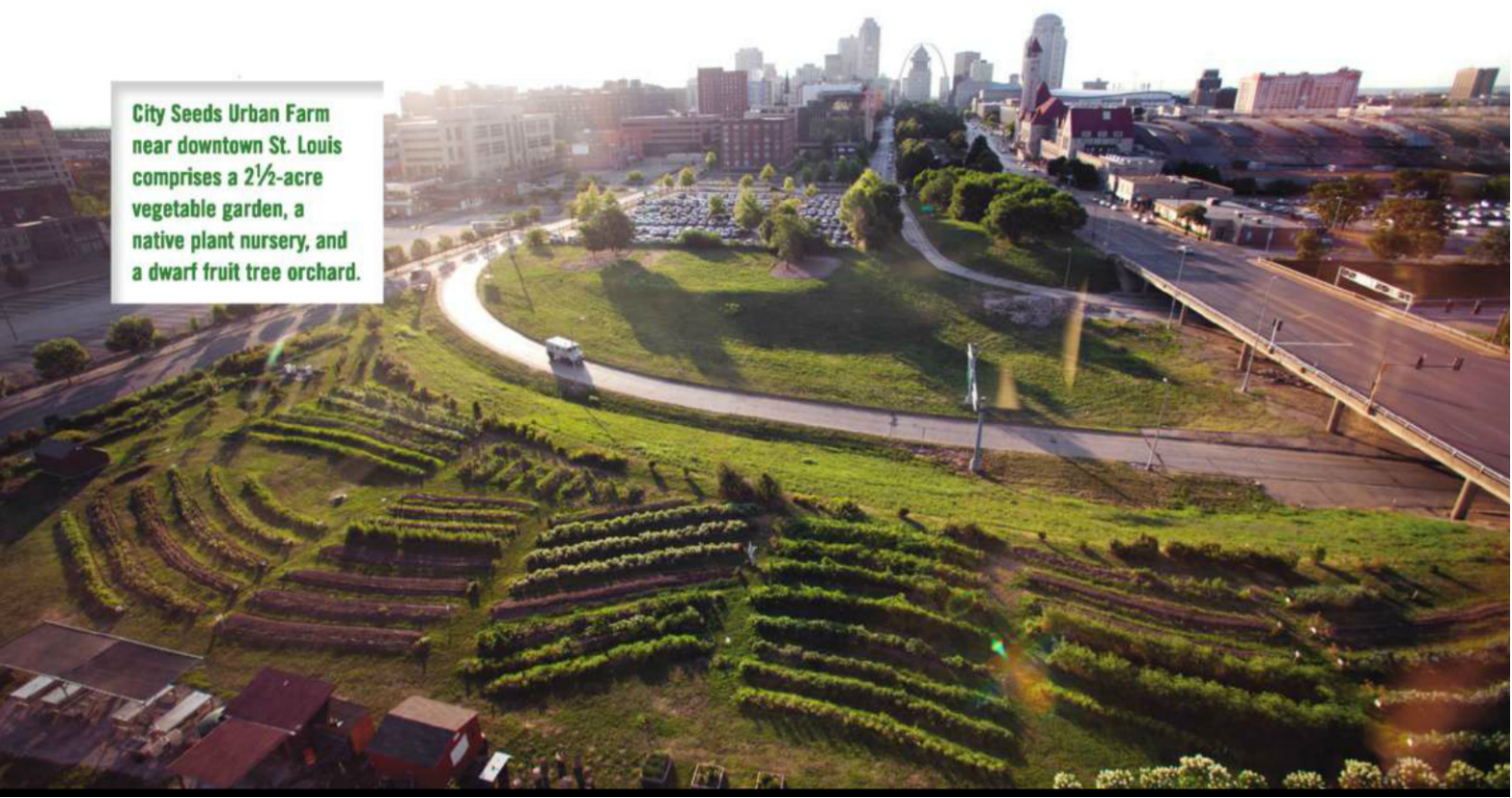
If you live in a city and dream of someday being able to work the land and become a modern homesteader, consider this: There's no need to wait—you can easily do many homesteading activities in the city. You may not have enough garden space to grow your own wheat or corn, but you can harvest an amazing amount of many crops from a collection of containers. Owning your own milk cow is likely not an option, but keeping backyard chickens certainly is. Plus, in the city, it can be much easier to build a community of like-minded neighbors who can share tools, knowledge and friendship.

Here's what it can look like: In a single year, six households working with the organization Daily Acts in Petaluma, Calif., produced more than 3,000 pounds of food; foraged 2,000 pounds of local fruit; collected more than 4,000 pounds of urban organic waste to be used as compost and mulch; planted more than 185 fruit trees; installed five greywater and rainwater catch-

ment systems that saved tens of thousands of gallons of water; tended to bees, chickens, ducks, quail and rabbits; and worked to reduce energy use and enhance public transportation opportunities. All of this from six households! (For another example of urban self-reliance, read about a Midwestern neighborhood that created a “homestead hamlet” on Page 42.)

Learning traditional skills such as canning, fermenting, soup-making, seed saving, sewing and knitting, beekeeping, candle-making, and water and energy management brings you and your neighbors together in constructive ways. These urban homesteading tasks will save money, create abundance, harness your creativity and put you in touch with the necessities of life. Classes and lectures, neighborhood elders, community projects, and resource books at the library can help you learn these skills.

Why not start re-skilling your community today? The following steps will get you moving along the path to more sustainable urban living.



City Seeds Urban Farm near downtown St. Louis comprises a 2½-acre vegetable garden, a native plant nursery, and a dwarf fruit tree orchard.

## 1. Observe and Interact

Slow down and look critically at where you live before taking any action. Through observation, you will make wiser, more responsive choices about your homestead that will have long-lasting results. Learn everything you can about your bioregion: Can you trace the water you drink from source to tap? Who is growing your food? Where do your garbage and sewage go?

Observation should not only include a clear-eyed assessment of the natural resources where you live—water, sun, wind, and available space for growing—but also interactions with your neighbors. For example, consider how close your neighbors are to where you want to site your chicken coop. Sharing a flock, chores and the bounty with your neighbors will be more efficient.

**Get started!** Observing and interacting are key principles of permaculture design. The permaculture principles outlined at <http://goo.gl/pJdfGq> will help you assess your surroundings.

## 2. Grow Food

One of the biggest complications for urban gardeners is finding space to grow food. Community gardens provide a great opportunity for you to learn next to other committed gardeners on a small plot of land. If you find yourself looking over the fence at your neighbor's unkempt yard, you could offer to turn it into a productive garden and share the bounty.

Use vertical spaces (a sun-drenched, south-facing wall provides a great microclimate for beans and tomatoes planted in containers), flat rooftops, and abandoned lots. You could even de-pave a driveway. In some cities, the economic downturn has yielded an impressive array of undeveloped lots, many of which can be turned into abundant food-growing zones.

You can grow a lot of food in a small space. On a patio or parking lot that gets sun for about six hours per day but has no soil, you could plant a garden in raised beds, or in barrels or storage bins with drainage holes punched through the bottom. You can grow many carrots, leeks or potatoes in 5-gallon buckets, and lettuce can spend its whole life in small pots. Columnar fruit trees will grow straight rather than branch out, and will thus easily fit into small spaces. If you only have shaded growing space, inoculate logs or straw to produce fresh mushrooms.

**Get started!** Read about how to grow a productive small-space garden at <http://goo.gl/D2LkCc>, and find out more about cultivating homegrown mushrooms at <http://goo.gl/bStfsA>.



A food-growing strategy can include dwarf fruit trees, vertical gardens and utilizing abandoned lots.

## 3. Source What You Can't Grow

Homegrown food is often a gateway to a more sustainable lifestyle, but if you live in a place where you really have no room to grow, you can still source healthy food. Farmers markets, community-supported agriculture (CSA) projects and local food co-ops are all great options. Cut out the middleman by joining or starting a bulk-food buying group to purchase staples directly from wholesalers. You can also glean from unused fruit trees, or forage for wild edibles depending on what's in season.

**Get started!** Find maps of public fruit trees and wild edibles at [www.FallingFruit.org](http://www.FallingFruit.org) (add spots you know of, too). Uncover stockpiles of bulk-buying how-to, including steps for starting your own buying club, on Page 53.

## 4. Compost on a Small Scale

Compost is the divine alchemy of the garden—the trick of turning “garbage” into fertility. Build a simple compost bin for your backyard in an afternoon by hammering together three wooden pallets. Purchase a pre-made plastic compost bin with a lid if you struggle with vermin visitors or nervous neighbors. You can even simply drill drainage holes in the bottom of a large garbage can with a lid.

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A worm bin is a small-scale composting container that can be maintained indoors to transform your smaller kitchen scraps into vermicompost—one of the best soil amendments.

**Get started!** Mine a heap of composting tips at <http://goo.gl/dp5Hh9>. Source the best compost bin options at <http://goo.gl/gGcc2W>. For information on comfortable environments in which to keep worms, head to <http://goo.gl/bcpcUZ>.

## 5. Raise Livestock

Animals can turn a backyard garden into a mini-farm and provide nitrogen-rich fertilizer. Backyard chickens and rabbits are the most common animals on urban homesteads, and urban beekeepers are growing in number. Some adventurous city farmers are even branching out to goats and pigs.

Check with your local municipality to find out which animals are allowed in your area—for example, some places allow chickens but not roosters. Undertaking animal projects with others will spread the work and responsibility. Get only the number of animals that you can humanely care for, and think about what you'll do when your chickens stop laying (because they will).

**Get started!** Take a peep at “Backyard Chicken Basics” at <http://goo.gl/NMrBrC>, and find plans to build MOTHER’s portable, predator-proof Chicken-Mobile at <http://goo.gl/YkWrH>. Learn why rabbits make a great addition to small homesteads, and find plans for DIY cages and recommended setups, at <http://goo.gl/3qWCT6>.

## 6. Create Kitchen Magic

Take up the pot and the pan, the cheesecloth and the strainer, the canning jar and the wine bottle, and you'll begin to re-weave the web of kitchen magic once common in every home. Not only will cooking save you money, but it will give you control over the ingredients. Take advantage of cooking classes held near you, gather friends together for kitchen projects and potlucks to share recipes and techniques, and invest time and energy into learning how to provide your own staples—homemade bread and cheese are within your reach!

**Get started!** For super-simple cheese recipes, turn to Page 18. Andrea Chesman’s book *Back to Basics: Traditional Kitchen Wisdom* tackles many



Mushrooms thrive in shady spaces, and one rabbit doe’s offspring can produce 300 pounds of meat in a year.

basics—order it on Page 81. Bread-baking options range from no-knead loaves to sourdoughs; find recipes at [www.MotherEarthNews.com/Homemade-Bread](http://www.MotherEarthNews.com/Homemade-Bread).

## 7. Preserve Food

Freezing, drying and canning—both with water bath and pressure canners—are proven methods of preserving bulk food, seasonal hauls from a local farmer, or your own harvests. If you glean fruits from nearby apple trees or score a large box of super-ripe tomatoes from a farmers market, you’ll want to know how to can apple butter and pasta sauce.

Before pasteurization and refrigeration, fermentation was a principal preservation method. Cheese and sauerkraut are just two creations that require fermentation.

**Get started!** Head to <http://goo.gl/wnd76d> for instructions for can-

ning, dehydrating, freezing and pickling foods. Try the homemade sauerkraut at <http://goo.gl/5Dkd9F>, then advance with the options in Sandor Katz’s book *Wild Fermentation* (available on Page 81).

## 8. Rewire Your Energy Strategy

Renters and owners alike can perform plenty of home energy fixes. Add thermal window shades or clear acrylic panels



Find materials to build an inexpensive coop at demolition sites and reuse stores.

during winter. Caulk window frames and insulate heating ducts. Adjust your thermostat to be cooler in winter, warmer in summer. Switch to efficient light bulbs, which will pay for themselves in energy savings within a few years.

Use the energy of the sun whenever possible. Install a solar hot water system if you can; string a clothesline no matter what. Cooking a pot of soup or baking a loaf of bread in a solar oven uses no electricity at all. Build a solar heat grabber out of a simple box to pull passive solar heat into your home.

**Get started!** Peruse the Guide to Home Heating at [www.MotherEarthNews.com/Home-Heating](http://www.MotherEarthNews.com/Home-Heating) for a comprehensive list of energy-efficient home heating options. You'll find the natural cooling strategies you need at <http://goo.gl/p3Gf3S>. For an impressive collection of DIY solar projects, from food dehydrators to water pumps, visit [www.BuildItSolar.com](http://www.BuildItSolar.com).

## 9. Manage Urban Water Resources

Greywater is lightly used water that empties from washing machines after the rinse cycle, and from bathroom sinks, showers and baths. With some low-budget plumbing adjustments,



**Top:** Aquatic plants filter greywater in a repurposed bathtub.  
**Bottom:** Water tanks harvest rainwater on a useful scale.

you can direct this water to your landscaping and gardens (make sure your soaps are biodegradable). Check city ordinances before configuring a greywater system. The simplest way to reuse greywater is with a bucket placed beneath a drain.

Catch and store rainwater in swales and earthworks, gutter downspouts diverted into rain barrels, and cisterns.

**Get started!** Tap into greywater with the ideas and plans at <http://goo.gl/rNjmr2>, and learn how to harvest rainwater at <http://goo.gl/Lt5ZAx>.

## 10. Share the Road

Embrace bicycle travel for mental health as well as physical well-being. Electric-assist bikes make for a sweat-free commute and are especially nice for hilly terrain. Then, hook up a trailer—a cargo bike will pull you

into finding out just how much you can haul with two wheels.

If you must drive, consider homebrewing biodiesel fuel. Urbanites are often surrounded by restaurants willing to unload their used vegetable oil.

**Get started!** Cruise over to our cargo bike guide at <http://goo.gl/s8ZEKa>, and get up to speed on people-powered transportation at <http://goo.gl/ShLfrN>. Tackle producing your own fuel from waste vegetable oil at <http://goo.gl/jTgYPH>.

Modern homesteading is not a return to a Depression-era mentality—it doesn't have to be about austerity or apocalypse. Instead, homesteading involves skills and practices that lift us out of a culture of inaction and cynicism and into one of abundance and empowerment. An urban homesteading lifestyle is not only about making a nice pie out of foraged apples and learning to fix a flat bicycle tire—it's about engaging in activities that shift our consciousness toward an ethic of conservation and care.



Urban homesteading is about sharing time and skills with your neighbors.

Rachel Kaplan is the co-author, with K. Ruby Blume, of *Urban Homesteading: Heirloom Skills for Sustainable Living* (see Page 81 to order). Find Kaplan online at [www.Urban-Homesteading.org](http://www.Urban-Homesteading.org).

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# How We Created a 'HOMESTEAD HAMLET'

Our Nebraska neighborhood is an example of how to live more sustainably and securely by networking with neighbors to produce and share homegrown harvests.

By Tim Rinne

For 10 years, I obsessed about the threat of climate change on an intellectual, theoretical level. But it wasn't until the personal implications of climate change began to dawn on me—how it would disrupt my daily routine and the world I took for granted—that the full horror of our situation finally sank in. And in early 2009, a realization hit me, right in the stomach: I didn't have the first clue about my food supply. I didn't know where it came from or how it was grown.

Isn't that a way of life that's just asking for trouble?

I decided to make a change. Or, rather, many small changes.

## Inklings of a Neighborhood Plan

Although I'd toyed with the idea for years, buying some land and moving to the country wasn't a viable option. My wife, Kay, and I both worked less than a mile from our home in Lincoln,

Neb., and we concluded that the carbon footprint of a longer commute every day would only compound our ecological woes.

About that time, our close friend Linda happened upon a workshop on "Cohousing and Intentional Communities." Linda was smitten with the idea of a community homestead—a group of like-minded people choosing to live in close proximity to each other in order to share resources, collectively work in gardens, and strive to lessen their load on the planet. After talking the idea over, the plan of repurposing an older neighborhood such as the one Kay and I lived in seemed the most sensible course to our ambitious trio. So, Linda and her husband, Ed, sold their home and moved onto our block, just two doors down.

Suddenly, we'd doubled our numbers. A seed was sprouting.

Kay and I decided to mortgage our home to purchase and renovate a "problem property" that was four doors down from us. We would establish a neighborhood garden there as soon as the lease for the existing tenants was up, and then we'd renovate the house

and rent it out again. With this, our property stake in the block increased again, though we didn't yet have a clear vision of what we could do.

Somewhere in my browsings, I stumbled across the concept of edible landscaping and discovered a book by that name written by Rosalind Creasy (available on Page 81). She posed a question that was to forever change our lives (and our lawn): Why, she asked, do we always plant things we can't eat?

I thought of our considerable corner lot. For 22 years, I'd dutifully mowed our grass and meticulously tended our trees and bushes—not one of which produced edible fruits. In my entire yard, apart from a little tomato plot, there wasn't a single food plant. I wondered why. Peach and cherry trees produce blossoms that are every bit as lovely as those of ornamentals—and you get something to eat besides. Strawberry beds make lovely ground cover, and the tangy little gems provide a delicious enticement to passers-by.

A plan began solidifying in my mind. Our home, I vowed, was going to become a lawn-free edible landscape—even the public right-of-way area, which city ordinance deems “sidewalk space.” Kay and I would create a model of what a food-producing urban lot could look like that other people could then emulate and adapt for their own properties (after they saw it and got over the shock).

Nobody has to move to the country—and most of us can't, anyway. We can stay put and turn our lawns into productive neighborhood gardens. *(To read more about sustainable city living, turn to “Guide to Urban Homesteading” on Page 36. —MOTHER)*



**Author Tim Rinne and his neighbors of all ages garden together and reap the rewards of an edible landscape.**

## Urban Homesteading

That first gardening season, in 2009, we spaded half of our lawn under and planted vegetables, with the remaining grass falling to the spade the following year. I quickly learned how much I didn't know. What I really needed if I intended to garden on this scale, Kay wisely counseled, was a Master Gardener course. I promptly enrolled, and I learned more in the first four months of 2010 than I'd absorbed in my previous 30 years as a homeowner.

While Kay and I were busy developing our edible landscape, our friend and now neighbor Linda was trying her hand at food gardening. She got hooked, and by the following year, she and Ed had converted their entire backyard into a garden.

After the tenants of our “problem property” moved out in May 2010 and we were able to take possession, we got to work turning the entire space (both front yard and backyard) into a community garden and orchard for our neighbors on the block to participate in. We brought in black topsoil to replace the gravel parking lot that covered most of the backyard, and we dug 2-foot-deep garden beds surrounded by wood-chip paths.

When our dozens of curious neighbors saw me setting out 150 strawberry plants that first year, every one of them asked what I thought I was going to do with all those berries. “Am I the only person on this block who likes strawberries?” I remember replying. The following spring, not a single neighbor, I might add, refused the 3 quarts of succulent jewels we distributed equally among the households that had helped in the neighborhood gardens.





Tim Rinne and Kay Walter — the author and his wife — added a greenhouse to their home in 2010 (left). With the sun as its only heat source, the greenhouse allows the community to grow cool-weather crops, such as lettuce, in winter (above).

In the meantime, Linda, Ed and another neighbor obtained permission to develop a community garden space in the empty backyard of another neglected property, adjacent to the one Kay and I had bought. And in the summer of 2011, as we'd hoped would

happen, Linda and Ed were able to acquire the property, adding a fourth lot to our burgeoning project. They embarked on the same grueling house- and yard-renovation process that Kay and I had gone through. The soil in the backyard was awful—mostly

composed of clay and rubble. But it has since been amended and the property has already been successfully integrated into the neighborhood garden.

And, like magic, the transformation we performed on our properties spread to the rest of the block. After gardening with us for a year, two of our neighbors were inspired to establish plots in their own small yards. Two more homeowners who live across the alley, and whose health conditions prohibit them from getting out to garden, offered us access to their backyards as well. And an investor-owner was so impressed with what we were doing to the neighborhood that he offered us his entire yard for more growing space. In return for the use of their properties, the rest of us share our surplus vegetables and fruits with them. In five years, we've carved out more than a half-acre of garden and orchard space in our single city block, with 50 fruit and nut trees, nine grape arbors, and 15 berry patches.

## The Hawley Hamlet, One Square Block



## So, What's a Hamlet?

For the first couple of years, we described what we were creating as a "village." But that term always sounded a bit presumptuous to me; what we were doing seemed a notch down from that.

The word "hamlet," I discovered, originally referred to a community too small to have a church or shops. Hamlet residents were dependent on a nearby



Members of the Hawley Hamlet in Lincoln, Neb., have upturned their once-grassy lawns to free up space for front-yard gardening and edible landscaping.

village to supply the necessary services the hamlet lacked. That definition sounded right on target—we're too small to be totally self-sufficient and will always be embedded in Lincoln's urban core. Living as we do in the Hawley Historic District, we now refer to our community homestead as the Hawley Hamlet.

All told, 20 families now participate in our hamlet. Everyone has his or her individual vegetable plot. We share the fruit harvest from the community orchard, and in the three "donated" backyards, we've established potato, bean and gourd patches that we rotate annually, sharing the harvests equally among the neighbors.

## Chickens, Bees, Solar Panels and More

Our corner lot's location offered us no secluded place for a chicken coop if we were to even remotely abide by city ordinance. The only suitable location near our home was the driveway of our next-door neighbor Barrie. Figuring I had nothing to lose, I asked Barrie whether he'd be interested in keeping chickens. He jumped at the idea, and since May 2011, Barrie, his boarder, Pat, and I have been the proud papas of four adorable Rhode Island Reds. Like clockwork, each reliably provides an egg every 30 hours, which keeps our households amply supplied.

When we first launched the community homestead, I was pretty hard-core about everyone growing only food. But thanks to Linda's sensible counsel, I lightened up, particularly after she pointed out how critical flowers are to the bees we rely on for pollination. At Linda's suggestion, we jointly took a class on beekeeping and set up our first hive in April 2012.

Kay and I have also been concentrating on turning our 108-year-old house into a "green" residence. In 2009, we installed a geothermal heating and cooling system and saw our utility bills plummet. In 2011, we installed rooftop solar panels on

our home and began generating energy, rather than just using it. We've also insulated our walls, installed energy-efficient lighting and low-flush toilets, and have rain barrels beneath every downspout.

What we've enjoyed most out of all of the green improvements we've made to our property, however, is the attached conservatory we added to our home (we call it the "greenhouse"). We live in a historic district, so we wanted to ensure that we built something compatible with the original architecture of the neighborhood. In my gardening reading, I'd come across the works of Eliot Coleman—an organic farmer in Maine who grows food year-round in unheated greenhouses—and wondered whether we could do something similar. We thus designed our greenhouse to have a dirt floor with no heat source other than the sun.

We've also erected a simple, 15-by-30-foot hoop house in one of the neighborhood gardens that cost us less than \$1,000 in materials. With just transparent plastic sheeting for a cover, we're able to grow salad greens for the block long after the first frost has ended the gardening season outside.

## Building Neighborly Bonds

Everything I've described here we've done without government assistance. Our hamlet is a self-initiated, self-supported urban homestead that we'd love to see replicated all over the country. The feature that makes this hamlet concept so attractive is that it can be imitated in any urban setting by neighbors building bonds with one another, collaboratively growing food in neighborhood gardens, making optimal use of their local resources, and lightening their footprint on our overstressed ecosystem.

And gardening, I can tell you, is a veritable magnet for neighbors. In my 30 years of political organizing, I've never seen anything break down barriers and foster dialogue like growing food does. In the first 22 years that Kay and I lived on our block, we knew maybe one or two of our neighbors by name. Today, after five years of working to build the hamlet, there are no strangers. We know everybody. We all work together to produce delicious, high-quality food, and we enjoy constantly learning new things. We also feel more secure and content.

Anyone can do what we have done. And the place where it can all begin, fittingly enough, is in the garden. 🌱

## Have a Homestead Hamlet?

We love this new term "homestead hamlet"—it has such a friendly, cozy sound to it. And we bet quite a few of you are doing similar things all across the country. Send us reports on your local homestead hamlet projects, and we'll share them in the magazine or online.

We invite all hamlets to schedule open houses and workshops for this September's International Homesteading Education Month (go to [www.MotherEarthNews.com/Homesteading-Education](http://www.MotherEarthNews.com/Homesteading-Education) for details). If you want to develop a hamlet in your neighborhood, why not let this article be a conversation starter with your neighbors?

Tim Rinne lives in Lincoln, Neb., and is the State Coordinator of Nebraskans for Peace. He can't credit enough all the neighbors who have come together to create the Hawley Hamlet.

# *From Field to Flour* HOW TO GROW WHEAT

Determine which types of wheat you should grow, plus learn how to cultivate and process this staple grain for use in the kitchen.

By Stan Cox

**P**retty much anywhere in North America, growing wheat is easy if you have a modest-sized plot of unshaded ground, the right seed, and the help of a few small implements.

Depending on your weather conditions and your growing practices, a small plot of wheat—say 500 square feet—should yield 15 to 50 pounds of grain. Yes, that's a pretty wide range, but soils, rainfall, temperatures, storms, diseases, pests and plain luck can vary from place to place and year to year. Those forces dramatically influence wheat's yield and quality. But your yield starts with your choice of which varieties of wheat to sow.

## Choose a Variety

After you've decided to grow wheat, you'll need to make three initial choices: winter or spring type, red-grained or white-grained, and free-threshing or hulled (with the hull intact). For details on various types of wheat, including durum, spelt, emmer and einkorn, see the article about wheat in our February/March 2014 issue, or online at <http://goo.gl/w6JX78>.

Winter wheats are sown in fall and harvested the following spring or summer. Spring wheats, which can be either common or durum wheats, are bred for Canadian and northerly U.S. regions where wheat can't survive through winter; they are sown in early spring and harvested in summer. The seasonal labels are

important: A winter variety that does not experience cold weather will produce no grain, while a spring variety sown in fall will die in winter freezes (unless you're in a frost-free region, where spring wheat varieties can be fall-sown).

The choice between red or white wheat is less consequential, unless you're growing wheat in an area with high summer rainfall. Under those conditions, white wheat kernels are more susceptible to premature sprouting in the head than red ones. Even a slight start on sprouting can ruin the bread-making quality of wheat grain.

Depending on the region, a wide range of diseases and pests can plague wheat. Recently developed varieties tend to have better resistance than older ones. That is





Plant a handful of speltz (left) and grow a small stand of wheat even in a backyard garden (right). Such a plot is easily harvested with a hand sickle.

not always true, however, and almost every variety has an Achilles' heel or two. If you are risk-averse, avoid varieties that are especially susceptible to diseases that often strike wheat in your area. Ask your local farm supplier or extension office to recommend resistant varieties.

The hulled ancestors of modern wheats—among them einkorn, emmer and speltz—can be winter or spring type, and either red or white. These varieties are becoming more popular in the grow-your-own community because of a reputation for good taste and quality. But if your home-grown wheat is hulled, you must accept that grain from these old-timers requires more processing to be used for food (see “Ancient Wheats and Their Pesky Hulls,” Page 48).

## Choose High-Quality Seed

At least as important as variety selection is the physical quality of the seed you sow. “The one really important aspect that is often overlooked is that you need to start with good, quality seed that is true to type, disease- and insect-free, and not contaminated with weed seed,” says Cornell University professor and wheat breeder Mark Sorrells, who leads a project on heirloom organic wheat varieties.

When you buy seed, it should be plump and free of dirt, weed seed and other foreign material, and its label should include, at a minimum, the variety name

and germination rate. Don't worry that you might accidentally buy transgenic (genetically modified, or “GM”) seed; no GM wheat seed is on the market. A wheat variety is not like a corn hybrid—its harvested seed will produce a crop of that same variety when sown the next season. When producing your own seed, you can ensure your homegrown wheat's quality during harvest and processing just as you would for wheat you plan to consume (more on that ahead).

**A wheat variety is not like a corn hybrid — replanting its seed will produce a crop of the same variety.**

## Ready the Soil

A soil test from your local county extension office or university can tell you whether your soil is too acidic (therefore requiring lime) or too alkaline (see Page 66 for solutions), whether it's deficient in any of the three big nutrients—nitrogen, phosphorus and potassium—and whether you need to be applying any of the minerals wheat requires in much smaller amounts.

Thanks to its high protein content, harvested wheat contains large quantities of nitrogen that the plant acquires from the soil. An essential element, nitrogen must be restored to the soil in a form

that can be taken up by plants grown the next season. Composted animal manure and vegetative compost, which also add organic matter to the soil, are preferred amendments commonly spread on a plot before sowing seed. These materials have relatively low nitrogen content, however, so you'll need to use more than you'd think for optimum fertility. In his book *The Organic Grain Grower* (available on Page 81 and highly recommended by MOTHER EARTH NEWS), Jack

Lazor recommends 4 tons of composted manure or 12 tons of rotted but non-composted manure per acre of wheat. For a 500-square-foot home plot, that would be about 90 or 275 pounds, respectively, of composted or rotted manure. A more elegant way to improve soil nitrogen and organic matter is to split the plot in half, if it's big enough, and alternate your wheat crop with a “green manure” planting of a nitrogen-fixing legume, such as white clover, that you'll later work into the soil.

Cultivating a plot before sowing incorporates organic matter and nutrients into the soil; it's then necessary to groom the surface layer so that planted seeds can germinate easily and seedlings can emerge and grow. While a garden-style, gas-powered mechanical tiller is the most common small-plot tool for the job, it will pulverize the soil and produce a too-fluffy seed bed. Many people don't like



A farmer uses a team of Belgian draft horses and a grain drill to plant spelt in Pittston, Maine (left). Wheat turns from the “milk” stage to the “dough” stage as it ripens (right).



the expense or hassle of buying, renting or borrowing the machine, let alone the noise and exhaust fumes. Instead, you can prepare a small plot using hand tools, such as spades and rakes. An especially useful tool for the job is a broadfork.

## Sow the Seed

After your soil has been raked or harrowed and is relatively level and clod-free, sow the seed. North Dakota State University research specialist Steve Zwinger says avoiding a too-thin planting is crucial, because leaving too much

space between wheat plants invites weed problems. In the Plains states, a common sowing recommendation is a million seeds per acre, which would be roughly a pound of healthy-sized seed per 500 square feet. But keep in mind that sowing very small or very large seed will give very different numbers of seed. The amount of seed you sow in a very dry location with no irrigation should be lower, and the amount should be higher in regions with ample moisture.

You can broadcast seed with a hand-cranked rotary seeder like those used for lawns, or simply by hand-tossing, followed by raking the seed in. But Zwinger, like most experts, recommends sowing in rows, which provides for better germination,

more uniform stands and easier weed control. To do so, make furrows with a hand or wheel hoe, drop in seed, and cover. Even better, use a push-type garden seeder, such as the traditional Planet Jr., or a jab-style corn planter (for more about push seeders, see our article “Choose the Right Garden Seed Planter” at <http://goo.gl/S8F8P2>). Space rows 6 to 7 inches apart to provide effective ground coverage and weed control.

A solid stand of wheat is good at out-competing weeds; nevertheless, whatever your sowing pattern or density, weeds will turn up uninvited. There will be no way around hoeing or, later, pulling weeds, and the reasons for doing so are not solely cosmetic. Weeds compete with your home-



GrainMaker mill with Homestead Huller Kit

## Ancient Wheats and Their Pesky Hulls

Liberating the grain of an einkorn, emmer or spelt crop doesn't end with threshing. North Dakota State University's Steve Zwinger, who has done research on emmer for 20 years, says, “Hulled wheats are actually the easiest to *thresh*. But for small plots, it's hard to come up with an effective, inexpensive way to *dehull* them.” Because hulls adhere tightly to the relatively soft kernel, they can be difficult to rub or knock off without also cracking the kernel.

The GrainMaker company will offer a Homestead Huller Kit as an accessory for its Model No. 99 mill later this year (shown in photo at left), priced at \$275 per pair of dehulling disks. With interest in hulled wheats growing fast, Zwinger says, we can expect growers themselves to come up with a new generation of small, relatively inexpensive dehullers. He says that in these situations, farmers are the creators. As an example, Zwinger points to Nigel Tudor of Weatherbury Farm, located 40 miles south of Pittsburgh. Tudor, with funding from the U.S. Department of Agriculture, is building a dehuller for emmer and spelt. But, Tudor warns, his dehuller is designed for larger-scale crops. “It would require a minimum of 60 pounds of grain to work efficiently,” he says.



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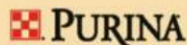
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As the wheat nears maturity (left), the best way to test its readiness is to bite a kernel. If it's crisp, the wheat is ready for the scythe (right).

grown wheat for light, rooting space, water and nutrients, and if left to grow, they'll produce a lot of seeds, each one of which will either contaminate your harvest or go into the soil to increase the number of weeds that will come up next year.

## Reap the Wheat

Wheat is ready to harvest when the wheat grains are anywhere from mature with still-high moisture (the "hard dough" stage) to dead ripe and fully dry. When the grain is ripe, cut by hand with a sickle or scythe, or with a gas-powered sickle-bar mower. If you cut the plants low, tie them into shocks and stack them against one another to keep heads off the ground and expose them for better sun- and air-drying (see photo on Page 46). With a small plot's harvest, cover the shocks with a large tarp in case of rain. If the weather's warm and dry and the wheat is dead ripe, cut with a sickle at any point below the heads and

thresh the heads right away. Otherwise, the shocks will have to stand until fully dry.

## Thresh Your Harvest

You'll then face the age-old question of how to thresh out the grain (unless you've shelled out several hundred dollars for a European hand-held "combine," which is used commercially for grain sampling, and cuts and threshes heads right in the field in one step). For easy-threshing wheats, some growers find they can simply grab small bundles and beat the grain out onto a threshing floor or tarp. A wooden box with a sheet of corrugated rubber (the material used for doormats and runners) glued to its inner bottom surface and a short piece of 2-by-4 with the same rubber on one side work well together to rub out the grain. Do-it-yourselfers have designed a variety of larger hand-cranked threshing devices, and you can obtain the plans for some of them. Professional

wheat breeders have long used machines for threshing large numbers of small grain bundles, and those small threshers (along with seed-cleaning equipment) sometimes show up among aging items being sold off by universities and seed companies. A treadle-powered thresher, selling for \$900, is available from the Back to the Land Store (see photo, opposite page). You can watch a video of the thresher in action at <http://goo.gl/hJNdqk>. Find source information for all of these machines in "The Tools You Need" on Page 51.

Ancient wheats will require an additional step to free the kernel from its hull (see "Ancient Wheats and Their Pesky Hulls," Page 48).

## Clean the Grain

Whatever your wheat variety and means of threshing or dehulling, the seed you obtain will still be mixed with chaff, dust and other inedible material



Wielding sickles (left), a work party harvests a wheat plot (right) on Crabapple Farm in Chesterfield, Mass.



that must be removed. Winnowing—using air movement to separate grain from chaff, dust and smaller weed seeds—is necessary for grain that’s to be milled into flour as well as for the portion that’s to be saved and sown to produce next year’s crop. In manual grain-handling, winnowing involves slowly pouring a stream of grain from one container into another while in a stiff breeze or in front of a small fan to remove lighter material. In his book, *Lazor* describes a winnowing system for small amounts of grain that uses 5-gallon plastic buckets, a three-speed box fan (or a shop vacuum), a tarp, and a good bit of trial and error.

With any winnowing system, multiple passes are usually necessary, and



A treadle-powered thresher, such as this one from the [Back to the Land Store](http://backtothelandstore.com), can speed up processing. See a video of one in action at <http://goo.gl/hJNdqk>.

that still leaves untouched any material that’s similar to—or larger than—a wheat kernel in size or density. *Lazor* suggests making wood-framed screens using wire mesh to remove this debris. You need one screen with openings large enough for wheat to fall through and another that will keep wheat on top and let smaller seeds and other material fall through. Grain screens are also available commercially, as are power-driven devices with complex arrangements of shakers, screens and blowers. But such equipment, like the small combines used by wheat researchers, is expensive if purchased new. Try to scavenge old screens, combines and other equipment

from seed or grain companies or universities.

Your grain will then be ready to be milled or eaten as whole cooked grain. (See the article about wheat in our February/March 2014 issue or read it online at <http://goo.gl/w6JX78> for best cooking uses for various types of wheat.) To set aside seed for the next crop, seal it tightly in a rodent-proof container and keep it in a cool, dry place. To prevent insect damage to grain that’s to be used for seed (not for food), mix in a little diatomaceous earth—a natural material that comes from micro-

scopic sea organisms. Silica gel packets, changed as needed, will help keep moisture levels under control. Before you know it, that seed will be back in the ground for another turn of the grain cycle—and you’ll have mastered the craft of growing this ancient crop. 🌾

## The Tools You Need

Searching for equipment for small-scale grain growing and processing? Browse these resources to locate what you need, plus acquire more know-how.

### PLANTING AND HARVESTING

**Ferrari:** <http://goo.gl/enfzKS>

**Push seeders:** <http://goo.gl/S8F8P2>

**Scythes, serrated harvest sickles**

**and sickle-bar mowers:**

<http://goo.gl/EpNXbJ>

**Using a scythe:** <http://goo.gl/nyxMwX>

### THRESHING, DEHULLING AND MILLING

**All kinds of equipment:**

<http://goo.gl/Z8Cq2r>

**Thresher:** <http://goo.gl/tNQ6sz>

**Hand-operated dehuller:**

<http://goo.gl/PDbYbA>

**Small flour mill:** <http://goo.gl/5EHFQj>

**Hand-cleaning screens and pans:**

<http://goo.gl/Dd83mA>

**Countertop grain mills:**

<http://goo.gl/nqtc38>

Stan Cox is a sustainable-living activist and plant breeder at The Land Institute in Salina, Kan. He has worked as a USDA wheat geneticist and his most recent book is *Any Way You Slice It: The Past, Present, and Future of Rationing*, available on Page 81.



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# BUY IN BULK

for Big  
Savings on  
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You can slash your family's food costs in half—and support local farmers—by buying meat, produce and dry goods in bulk.

By Rebecca Martin  
and Dan Sullivan

**W**e all have a taste for good food, but quality groceries can come at a high price. Whet your appetite with this money-saving advice: Purchasing bulk food is a highly effective way to cut expenses and eat locally. You may already shop the bulk department of your co-op or grocery store, but cutting out the storefront altogether can offer even more financial, environmental and gastronomical benefits. Besides making your food shopping easier and less frequent,

bulk groceries are often of higher quality than packaged supermarket products. And the money savings will wow you: See our chart on Page 57 for specific savings on 20 items.

If you choose to eat organic, the savings from buying in bulk can be even more staggering: A 2012 study by the Food Industry Leadership Center at Portland State University found that consumers saved an average of 89 percent compared with supermarket costs when they bought large quantities of certain organic foodstuffs, including grains, beans and spices (read more at <http://goo.gl/BBKsgS>).

Buying food in bulk may seem intimidating if you don't know beans about it. We'll walk you through the key steps of buying in bulk on your own from local farmers and, for even greater savings on more items, joining a food-buying club.

## Member Benefits

Buying clubs are groups of individuals and families who merge their grocery lists to buy food in big quantities at close-to-wholesale prices. Clubs make a collective purchase once or twice per month, usually through a single wholesaler, nabbing substantial savings on large-quantity purchases of everything from toothpaste to whole grains. As our chart shows, you can routinely save as much as 50 percent. Food-buying clubs also build community—members get to know each other while coordinating orders and volunteering time to divide the food.

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Buying in bulk reduces waste, especially when packing materials are reused (as they are in the Know Thy Food buying club in Portland, Ore.).

Purchasing bulk food through a club requires thoughtful planning. You'll need enough jars, bins and tubs to pick up and store your portion of brown rice, wheat, nuts and more. A chest freezer is a good investment to prevent large purchases of butter, meat, flour and nuts from spoiling. Some clubs ask their members to chip in on shared freezers, a scale for dividing orders, and even a grain mill for grinding fresh flours.

Buying-club households usually waste less food because their cooking habits become grounded in a pantry mentality: Meal planning begins with the goods already stocked at home. Avoid purchasing unfamiliar foodstuffs until you're sure you'll eat them. Try a small package from the grocery store first, so you don't get stuck with a 10-pound bag of hull-intact buckwheat that needs to be ground twice to become a usable flour you end up not liking much. Keep track of what your family actually eats, too, and which foods linger on your pantry shelves despite your best culinary inventions.

## Welcome to the Club

Hundreds of food-buying clubs are scattered all across North America. The staff at your local food co-op will probably be aware of any clubs in your area. If you can't find one nearby, cook one up by following these steps. *(If your club*

*is looking for new members, please add it to the new Google map we've created at <http://goo.gl/VbNdBk> so others can find you. —MOTHER)*

**Recruit members.** Many clubs have at least 20 members because some wholesale food distributors require minimum orders of \$500 or more. The bigger the group, the greater the savings, because large orders lead to volume discounts and reduced shipping costs. You can recruit members from among your friends, relatives and groups you're active in. Tack up a notice in the break room

The bigger the buying club, the greater the savings: Large orders lead to volume discounts.

at work. Maybe schedule a brown-bag lunch meeting to discuss the benefits of buying in bulk and how a club might work. How often will you order? Will you limit the types of goods purchased? Can members share (or "split") cases and bags? If so, who will coordinate that step? When and where will your club take deliveries?

**Select a vendor.** You'll want to choose companies that don't limit their sales to commercial accounts when selecting a vendor for your club. See "Resources"

on Page 58 for companies that sell to buying clubs, or contact an existing buying club for vendor recommendations.

You can also strengthen your area's food system by buying some items directly from local producers.

**Set up an ordering strategy.** The Web has made compiling orders more convenient than ever for food-buying clubs. You can place an order with a credit card, and schedule a drop date and location entirely online. A few national distributors use e-commerce software that tallies totals in real time as members add items to a club-specific shopping cart, making it easy to see when minimums are met.

Most food-buying clubs have one or two point persons who take the lead in sending reminders, placing orders and scheduling distribution. Your club may decide to reward these individuals with a higher markdown. Distributors generally won't ship partial cases, so holding monthly meetings is a good way for members to decide on splits. The savings are huge on a 25-pound bag of organic black beans—more than \$2 per pound when compared with a 1-pound package—but unless your family truly loves a lot of legumes, dividing that bag with at least one other household will make the purchase more feasible.

**Secure a drop-off location.** A club can receive bulk food shipments at a mem-



Members of Maine's Kennebec Local Food Initiative weigh and divide the club's bulk purchases.

ber's garage or possibly at a member's workplace. Someone will need to be present to accept the goods and check the delivery against the original order for mistakes and out-of-stock items. Keep in mind that delivery locations without refrigeration will limit ordering options.

**Develop a distribution scheme.** The cheaper prices your club receives for bulk food are often subsidized by volunteers who split the orders—they open up the bags and weigh, package and label the contents based on each member's order sheet. Distribution helpers should receive deeper discounts because they volunteer their time, or the job should rotate through the club so everyone takes a fair turn. Coordinating this splitting process may be more trouble than

the savings are worth to your group. Some clubs forgo splits, so members must choose between smaller bags at a reduced discount or larger bags requiring proper long-term storage at home.

**Pay the bills.** Perhaps the busiest club member, the treasurer figures splits, sales taxes and discounts, and ensures that all members pay their share. Some clubs rotate this task among members. Calculating splits is much easier when you use a spreadsheet, or you can register for the free club-specific software offered at [www.FoodClub.org](http://www.FoodClub.org).

## Food for Thought

Now that you've learned how to save money on food by starting your own buying club, you'll need some tips for

keeping those volume purchases at optimal freshness and nutritional value until they end up on your plate. In addition to the following advice, "Save Money on Groceries" at <http://goo.gl/hyMVWH> has more suggestions on storing sizable amounts of food.

**Dry goods.** Foodstuffs that don't contain liquid are among the easiest items to store. Distributors offer dry goods—sometimes including rare varieties of beans, rice and grains—in bags weighing anywhere from 1 to 50 pounds. The savings can be substantial, particularly on large bags of organic dry goods: A 50-pound sack of wheat berries costs less than 50 cents per pound, while a 5-pound bag of organic whole-wheat flour at the supermarket runs as much as \$1.80 per pound—nearly four times more!

Store dried beans in an airtight container in a cool, dry environment away from direct sunlight, and they'll last well over a year. Nuts will keep in a refrigerator or freezer for up to two years.

Grains are a staple in almost every larder, but they're challenging for long-term storage because of meal moths, weevils and other pests. One way to break the life cycle of weevils is to freeze grains for at least a week before storing them in a dry, dark environment at 60 degrees Fahrenheit or cooler. Grains can be stored in a freezer indefinitely. When freezer space isn't available, store grains in



Consider how you'll store bulk food before you buy. For example, freezing fruits and vegetables preserves their flavor and texture for up to 18 months.

5-gallon plastic buckets with tight lids. Two 5-gallon buckets will easily hold 50 pounds of wheat berries. The buckets stack nicely and can be picked up at low—sometimes even no—cost from bakeries and fast-food restaurants.

**Produce.** Mouthwatering, ripe produce is a lot cheaper if purchased in

season from local growers. A bushel of conventional green peppers costs about 80 cents per pound at a farmers market in August, while a handful of peppers will be priced at \$2 per pound at a grocery store in February. True, freezing or canning all of that fresh produce will take some time, but the job won't seem

onerous if you preserve small batches several times a week or organize a canning bee with friends.

Crops need to be matched with their preferred storage conditions, because some fruits and vegetables like cold and moist settings while others prefer warm and dry ones. Find detailed advice for

## Estimated Savings From Buying in Bulk

These estimates are averages of prices obtained from at least three vendors.

Side of Beef	Direct-From-Farmer Price	Supermarket Price	Savings
Conventional	\$3.97/lb.	\$6.56/lb.	39%
Grass-fed	\$6.64/lb.	\$10.77/lb.	38%
Certified organic	\$8.56/lb.	\$13.34/lb.	36%

Beef costs were figured assuming a yield of 225 pounds per side, packaged as 30 lbs. of ground beef, 50 lbs. of chuck and arm roasts, 20 lbs. of rib roasts and rib-eye steaks, 17 lbs. of short loin strip steaks, 20 lbs. of sirloin steaks, 50 lbs. of round and rump roasts, 13 lbs. of brisket, and 25 lbs. of flank and skirt steaks and short ribs. This mix of cuts from a side can vary based on the instructions you provide to the butcher. "Direct-From-Farmer Price" estimates include butchering costs.

Dry Goods	Food-Buying Club Price	Supermarket Price	Savings
Rice, long-grain white, enriched	\$0.50 (20-lb. bag)	\$0.90 (5-lb. package)	44%
Rice, long-grain brown, organic	\$1.17 (25-lb. bag)	\$2.22 (2-lb. package)	47%
Pinto beans, dried, conventional	\$0.88 (25-lb. bag)	\$1.64 (1-lb. package)	46%
Pinto beans, dried, organic	\$1.11 (25-lb. bag)	\$2.49 (1-lb. package)	55%
Pinto beans, canned, conventional	\$0.03 per oz. (108-oz. No. 10 can)	\$0.05 per oz. (one 15.5-oz. can)	45%
Pinto beans, canned, organic	\$0.09 per oz. (twelve 15-oz. cans)	\$0.13 per oz. (one 15-oz. can)	35%
Unbleached flour, conventional	\$0.56 (25-lb. bag)	\$0.48 (5-lb. package)	0%
Unbleached flour, organic	\$0.73 (25-lb. bag)	\$1.35 (5-lb. package)	46%
Peanuts, conventional	\$1.05 (25-lb. bag, roasted in shell)	\$1.90 (3-lb. package, in shell)	45%
Peanuts, organic	\$2.78 (25-lb. bag, dry-roasted, shelled)	\$6.49 (1-lb. package, dry-roasted, shelled)	57%
Potatoes, russet, conventional	\$0.22 (50-lb. bag)	\$0.51 (5-lb. bag)	57%
Potatoes, russet, organic	\$0.76 (50-lb. bag)	\$1.26 (5-lb. bag)	40%

All costs are per pound unless otherwise noted. "Food-Buying Club Price" estimates are based on bulk orders purchased from wholesale distributors in the quantities listed.

Fresh Produce	In-Season, From-Farmer Price	Supermarket Price	Savings
Tomatoes	\$1.01/lb.	\$2.94/lb.	66%
Green peppers	\$0.84/lb.	\$2.13/lb.	61%
Blackberries	\$1.75/lb.	\$5.18/lb.	66%
Apples	\$0.49/lb.	\$1.07/lb.	54%
Strawberries	\$1.60/lb.	\$2.28/lb.	30%

"In-Season, From-Farmer Price" estimates are for 25-pound quantities of conventional produce purchased in season at farmers markets or from pick-your-own operations.



Jars, bins and a chest freezer are wise investments for storing bulk food purchases. One cubic foot of freezer space holds about 35 pounds of meat.

storing 20 common vegetables and fruits at <http://goo.gl/HZr37V>.

The simplest way to squirrel away your stockpile of potatoes, carrots and other root crops is to keep them in the ground under a thick blanket of mulch, in a trench silo or pit beneath a layer of soil, or inside a buried garbage can. Find instructions for making five easy outdoor root cellars at <http://goo.gl/ndctT6>. Store winter squash and onions inside your garage, in a basement—even in a cool bedroom.

Canning is the traditional preservation method for most fruits and vegetables. To learn how to can, refer to the Home Canning Guide at [www.MotherEarthNews.com/Canning](http://www.MotherEarthNews.com/Canning). Another way to lock in taste and nutrition is by blanching and freezing (check out “Freezing Vegetables From Your Garden,” <http://goo.gl/AtQy45>). Most fruits and vegetables freeze well for up to 18 months.

Use energy from the sun to preserve fresh produce with a solar food dehydrator. Dehydrating with a solar (or electric) food dryer locks in peak flavor and nutrients while removing the moisture that causes fruits and vegetables to spoil. Store dried produce in jars or bags. Learn how to build a simple solar food dryer using cardboard boxes at <http://goo.gl/NFdJN9>. (Watch for plans to build a state-of-the-art sun-powered food dehydrator in our June/July 2014 issue. —MOTHER)

**Meat.** The priciest line item in a non-vegetarian budget is usually meat.

Buying beef and pork in bulk results in substantial savings, particularly on premium cuts. If you buy half a cow directly from a farmer, your take-home cuts can include roughly 17 pounds of strip and tenderloin steaks at about \$3.97 per pound. The savings are more than 63 percent when compared with 17 pounds of the same cuts purchased from a conventional grocery store at \$11.00 per pound. And that’s just for conventional beef—don’t miss reviewing the savings from buying grass-fed and organic meat in large quantity in the chart on Page 57.

Buying meat in volume is a great way to build relationships with local farmers, too. Ask a butcher—maybe one at a local food co-op—where to buy hormone-free pastured animals from a reputable producer, or locate names via the pastured producers listings for your state at [www.AmericanGrassfed.org](http://www.AmericanGrassfed.org), [www.Eatwild.com](http://www.Eatwild.com) and [www.LocalHarvest.org](http://www.LocalHarvest.org).

Figure out how to store your portion of the animal before you buy. One cubic foot of freezer space holds 30 to 35 pounds of beef. After subtracting processing waste, a 1,000-pound cow yields about 450 pounds of meat from the whole animal, 225 pounds from a side (half a cow), or 110 pounds from a quarter. A 250-pound hog, slaughtered and dressed, produces about 144 pounds of cuts from the whole animal, or 72 pounds from a half.

Butchers and meat processors typically freeze cuts inside vacuum packs or wrapped in butcher paper. Freezing

makes buying in bulk convenient, and fresh-frozen beef and pork are safe to eat indefinitely, although the quality begins to suffer after six months to a year.

Now that you’re stocked up with tips on how to save money on food, just remember: Plan your household’s bulk purchases carefully, figure out how you’ll store the food, and take pride in keeping your belly full for less. 🌳

## RESOURCES

### WHOLESALE DISTRIBUTORS SERVING BUYING CLUBS

[www.AssocBuyers.com](http://www.AssocBuyers.com) (Northeast)  
[www.AzureStandard.com](http://www.AzureStandard.com) (Entire U.S.)  
[www.CoopPartners.coop](http://www.CoopPartners.coop)  
 (Upper Midwest)  
[www.FrontierCoop.com](http://www.FrontierCoop.com) (Entire U.S.)  
[www.GlobalOrganics.ws](http://www.GlobalOrganics.ws) (Southeast)  
[www.HummingbirdWholesale.com](http://www.HummingbirdWholesale.com)  
 (Pacific Northwest)  
[www.UnitedBuyingClubs.com](http://www.UnitedBuyingClubs.com)  
 (Entire U.S.)

### ORGANIC BULK FOODS

[www.BobsRedMill.com](http://www.BobsRedMill.com)  
[www.EdenFoods.com](http://www.EdenFoods.com)  
[www.HealthyBuyersClub.com](http://www.HealthyBuyersClub.com)  
[www.PleasantHillGrain.com](http://www.PleasantHillGrain.com)

### FIND LOCAL FARMERS

[www.AmericanGrassfed.org](http://www.AmericanGrassfed.org)  
[www.Eatwild.com](http://www.Eatwild.com)  
[www.LocalHarvest.org](http://www.LocalHarvest.org)  
[www.PickYourOwn.org](http://www.PickYourOwn.org)  
[www.TheOrganicPages.com](http://www.TheOrganicPages.com)  
[www.MotherEarthNews.com/Facebook](http://www.MotherEarthNews.com/Facebook)



## BUY LOCAL!

Connect with local producers via the MOTHER EARTH NEWS state and province Facebook pages at [www.MotherEarthNews.com/Facebook](http://www.MotherEarthNews.com/Facebook), Local Harvest’s directory of producers ([www.LocalHarvest.org](http://www.LocalHarvest.org)), or your local farmers market.



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- We all know now how important minerals are to the body and minerals are the energy for ALL soils, animals, and humans. Dino-Green Mineralizer is like a 'super multi-vitamin for your plants and soils'!

- **Helps heal ALL soil types!** Great for recharging soil in outdoor gardens, garden boxes and deck containers, indoor herb gardens & plants, as all composts and potting soils need mineral energy as organic matter needs minerals to catalyze and break down.

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## Ask Yourself...

- Does your soil have all the energy it needs? Due to over use of chemicals in our nations soils, most have been depleted of essential minerals, micro-nutrients, and trace elements. Regain those lost minerals with our **Harmonic Balance Blend™**.

- Dino-Mite Dino-Green Mineralizer is the finest blend of minerals available to recharge your soils. Our proprietary blend of all natural occurring minerals is the purest blend of non-toxic minerals available today. It has taken over 35 years of research and testing to achieve this **Exclusive Life-Force Formula™**

**We've done all the work for you!** We have taken those proprietary minerals and blended them in a way a chef bakes a cake, the result – we call this our Harmonic Balance Blend™. Dino-Green Dino-Mite mineralizer plant and soil amendment provides you with all the convenience and cost benefits - **imagine the cost of buying all the ingredients yourself?** From the beginning Dino-Green **SAVES YOU MONEY** and that's just the start!

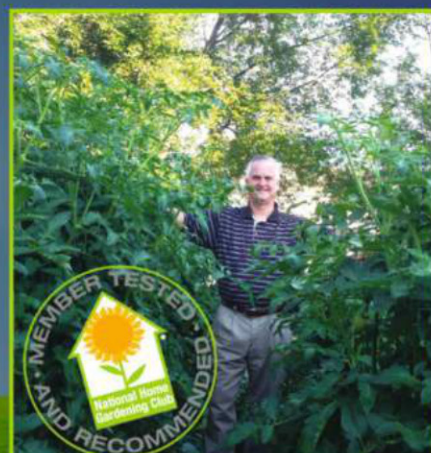
You'll feel better knowing your family is **healthier** just by using an all-natural organic mineralizer. We develop our probiotics and immunities when we are babies and very young children just through our exposure to natural elements such as dirt, eating dirt, bugs, flowers, etc. If you use chemical products on your flowers, garden, lawn, trees, shrubs, and so on, **what kind of environment are you creating?** It's important that we create a very healthy, strong, and natural environment that is friendly to good and beneficial insects.

**Technical Note** - Our mineral blend combined, creates hundreds to thousands of micro-mineral compounds that create a great stimulation and proliferation of micro-organisms, protoplasm, enzymes,

Circle #20; see card pg 97

fungi, and more, so at a microscopic level is where the liquid process for the roots takes place. The roots are the brains of the plant when all components and nutrients are in place for growth, the plant springs to life! Dino-Green Mineralizer Soil Amendment has been designed and proven to create this magical process quickly and naturally! **Anything with roots will love you for adding this!**

Great news for the remineralizers and rock dusters that already know the value of what we have created – a convenient and optimum blend for superior results! It's everything you've been waiting for... you'll love the results, nutrition, and



Me standing in my bed of Dino-Green fed tomatoes. I really like the product and I would like to lead many others to the natural route. ~J. Sikina-Director of New Product Development, W. Atlee Burpee Co.


exquisite flavor. You'll appreciate that we use only pure non-toxic mineral groups - **NO animal by products** as it is very pure, concentrated, and bio-available to all plants and soil types.

Try this on one of your struggling houseplants or tomato plants (tomatoes love Dino-Mite!) \*See our Spring special at **www.dino-greenmineralizer.com!**

**Try This, Your Plants Will Love You For It!**

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Make this root cellar by burying a new concrete septic tank into a hillside.

# ROOT CELLAR PLANS

## *Take It Underground*

Turn a never-used concrete septic tank into an old-fashioned root cellar to store your potatoes, winter squash and so much more.

By Steve Maxwell

Illustrations by Len Churchill

**T**he cool, moist and dark conditions of a root cellar make it the perfect place to keep many fruits and vegetables crisp and delicious for weeks—even months—of storage. And while there are myriad ways to store vegetables, our innovative plans show you how to build a root cellar by modifying a new, precast concrete septic tank. By following the plans, you'll cut an entrance, install a door, add a pair of vent pipes and cover the tank with soil to bring an old-fashioned, walk-in cellar into your modern life.

### Think Tank

You'll want to buy an unused septic tank for this root cellar design, but look for a deal to avoid paying full price. A percentage of all precast concrete tanks end up with small manufacturing defects that prohibit them from being used for sewage treatment. As long as the tank is solid and sound, a chipped edge or a patchable hole won't prevent it from being a root cellar. You won't need the plastic fittings or effluent filter found inside most septic tanks, so ask the supplier to remove these before delivery.

Tank size is another detail you'll need to consider. The capacity of septic tanks is measured in gallons, with different models being taller or shorter. While you might be tempted to buy a 1,000- or



work platform a couple of feet lower than the tank's top, don eye and ear protection, and recruit a second pair of hands to hold the masonry saw from above as you move along the top horizontal cut line. Make the two vertical cuts next, then tackle the horizontal cut across the bottom. Leave a small amount of concrete uncut in the upper corners to hold the slab in place until you're ready to bust it into the tank with a sledgehammer. Repeat this process to remove the inner partition if your tank still has one.

You can make your own door out of wood, but getting it to seal well will be difficult. Consider using an insulated steel residential door pre-hung in a frame. Exterior steel doors provide exceptional seals. Choose one without a window because darkness is essential for maximizing the storage life of produce.

Good root cellar design requires two 4-inch-diameter vent pipes to control internal temperatures and allow excess moisture and gases to escape. One pipe should extend to the floor inside the cellar while the other should end near the ceiling. This difference in height encourages air circulation. All septic tanks have a hole for a 4-inch pipe at one end, which will work for a ceiling vent, but you'll need to bore a hole somewhere else for the longer vent

## Cutting Concrete

For this project, you'll need to rent or borrow a gas-powered masonry cutoff saw spinning a 14-inch-diameter diamond wheel to make the door opening in the concrete, and an electric rotary hammer with a 4-inch carbide coring bit to bore vent and drain holes. Be sure to use a saw that accepts a garden hose because water injection will tame the clouds of dust. The rotary hammer with coring bit needs no water. Septic tanks usually have reinforcing rods embedded in the concrete, so ask for a coring bit and masonry blade that can handle metal.

that extends down to floor level—just inside the door is best (see illustration on previous page). While you're at it, bore a 4-inch drain hole in the floor so you'll be able to hose out your root cellar at the end of the season.

## Batten Down the Hatches

The tops of concrete septic tanks have access hatches that must be sealed. Apply a generous bead of polyurethane caulking around the perimeter of the hatch openings and close the hatches

for the last time. Next, use a hand-held grinder to cut off the hatches' protruding metal handles. Now that the tank is flat on top, you'll need to apply a watertight barrier to prevent roof leaks. Use a heavy, self-adhering water-and-ice shield designed to be used as roofing underlay. The best shields are thick and have a peel-and-stick adhesive backing—my favorite brands include Blueskin and Grace. Apply two layers of shield that extend over the top in overlapping sheets and fold down the sides 4 inches lower than the joint where the tank's top and sides meet.

Because your tank will be tucked into the earth, you'll need a secure way to hold back soil around the entryway. The drawings on Page 64 show you how to build a retaining wall using 6-by-6 tim-



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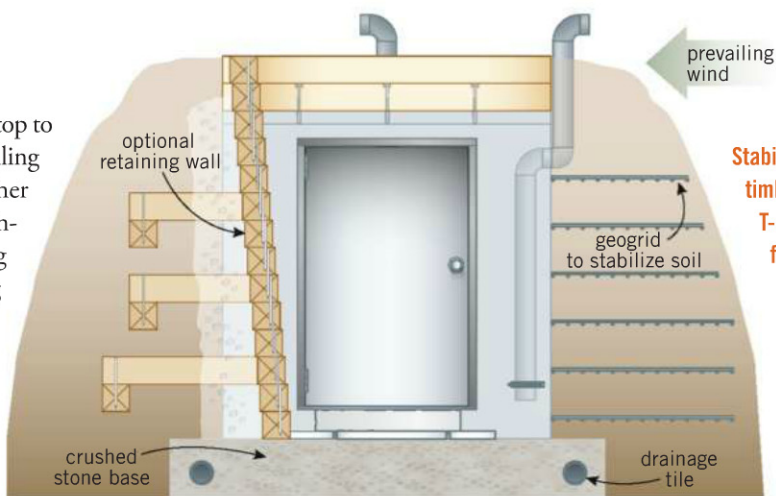


Circle #32; see card pg 97

bers, with a lintel across the top to stop backfilled soil from falling down over the door. Another option is to construct a retaining wall using interlocking concrete blocks. Retaining walls ensure the best cellar performance in cold climates because they maximize the amount of soil contact on both sides of the door, and soil's insulating factor is what stabilizes the temperature inside a root cellar and makes it suitable for storing vegetables.

If your climate doesn't experience severe winters, an easier alternative involves banking up the soil as steeply as possible on both sides of the doorway while leaving some of the front wall exposed. Instead of building a tall retaining wall, you could install horizontal layers of geogrid (a polymer material used to reinforce soils) in the dirt as you backfill around the door.

Haul in soil and spread it around the sides and top of your tank. Because backfilling by hand is hard work, you'll probably want to hire the backhoe and operator for several more hours. Sandy, light soil is best because it reduces soil pressure on the sides and top of the tank, drains better, and is easier to shape and contour. Aim for



FRONT VIEW

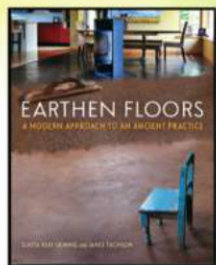
Stabilize soil at the entrance with a timber retaining wall anchored by T-shaped tiebacks (you can find instructions online at <http://goo.gl/TVaehr>), or with horizontal bands of geogrid.

a layer of 1 to 2 feet of soil on the roof.

Plant grass on the back-filled soil, build shelves and bins inside your cellar (learn how to construct wooden storage shelves at <http://goo.gl/xhp6QE>), and then load 'em up with your healthy, homegrown foods. Money can't buy the feeling of security and satisfaction you'll get from a winter's worth of good eating sheltered by your own root cellar. 🌱

Contributing Editor Steve Maxwell is an expert builder and stonemason who stores his garden produce underground in Ontario, Canada. Find his homesteading advice at [www.RealRuralLife.com](http://www.RealRuralLife.com). Maxwell co-authored *The Complete Root Cellar Book*, available at a 25 percent discount until April 30, 2014. See Page 81 to order.

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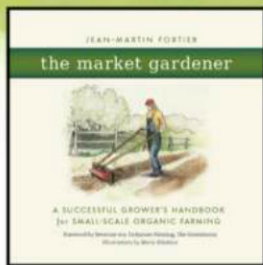
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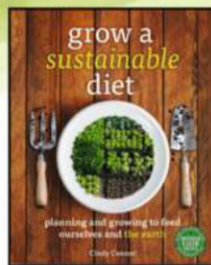
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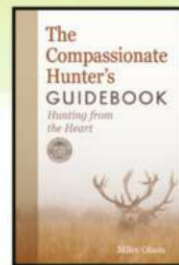
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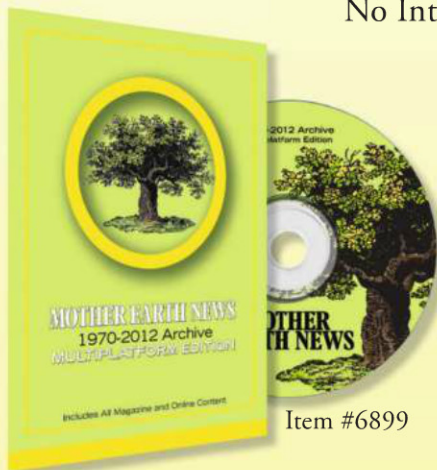
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# *Acidic, Alkaline or Neutral?* **YOUR GARDEN'S SOIL pH MATTERS**

Infuse your gardening with a little chemistry so you can fine-tune your soil for healthy crops and high yields.

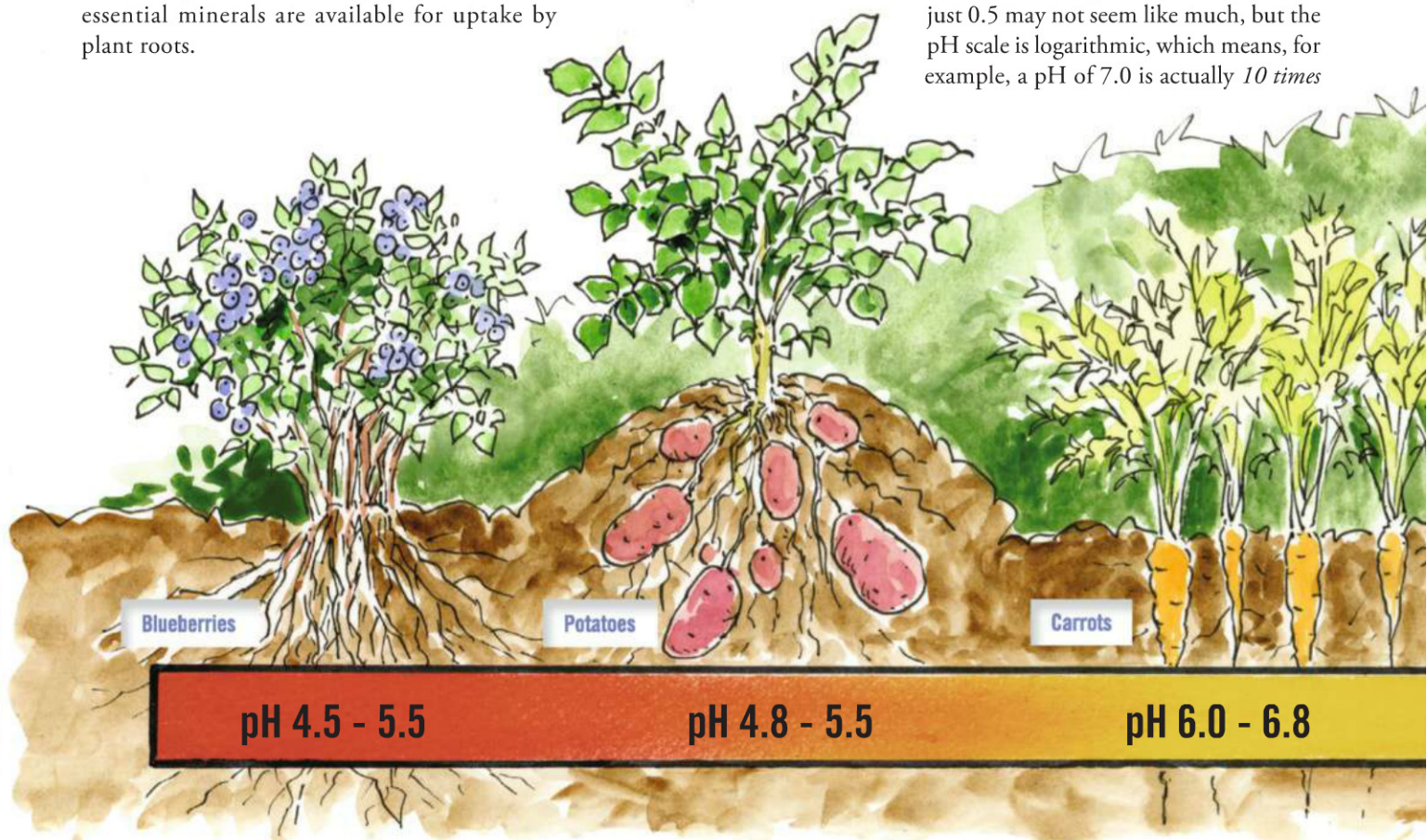
By Barbara Pleasant  
Illustrations by Elayne Sears

**T**o ensure that your garden crops make the most of the rich, organic soil you create, you need to understand your soil's pH. The pH describes the relative acidity or alkalinity of your soil's makeup, and it has important implications for plant health and growth. Soil pH impacts beneficial fungi and bacteria in the soil and influences whether essential minerals are available for uptake by plant roots.

## What Is Soil pH?

A solution's pH is a numerical rating of its acidity or alkalinity. All pH is measured on a logarithmic scale from zero (most acidic) to 14 (most alkaline, or basic); 7.0 is neutral. The pH scale is used by chemists to measure the concentration of reactive hydrogen ions ( $H^+$ ) in a solution.

Most food crops prefer a pH of 6.0 to 6.5, but you can have a productive food garden as long as your pH is about 5.5 to 7.5 (see chart, Page 68). A difference of just 0.5 may not seem like much, but the pH scale is logarithmic, which means, for example, a pH of 7.0 is actually *10 times*



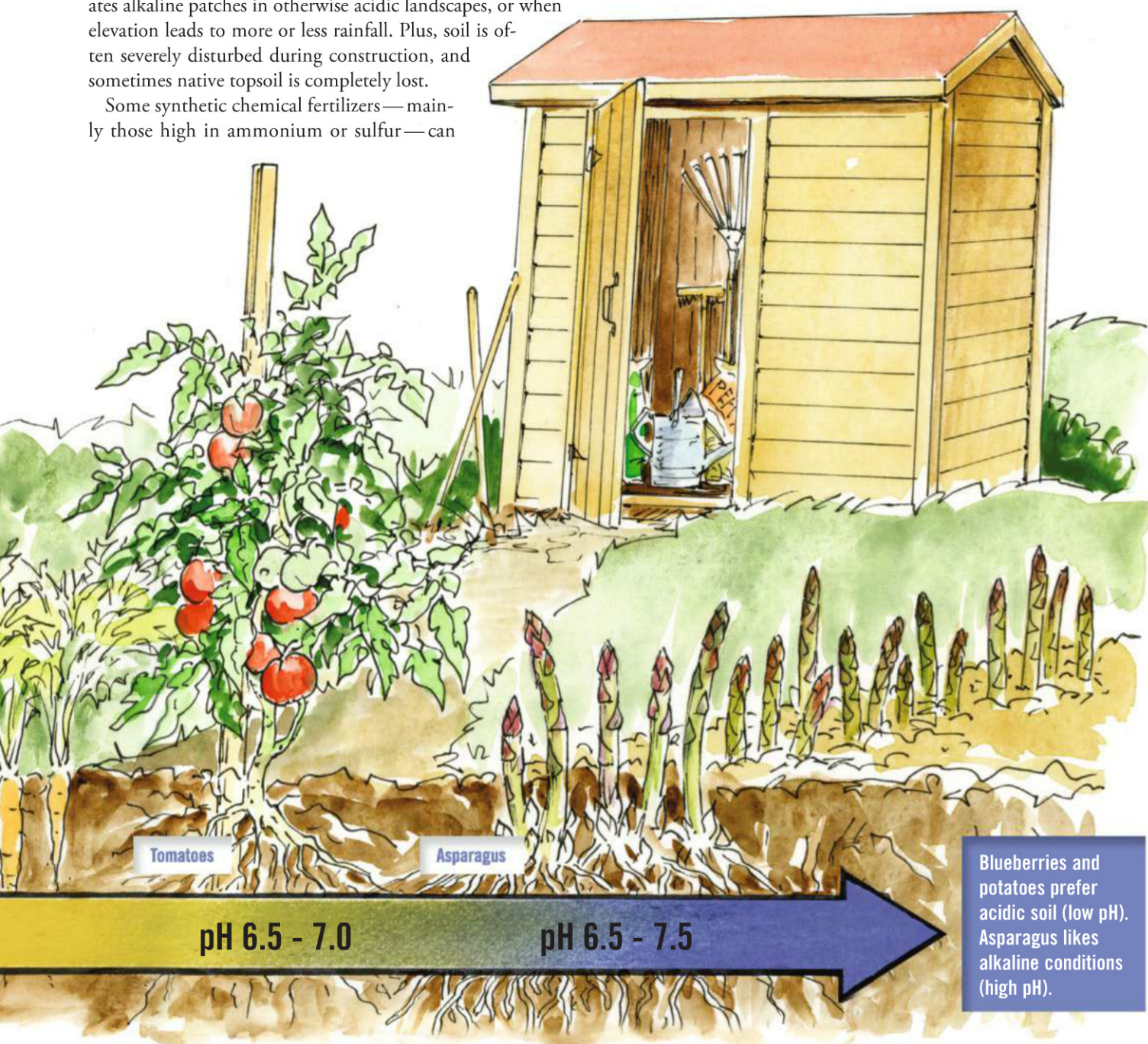
less acidic than a pH of 6.0. Potatoes and most berries, which grow best in more acidic soil, are the main exceptions to the average preferred pH range.

A soil's pH results from interactions among native rocks, plants and weather conditions over many years, and it varies with climate and physical surroundings. In moist climates that support dense forests, such as those east of the Mississippi River and along the Pacific Coast, soil tends to be acidic, with pH ratings usually between 4.0 and 5.5. The grasslands of the comparatively dry Midwest often have *slightly* acidic soil (6.0 to 6.5), while most arid regions, such as the Rocky Mountains, are dominated by alkaline soil (7.0 to 7.8). Local differences in rock can cause huge variations within these general patterns, however—for example, when weathered limestone creates alkaline patches in otherwise acidic landscapes, or when elevation leads to more or less rainfall. Plus, soil is often severely disturbed during construction, and sometimes native topsoil is completely lost.

Some synthetic chemical fertilizers—mainly those high in ammonium or sulfur—can

make soil more acidic, as can tillage methods that reduce soil's levels of organic matter. Acid rain caused by air pollution from coal combustion began to acidify streams and soil during the late 1800s, and continues to push soil in some regions into the acidic range every time it rains. In addition to outside influences, some types of organic matter, such as peat moss and pine needles, acidify naturally during decomposition.

Alkaline soil occurs naturally in places where soil is formed from limestone or other calcium-rich minerals, and high water-evaporation rates common in arid climates aggravate the problem by loading the topsoil with accumulated salts. Many garden plants can still thrive when grown in alkaline soil that has been generously enriched with organic matter, which also improves the soil's ability to retain water. Mulches also will



slow the buildup of salts in plants' root zones by reducing the amount of surface evaporation.

## How to Test Soil pH

Soil chemistry is complex, so how can we boil it down to help you in your garden? If your crops seem to be thriving, then you probably don't need to worry much about your pH. But if you find that plants just don't seem to be growing as well for you as they do for your neighbors, then the problem could be related to pH and you should probably have your soil checked with a pH test. The cost for basic soil evaluation done by a state soil-testing lab ranges from free to \$25, depending on the state in which you live, and typically includes a pH test along with results for major and sometimes minor nutrients. Soil-test kits with detailed instructions are usually available at extension service offices, or you can order them by mail.

If one bed or small section of your garden goes wonky, you might try a home pH test kit rather than waiting on lab results. When a team of Missouri extension experts submitted soil samples to 82 soil-testing laboratories and compared the lab's results with those from do-it-yourself pH-measuring kits, the \$20 LaMotte home color kit (available at <http://goo.gl/VmfWWT>) earned high accuracy ratings. Personally, I like pH color kits because they are fun to use, and a practiced eye can detect the small changes in color between shades of orange (acid) and green (neutral to alkaline) in the test results.

## Start by Adding Compost

Raising the organic matter content of soil will usually move the pH of both acidic and alkaline soils toward the neutral range. This is because organic matter plays a buffering role, protecting soil from becoming overly acidic or alkaline. Finished compost usually has a near-neutral pH, so regular infusions of compost should be the primary method you use to improve soil with extreme pH issues. If your pH readings are only slightly acidic or slightly alkaline, compost and organic mulches may be the only amendments you need to keep your crops happy and your garden growing well.

## Raising the pH of Acidic Soil

The standard intervention for overly acidic soil is to amend it with lime, an inexpensive soil amendment made from ground limestone that slowly raises the pH over a period of months. Products labeled "dolomitic lime" are usually preferred because they contain both calcium and magnesium. But if you have dense soil and a soil test indicates excess magnesium (which can tie up nitrogen), you should use low-magnesium, calcium-rich powdered crab or oyster shells as your liming material. Read and follow the label, because products differ

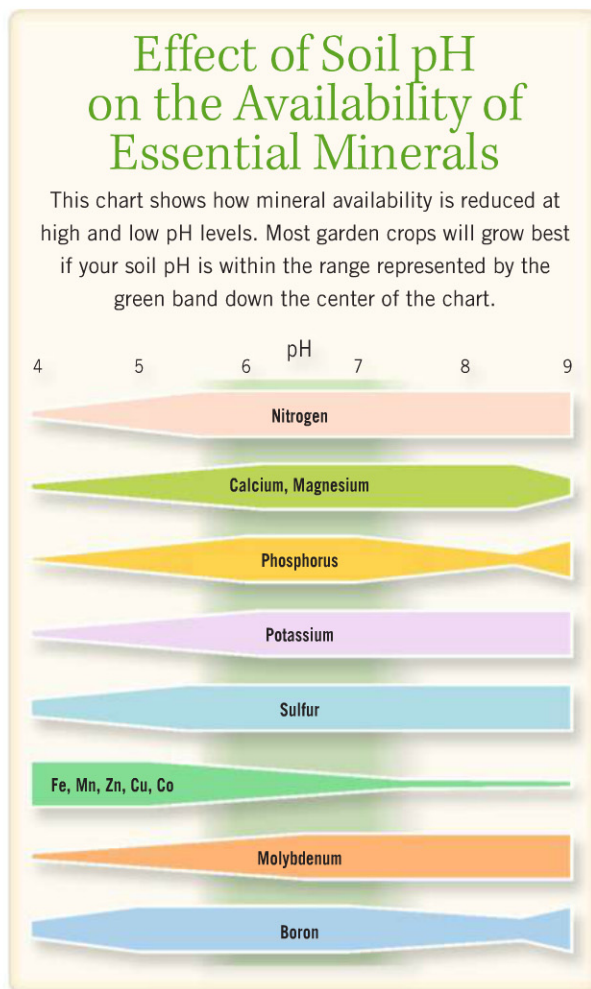
in application rates, which, in turn, vary with soil type. You can't apply a correct amount of lime unless you know your soil's pH first, and if you apply too much, it will be extremely difficult to correct. Err on the cautious side by applying too little lime at first.

After the pH of acidic soil is raised above 6.0 using organic amendments and dolomitic lime, I've found it can be maintained with a light, yearly application of alkaline woodstove ashes. In addition to containing enough calcium and magnesium to have a liming effect, wood ashes contain an array of micronutrients, too. The key is to use them *sparingly*, in small, dispersed amounts, and to never add wood ashes or lime to soil with a pH higher than 6.5. A quart of wood ashes (1 pound) is about right for 50 square feet of cultivated space. When you have a lot of ashes to spread, apply no more than 20 pounds of ashes per 1,000 square feet of garden bed.

If you are not using acidic chemical fertilizers, a normally acidic soil may not require liming again for several years, if ever. Then again, if your soil is porous sand in a high-rainfall area, pH testing may show a need for liming every other year. Just be careful to never apply lime unless a pH test shows it is needed, and never use it where you are growing plants that prefer acidic soil conditions, such as blueberries and azaleas.

## Lowering the pH of Alkaline Soil

If you have exceptionally alkaline, high-pH soil, you can often tame it by adding organic matter and powdered sulfur. However, sulfur may do little good in alkaline soil that is rich




in free lime, also known as calcium carbonate. You can test for free lime by covering a soil sample with vinegar; if it bubbles, you have free lime and should consider gardening in beds filled with non-native soil.

Extension experts in places where alkaline soil predominates emphasize that most plants will grow well in organically improved soil with a pH as high as 7.5, and improving soil quality with organic matter—rather than lowering the pH—should be your primary goal. Alkaline soil can be stubborn about releasing its valuable phosphorus to plants, so amend it every chance you get with composted manure, which has been found to solve several problems associated with high pH levels. The humic acids in both composted manure and vermicompost help make phosphorus available to



You may need to acidify your soil with pH-lowering sulfur to grow acid-loving blueberries.

plants grown in alkaline soil, as does the presence of rotted plant tissues from both regular compost and cover crops. Acidic mulches, such as pine needles, can help lower soil pH slightly, but other mulches, such as bark or wood chips, have little effect on soil pH.

In my own garden, which has dark, fluffy soil that has been nurtured organically for years, soil pH tests show a near-neutral pH. My newer beds that have tight clay, on the other hand, test acidic. Monitoring the soil pH helps me gauge how well I'm improving the soil, reducing the effects of acid rain, and maximizing the soil's microbial activity. These steps all add up to growing a better garden. 

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# Growing Up Free INSPIRED BY NATURE



For children to feel deeply connected with nature, they need to spend time roaming free.

By today's standards, some aspects of my upbringing would be considered parental negligence.

Those were the best parts of my childhood.

I grew up less than a half-mile from the border between southern New Mexico and the Mexican state of Chihuahua. The border was calmer then, but our neighborhood wasn't quiet. Smugglers and undocumented immigrants streamed back and forth across the ragged barbed-wire fence that marked the boundary. From our yard we could watch hundreds of illegal crossings in a day. U.S. Customs

and Border Protection officials staked out the hilltops and patrolled the sky in their aircraft, but they couldn't hold back the tide. Crime rates were high, primarily because the wealth differential across the border made mundane U.S. possessions immensely valuable if they could be smuggled south.

Then we had the neighbors to consider. As kids, we were routinely told to avoid the trailer where "the pervert" lived. So we did. If I wanted to walk past the shack inhabited by another neighbor, an elderly, trigger-happy alcoholic known as "Old Man Pat," my grandfather would

call Pat on the phone. I vividly remember one such conversation. "Pat, are you drunk?" Grandpa asked. He listened to Pat's response. "Well, OK. My grandson is going to walk past your house in a few minutes. Don't shoot at him."

Did I mention that the area was also infested with rattlesnakes?

That I was encouraged to wander the village and the surrounding sand hills with my friends is remarkable in retrospect. My mother would literally tell us to go outside and play "until the sun goes down." So we did. We dug forts in the sand. Our parents just said, "That's liable to cave in on you." We hunted for arrowheads. ("Watch for snakes!") We shot our BB guns. ("Don't put an eye out!")

I took a job helping with a neighbor's goats, taking them to graze in the desert. By the time I was 11, I had my own horse and I could wander much farther, up onto the mesas or down to the Rio Grande. Out there in that rugged landscape, among the sandblasted shacks and junked cars, I was enchanted. I fell in love with nature.

Every naturalist and conservationist throughout history has shared a single inspiration: a love of the natural world.

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*"In all things of nature there is something of the marvelous."*—Aristotle (384 B.C.–322 B.C.)

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Can we learn to love nature from inside a house or a speeding car? Possibly, but it seems unlikely.

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*"Our children no longer learn how to read the Great Book of Nature from their own direct experience or how to*



Photographer Laura Husar Garcia shot this article's images of her children, Gracie Garcia, 10, and Mateo Garcia, 8, in their favorite place—the woods around the family cabin near Franklin Grove, Ill.



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*interact creatively with the seasonal transformations of the planet. They seldom learn where their water comes from or where it goes. We no longer coordinate our human celebration with the great liturgy of the heavens.*—Thomas Berry (1914–2009)

I would never have fallen in love with the natural world if it weren't for the seductive danger and excitement I felt when wandering alone in wild places.

*"Reading about nature is fine, but if a person walks in the woods and listens carefully, he can learn more than what is in books, for they speak with the voice of God."*—George Washington Carver (1864–1943)

My own children had much less of that kind of freedom out in nature. My wife

and I were typical parents of the 1990s. We believed we needed to know precisely where our children were at all times. That sounds reasonable, doesn't it? But it meant my kids never had a chance to wander alone in the woods listening to the voice of God. They walked in the woods with us, but that's not quite the same thing.

*"Keep close to Nature's heart, yourself; and break clear away, once in a while, and climb a mountain or spend a week in the woods. Wash your spirit clean. ... Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul."*—John Muir (1838–1914)

In his groundbreaking 2006 book, *Last Child in the Woods*, Richard Louv suggests that our kids are suffering from something





he calls "Nature-Deficit Disorder." He believes that firsthand experience of nature is a critical part of human education.

*"Look deep into nature, and then you will understand everything better."*—Albert Einstein (1879–1955)

Wise people throughout history have recognized that nature provides intellectual stimulation, aesthetic satisfaction and spiritual solace.

*"Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth are never alone or weary of life. Whatever the vexations or concerns of their personal lives, their thoughts can find paths that lead to inner contentment and to renewed excitement in living."*—Rachel Carson (1907–1964)

*"Come forth into the light of things, Let Nature be your teacher."*—William Wordsworth (1770–1850)

*"Believe me, you will find more lessons in the woods than in books. Trees and stones will teach you what you cannot learn from masters."*—St. Bernard of Clairvaux (1090–1153)

If exposure to nature has been a formative experience for so many of our wisest teachers, how can we deprive our children of that instruction?

On the other hand, a child alone in nature is vulnerable.

I don't question the vulnerability of children. Part of the magic of the natural experience, for a child, stems from the fact that

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Circle #69; see card pg 97

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the experience—and the danger—is vital and real. It's instructive to note, however, that children often may be safer alone in the natural world than in their own homes. Medical conditions, car wrecks and shootings make up more than 60 percent of all child deaths, none of them the result of being alone in nature. About 90 percent of sexually abused children are victimized by someone they know at home.

We have cooped up our children to keep them safe, but safe from what? Wilderness is, arguably, safer than home for a great many children.

Clearly there's no simple answer. But if my exposure to sunshine and wind, creosote bushes and yuccas, rattlesnakes, and the danger and exhilaration of empty places had always been directly supervised by adults, then I would not have loved the experience as I did. Between the ages of 8 and 13, I was in the desert every day, not just on special occasions when the adults could come along.

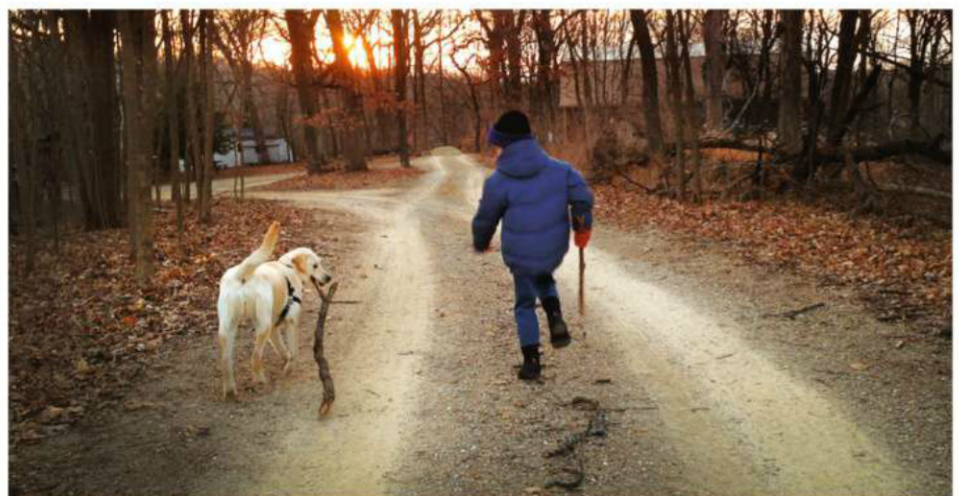
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*"What is the good of your stars and trees, your sunrise and the wind, if they do not enter into our daily lives?"—E.M. Forster (1879–1970)*

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I think I'll join Richard Louv in calling for universal experiences in the natural world as a fundamental part of every child's education. Exposure to nature is at least as important as exposure to mathematics or literature. And I'll do my best to give my grandsons the gift my own parents and grandparents gave me: unfettered, solitary time in God's creation. 🌳

MOTHER EARTH NEWS Publisher and Editorial Director Bryan Welch is the author of *Beautiful and Abundant: Building the World We Want* (see Page 81 to order).





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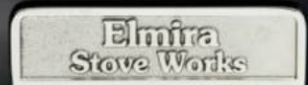
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# Passive House: Beyond Passive Solar

*What's the difference between a "passive solar" home and a home built to "Passive House" standards? Is one better than the other?*

"Passive solar" is a design approach that was popularized in the 1970s and in which heat from the sun is strategically captured to warm homes. Passive solar's low-tech approach doesn't abide by any established standard, but the design principles are consistent: Passive solar homes capitalize on solar heat that radiates through south-facing windows (north-facing windows if the home is in the Southern Hemisphere). As the sun warms the house, the heat is retained via insulation and by use of thermal mass—such as concrete, stones or tile—that stores and slowly releases it.

About 20 years after the popularization of passive solar homes, German physicist Wolfgang Feist founded the Passivhaus Institut (PHI), which formalized "Passivhaus," a comprehensive energy-efficient building standard that was influenced by early passive solar designs, but which placed more importance on an airtight envelope, high-efficiency windows and conditioned air recovery. By 2010, the newly formed Passive House Institute U.S. (PHIUS) had carved out a place for the extremely efficient, very specific and highly demanding standard in the U.S. market. PHI and PHIUS are now working separately to advance Passive House standards in the United States.

The goal of the standard is to achieve a durable, comfortable home with overall energy savings of 60 to 70 percent compared with conventional new homes, including a 90 percent reduction in space-heating requirements. A home must follow the standard exactly to receive Passive House certification. With the dramatically reduced energy requirements, the need for conventional heating and cooling systems disappears. This frees up financial resources that can instead be used to make a home deeply efficient. Adding renewable energy systems becomes more affordable, because a smaller energy-



**Passive House-certified homes combine captured sunshine and high-tech design for increased comfort and deep efficiency.**

generation system can now meet the much smaller energy demands of a certified Passive House.

The rigorous Passive House standard doesn't render passive solar design entirely obsolete, however. Many homes built to the Passive House standard rely on passive solar design as one tactic among many to make the home super-efficient. But Passive House certification goes beyond passive solar details and ultimately offers superior performance. Thanks to modern building techniques and products, Passive House buildings allow for far more design innovation than passive solar homes, particularly for structures without ideal sun exposure. Regardless, buildings should incorporate passive solar techniques before active solar techniques, such as solar panels, enter the picture.

For more information, visit the PHI website at [www.Passiv.de/en](http://www.Passiv.de/en) or the PHIUS website at [www.PassiveHouse.us](http://www.PassiveHouse.us).

—Paul Scheckel

## Avoid Unsafe Chemicals in Plastic

*I've heard I should stay away from BPA. Is it really that bad? How can I avoid it?*

You've heard correctly! Bisphenol A (BPA) is a synthetic chemical that has been widely used in plastic manufacturing since the 1950s. The compound is used to line metal cans of food, and to form many plastic containers and cash register receipts. As convenient as plastic packaging is, and as pervasive as it has become, you should still

try to choose different packaging or otherwise limit your exposure to BPA because of the health risks.

As is so often the case with many modern chemicals, many plastics are deemed safe because they seem to have no ill effects after short-term exposure. Unfortunately, scientists have recently shown that plastics can off-gas or leach toxic compounds into the surrounding environment in relatively small but sometimes physiologically

significant quantities. Bisphenols appear to be one (among many) of those compounds leached from plastic.

The most serious concern about BPA is that it disrupts the endocrine system. Endocrine disruptors are insidious, interfering with normal, often very fine-tuned and subtle interactions among our bodies' natural hormones, hormone receptors, and the physiological processes they regulate. If fetuses, infants or chil-



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dren are exposed to persistent doses of an endocrine disruptor, they may experience developmental ramifications, such as abnormal growth patterns. In 2012, the Food and Drug Administration halted BPA use in baby bottles, sippy cups and plastic formula packaging. The FDA claimed to have made the decision based on market demand, not safety. Manufacturers insist only high levels of BPA will cause endocrine disruption. Independent scientists say any amount is too much. As a biochemist who has studied this issue, I say you should avoid all exposure to endocrine disruptors.

Are you safe if you choose packaging or products that are labeled “BPA-free”? Perhaps not. Many BPA-free products are indeed free of BPA. However, Bisphenol S is a common substitute, and that compound may be just as toxic. And bisphenols may only be the tip of the iceberg. Phthalates—syn-

thetic compounds that help make plastic flexible—are even more pervasive in plastics than bisphenols and have been linked to asthma, breast cancer, diabetes, obesity and more. Phthalates, or their chemical components, are commonly found in human urine. The Centers for Disease Control reports that phthalates are present in the bodies of most North Americans.

Because of the prevalence of plastic, taking complete control of your BPA consumption will be difficult, but reducing your exposure is entirely achievable. Eat fresh, local foods when you can—many grocery stores sell produce without plastic packaging around it, and you can then transport your fresh food in a reusable cloth bag. Buy food packaged in glass containers as often as possible, and use glass, porcelain or steel containers to store and reheat food. You can also drink from a BPA-free stainless steel bottle.

## Portable Table Saw Purchasing Tips

*I want to buy a portable table saw for constructing outbuildings around my property, and for making furniture in my shop. What should I look for?*

For a table saw that will suit your needs, you have two main choices: a benchtop model or a contractor model. **Benchtop saws** have aluminum tops and are the lightest and most easily movable. The best models include folding support stands with wheels for easy portability and vacuum connection ports for effective dust control. The name “benchtop” is a little misleading, though, because these saws are typically operated on stands. Quality benchtop models cost about \$500. Some cheaper table saws that look similar are available, but their capacity and power will disappoint any serious user.

**Contractor table saws** are heavier and don’t have folding stands, but they do offer a more stable, cast-iron working platform that’s typically larger than what you’ll find on a benchtop saw. Contractor table saw prices start at about \$800.

So the core question is how important portability is for you. If you won’t be moving your saw often, a contractor model may serve you better. It’ll be larger and thus more stable, though few contractor saws can connect to a vacuum for sawdust control. If you really need the benefit of easy portability, then a benchtop saw is the way to go. There’s no significant power difference between benchtop and contractor models.

If you decide to go with a benchtop saw, consider building a stationary out-feed table in your shop. Build it so the saw will fit right into a cutout in the surface, and you’ll enjoy a large support area for cutting plywood and other materials safely, all without sacrificing your saw’s portability.

—Steve Maxwell



**A folding stand and wheels make for an easy-to-move benchtop saw.**

These tactics will help lower the levels of bisphenols and phthalates in your body, in spite of their pervasiveness in our plastic-packed world.

—Oscar H. Will III



**Don't be foiled by your heavy clay soil: Add organic matter to soften up your tough terrain.**

## How to Improve Clay Soil

*I have heavy clay soil that becomes as hard as a brick when it dries. What can I do to make gardening in it easier?*

First, the good news: "Of the three major soil components—sand, silt and clay—clay has the highest nutrient content," says Garn Wallace, president of Wallace Labs, a soil-testing firm in El Segundo, Calif. Clay soils retain minerals in forms that are readily available to plants and that aren't water soluble, so rain and irrigation water are less likely to leach them away. The trouble is that clay lacks good porosity. Its fine-textured particles tend to clump tightly together. Air, water, roots and seedlings can have trouble moving through it, so crop yields may be lower. (Plus, clay is a pain to work in!)

Increasing your soil's organic matter is the first and most important step toward improving heavy clay soil. Organic matter invites in more porosity-improving earthworms. Work in compost, grass clippings, shredded leaves or other organic materials. Plant and turn under cover crops, and safeguard your soil's surface with an organic mulch to prevent crusting. Sand or peat moss can also improve soil texture, but they lack many of the other benefits of organic matter, such as beneficial microbial activity and nutrients for your plants to uptake. Plus, you'll need a lot of sand to make a real difference (1 part sand to every 2 parts clay soil).

—Vicki Mattern

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Circle #78; see card pg 97

## Eliminate Mold in Your Home

*How can I get rid of household mold?*

Mold growth is an ever-present possibility in homes, and though not all molds are dangerous, identifying which ones are harmful can be difficult. You should thus eliminate mold when you find it by addressing the root causes and then killing the dormant spores left behind.

Mold grows only when sufficient moisture encounters organic materials, so moisture control should always be the first step toward managing mold growth. Increase your home's ventilation enough during winter to eradicate or greatly reduce window condensation that could trigger mold growth. Proper ventilation will also help curtail the moisture buildup in other places, too. A heat recovery ventilator (HRV) is the best way to boost ventilation and will also improve indoor air quality.

A bleach-and-water solution is a traditional means of killing mold, but this method isn't always effective. The best way I've found to get rid of mold is to use a fungicide called Concrobium Mold Control ([www.Concrobium.com](http://www.Concrobium.com)), which is registered by the Environmental Protection Agency. This product contains sodium bicarbonate (baking soda), sodium carbonate (washing soda) and trisodium phosphate (TSP). It's a transparent, odorless, non-sticky liquid that kills mold and mold spores as it dries. It also offers some residual mold control. Brush or spray it onto moldy surfaces. Professional mold-abatement workers employ fogging units to deliver this same product over large areas inside of buildings infested with mold. A companion product called Mold Stain Eraser uses oxygen-based bleaching to eliminate mold stains with little or no scrubbing.

—Steve Maxwell



Do you have a query about homesteading or gardening? Email it to [AskOurExperts@MotherEarthNews.com](mailto:AskOurExperts@MotherEarthNews.com), or write to Ask Our Experts; MOTHER EARTH NEWS; 1503 SW 42nd St.; Topeka, KS 66609.

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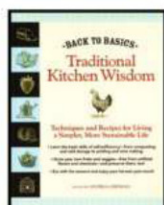
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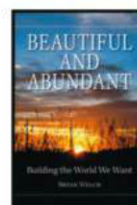
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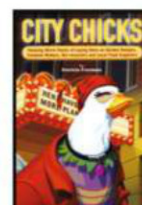
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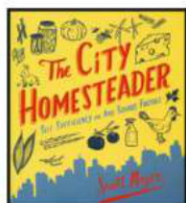
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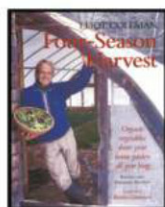
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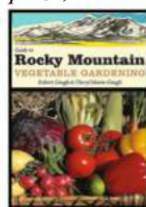
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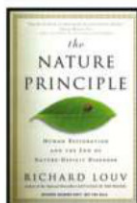
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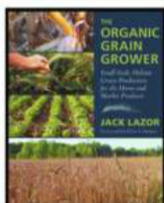
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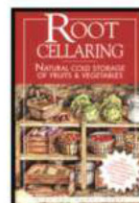
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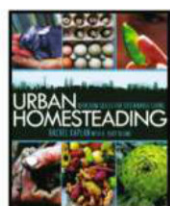
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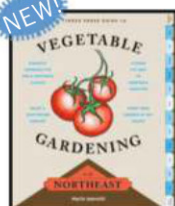
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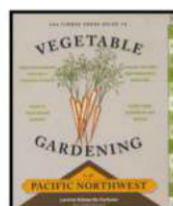
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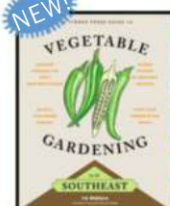
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# Schoolchildren's Urban Oasis

I am a teacher at a K-through-12 school in Bangkok, and in the past year we have transformed our concrete rooftop into a thriving vegetable garden. The rooftop garden gives our students the opportunity to learn valuable gardening skills. We also sell our organic produce to the parents and staff, which provides income to buy more seeds and supplies. Students have been involved in the process from the beginning.

One of our first priorities was to build about 50 raised garden beds. We were able to do this thanks to a donation of 100 wood pallets. Staff and students dismantled each pallet one by one and rebuilt them into 6 $\frac{2}{3}$ -by-2 $\frac{1}{3}$ -foot beds. The gardening crew lined the beds with old plastic sheeting that had previously been used for advertising school events. As time has gone by, we've built more garden beds. We have also started making our own compost, and we're about to begin experimenting with aquaponics—the garden coordinators just sent out a request to the school community for old bathtubs!

Brian Johnson  
Bangkok, Thailand



A Bangkok school's bountiful rooftop garden incorporates drip irrigation.

## Eco-Minded Trash Recycling

My partner and I are committed to keeping as many items as possible out of the landfill. We often drive through a neighborhood the day before trash pickup to fill the bed of our truck with other people's "trash." What we cannot use ourselves we give away via the website [www.Craigslist.org](http://www.Craigslist.org).

We also donate many items to local thrift stores. I guess you could say we work on reducing other people's environmental footprints.

Deb Joyce  
Titusville, Florida

**Earth Day focus:** In honor of Earth Day, we asked readers to share the Earth-friendly actions they are most proud of taking for this edition of Country Lore. We were delighted to hear from people around the world who have made changes to significantly reduce their environmental footprints.—MOTHER

## A Patchwork of Pallet Projects

My husband has been collecting discarded wood pallets and shipping crates for years. Businesses that receive pallets and shipping crates include hardware and appliance stores, building supply outlets, and manufacturing businesses. The pallets are usually stacked next to dumpsters and are free for the taking. Discarded wood pallets and shipping crates are everywhere; you just have to know where to look!



This whimsical shed is made from recycled wood pallets.

We burn the pallets that aren't in the best shape to get free heat during our frigid Vermont winters. With the best pallet wood (and occasional wood shipping containers), my husband has built a greenhouse, toolshed and storage shed. He's also fenced our garden and put siding on a barn.

For the next wood pallet project, we're going to replace the living room carpet with wood pallet flooring. Yes—we have enough pallets to do this!

The cost of the wood pallets equals only the cost of the gas to go pick them up. Not only are we keeping the pallets out of the landfill, but we're also doing the businesses a favor by saving them the trash fee.

Kitty Werner  
Waitsfield, Vermont

## There's No Place Like Earth

My wife and I have been on a journey the past few years that started with a simple vegetable garden. We now compost everything we can, and we even built our own compost tumbler

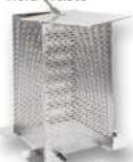
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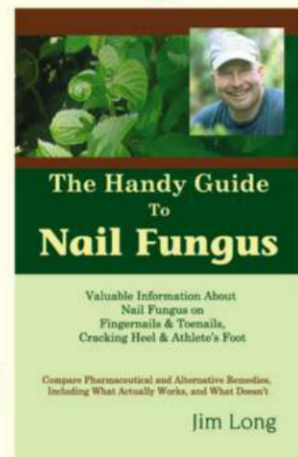
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out of scrap materials. We also make our own natural cleaning products, deodorants, salves and tinctures, as well as flea sprays for our pets. The thing we are most proud of, however, is our new environmental mindset.

Since gaining this viewpoint, every decision we make is with a sense of responsibility toward the life around us. We have an awareness of where our resources come from, what it took for them to get here, and what we will leave (or not leave) as waste. We now have the mindfulness to see that "the environment" is just another way of saying "our home."

I'm proud of our new outlook, because, more than any one choice we make—more than toting reusable shopping bags or driving a Prius to lower our carbon footprint—this perspective will continue to influence every action we take for the rest of our lives.

Aaron Miller  
Olympia, Washington

## Have You Herd? Raising Goats for Milk and Meat

My household believes that a big part of living sustainably is reducing our reliance on commercial products. For this reason, we have taken to raising goats for meat and milk. Our ladies provide us with rich, tasty milk for our morning oatmeal, often with enough left over to pound out a couple of loaves of bread in the afternoon. After the kids have been weaned, we have even more goat's milk for an evening hot chocolate or *atole* (a warm, corn-based drink). Goat meat is a healthy and flavorful occasional addition to our diet as well. It can be cooked for a broth, hung to dry with lime and salt, or cooked *estilo barba-coa* (barbecued).

Camille Torok de Flores  
Moroleón, Mexico

## A Recycler's Mantra

To reduce our environmental footprint and save money, our family of six has ardently

## Conserve Fuel With a 'Wonder Box'

I work with a small group of volunteers in the Western Cape of South Africa that's showing the region's low-income residents how to save precious fuel by using a hot box to cook their food. Inhabitants of these shanty areas rely on purchased gas, paraffin or hand-gathered wood for fuel. Our volunteers teach those interested how to prepare a meal with a hot box and a 16-brick rocket stove, which uses 75 percent less fuel than a conventional stove. When a pot of food has reached a hard boil on the rocket stove, the cook transfers it from the rocket stove to a hot box to finish cooking without fuel.

We call our hot box design the "Wonder Box," and it's made by sewing soft cotton or broadcloth into a circular shape that will wrap around your cooking pot. We use polystyrene beads, which are a form of insulation commonly used as packing material for electronics, to stuff the Wonder Box shell. You can also stuff the cushions with

wool or nylon materials, newspaper, sawdust, hay, or wood shavings. To learn more about making a Wonder Box of your own, go to <http://goo.gl/3ZETxm>.

Elma Hunter  
Stanford, South Africa



This hot box fits snugly in a kitchen drawer.

If you try a hot box, you should return the food to a boil on the stove if its temperature has dropped below 140 degrees Fahrenheit before the food has finished cooking. View a video about how to build a rocket stove from cement blocks at <http://goo.gl/pmQN3p>. —MOTHER

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Circle #18; see card pg 97



**Hungry chickens built this drainage channel peck by peck.**

employed the simple strategy of “Reduce, Reuse, Repurpose, Recycle.” We’ve quickly learned that focusing on the first of these—reduce—dramatically downscales our need to employ the remaining three parts of the mantra. In fact, this past year, we were able to ask our recycling company to cut in half the number of times it picks up our recycled goods (our bill also dropped accordingly). We accomplished most of our downsizing through a shift to bulk whole foods, which have little to no packaging. (*Bulk up your money savings and waste reduction with food-buying clubs. See Page 53. —MOTHER*)

When brainstorming how to reduce trash production, we had the idea to establish a bin for items that could be reused and repurposed rather than recycled (or discarded as trash). Among

the items that make their way into this bin are unusual wine or other alcohol bottles, which we cork and then use to serve chilled water at our dinner parties.

*John Atwell  
Oakton, Virginia*

## Scratch That

We live in Southwest Florida, and our raised-bed garden lies in a flood plain. Every year our pond floods, so we decided to create a flood channel that leads straight to the garden. Dug by hand? No—dug by chicken.

We put out corn and scratch grains in a path to the garden, and after about a year, the chickens had dug a nice, deep flood channel. Floods wash in fresh nutrients, and for the first several months of the gardening season we don’t need to water, because the ground is already nicely saturated.

We also keep rescued waterfowl in a secure enclosure at night with a 30-gallon kiddie pool full of water. We dump the manure-infused water into the flood channel to be carried straight to our garden.

*Kelly McCormick  
Duette, Florida*

## Teaching Cob Construction in Africa

I work as a volunteer for a nonprofit organization in South Africa. Eighty percent of my food is from a no-dig permaculture garden that was built by five trainees in our community. I shower with a little more than a gallon of water heated by a self-designed rocket-stove shower that runs on 3½ ounces of biodiesel.

We are building a skills center for which more than 80 percent of the construction resources will come from our immediate surroundings. We’re building with cob and also making the doors and windows on-site. We’re making durable cob cupboard doors

from sticks and plaited grass rope, as well as chairs, tables and beds. I go to town once a month by public transportation—118 miles round-trip.

The best part of this way of life is that I can teach others the ways I have learned to be self-sufficient. It’s an ongoing process that’s exceptionally rewarding.

*JP van der Walt  
Eastern Cape, South Africa*



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*To avoid the slight risk of transferring pathogens to your food supply, you should only apply water containing fresh manure during a season when food crops are absent, or use the water in your orchard. —MOTHER*

### Trash, Trinket or Treasure?

I reduce waste with the help of the non-profit, community recycling website [www.freecycle.org](http://www.freecycle.org). There's almost always someone out there who will think your "trash" is reusable, and [Freecycle.org](http://www.freecycle.org) can put you in touch. I've freecycled so many things that would have otherwise ended up in the recycling bin, including packing material, boxes, pet food cans and the cardboard tubes from paper products.

*Deb Millikan  
Lafayette, Indiana*

### Lead by Example

My husband and I are proudest of teaching our two children how to live environmentally friendly lives, and of showing them how we can reduce our environmental footprint as a family. We try to lead by example: We have a rain barrel and a garden, shop at the local farmers market, drive a hybrid car, and much more. We believe that showing our children models of environmentally conscious living is the most important step we can take toward a more sustainable future.

*Kristy Severin  
Ashland, Virginia*

### A Pinch of This, Plus a Bit of That

It's the little things that count when you're striving to live an environmentally friendly life. What may seem like small actions on their own—such as installing a water-saving shower head, putting a timer on your hot water tank or insulating windows—create substantial changes over time. You can unplug electronics when you're not using them, switch to compact fluorescents (CFLs) and LEDs for lighting, and install heavy window drapes to block out heat in summer and the chill in winter. All of the little things really do add up to make a big difference.

*Daby Napthine  
West Clifford, Nova Scotia*



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Circle #67; see card pg 97



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Circle #12; see card pg 97



This pond will be an appealing and practical backyard oasis.

## A Hand-Dug Backyard Pond

I've always wanted to have a backyard pond to store rainwater on my property and to enjoy as a beautiful oasis. I'm also interested in experimenting with an aquaponic system.

I plan to fill my in-progress pond with rainwater collected from my house, so last fall I rerouted all of the downspouts to drain from one corner of the house. The underground pipes I'm going to install will travel about 60 feet from my house to the pond.

I recently discovered that my city has a stormwater-quality grant program for people looking to establish rain gardens. I applied, and I was awarded up to 50 percent of my project cost! That's significant, because the 30-by-40-foot pond liner was expensive, and I had to purchase pumps, piping and more components. The grant program is a fantastic incentive to help people get away from their computers and TVs and start digging. No gym fees required!

Wayne Johnson  
North Liberty, Iowa

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Circle #76; see card pg 97

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Circle #48; see card pg 97

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Circle #35; see card pg 97

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Circle #52; see card pg 97

(CONTINUED FROM PAGE 11)

drainage from other yards, among several other challenges.

I see so much information devoted to rural and urban gardening, but little instruction exists for the suburbanites who long to have more land but just can't right now. We still want to grow things, however, and we're still passionate about eating well and caring for the Earth.

JoAnn Hogenson  
Clarksville, Maryland

Thank you for the suggestion, JoAnn. The article about city homesteading on Page 36 has some tips that will work excellently in the suburbs as well, and check out Page 42 for a look at a Nebraska neighborhood's innovative community-gardening setup. —MOTHER

## Free Potato Mulch

The potato article in the February/March 2014 issue mentioned mulching potatoes with hay or straw ("No. 1 Expert Shares Organic Potato Tips"). Bales of either cost too much around here, though, so I'm wondering whether I could just as well mulch with fallen leaves from the maple forest behind my house.

I usually run my lawn mower over piles of these leaves and then put them in the compost bin. I would have enough leaves left over to mulch the spuds, though. Any advice?

Bill Wigham  
Westfield, Massachusetts

Great question, Bill. Yes, shredded leaves (or grass clippings) will indeed work to mulch your potatoes. —MOTHER



## Inbox Inspiration

I've signed up for many newsletters that looked interesting on the surface but turned out to be nothing but advertising and sales talk. Your Gardening & Food Self-Sufficiency newsletter, however, is one of the best things I've ever subscribed to. Thank you for an informative, helpful newsletter. I really appreciate it!

Melody Tregear  
Durban, South Africa

Sign up for our free newsletters at [www.MotherEarthNews.com/Newsletters](http://www.MotherEarthNews.com/Newsletters). —MOTHER

## Frack Check

The article "Fracking and Our Food Supply" (February/March 2014) contained so much misinformation I could compose a lengthy counter-article.

One of the worst errors was the assertion that fracking pollutes water supplies, which the article backed up with a reference to the 2010 documentary film *Gasland*. The scene in the film in which tap water is set afire (possibly because of fracking pollution) has been thoroughly debunked. I really enjoy your magazine, but you're hurting its credibility by printing articles like this.

Karen Reeder  
Colorado Springs, Colorado

For more information about the link between fracking and tap water catching fire, go to <http://goo.gl/HMyPDM>. —MOTHER

## MOTHER'S Wish List

**Great places.** We're on the hunt for outstanding cities and towns to spotlight in our annual installment of "Great Places You've (Maybe) Never Heard Of." Tell us about a place you know of that has a strong commitment to community and sustainability, and that offers a high quality of life at an affordable cost. We're especially interested in hearing about some of the lesser-known jewels of our nation. For a look at the cities we've featured in the past, go to [www.MotherEarthNews.com/Great-Places](http://www.MotherEarthNews.com/Great-Places), and send your suggestions to [Letters@MotherEarthNews.com](mailto:Letters@MotherEarthNews.com) with the subject line "Great Places" by May 1, 2014.

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Circle #24; see card pg 97

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Circle #6; see card pg 97

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Circle #39; see card pg 97

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Circle #62; see card pg 97

## A Second Opinion

I read with interest about how the MOTHER EARTH NEWS audience is growing, and about the survey that revealed the magazine has twice as many politically "very conservative" readers compared with "very liberal" readers ("Great Gardens, Pure Food and Clean Energy: The Ties That Bind," February/March 2014). For a while, I thought I may have been the only conservative who read the magazine.

I reluctantly ended my subscription several years ago because of my perception of the magazine's political bent, but I'm back now, as most of what you publish is so useful.

I also read the February/March 2014 articles about fracking and the Keystone XL pipeline (Green Gazette), and I found them both to be factually wrong and highly biased. How about offering opposing views on such politically charged topics in the future?

*David Stevenson*  
*Lewes, Delaware*

## Politics Aside

I enjoyed reading "Great Gardens, Pure Food and Clean Energy: The Ties That Bind" (February/March 2014). No matter our politics, the idea I gain from MOTHER EARTH NEWS is that the path back to our individual freedom and prosperity begins with knowledge, determination and a small slice of land, be it a container in a city apartment or acreage in the country.

*Jon Silvis*  
*Rocky River, Ohio*

## Against the Grain

I anxiously await the arrival of MOTHER EARTH NEWS in my mailbox and am always so inspired as I devour it. I was disappointed, though, to read the section in the February/March 2014 issue entitled "Why Are Wheat

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Products Making Some People Sick?"

("Wonderful Wheat: Why This Ancient Staple Is Still Good for You"). The author presented the idea that non-celiacs who think they suffer from gluten intolerance may be mistaken.

Although the stance Dr. William Davis takes in his book *Wheat Belly* is extreme, he does not advocate merely switching to processed, gluten-free foods as an alternative to wheat-based foods. The author's proposed path to improved health lies not only in getting rid of wheat, but also in eliminating sugar and processed foods in general. I think one of the greater benefits to be gleaned from Davis' book is the concept of completely removing refined sugar from your diet.

I agree that as we make changes to our diets, incorporating organic, whole foods in place of the processed foods that have become so common, we'll experience health benefits. I don't agree, however, that the link between wheat and poor health doesn't exist.

Katie Linkous  
Lenoir City, Tennessee

## Finally Getting That Farm

Thank you for the digital MOTHER EARTH NEWS Archive 1970–2012 (available online at <http://goo.gl/6YkAPz>. —MOTHER). I just purchased it, and I know I'm going to relish reading through all of the back issues.

I've wanted to have a farm my whole life, and I used to buy MOTHER EARTH NEWS back in its early days, whenever I could afford it. I always regretted not being able to keep up with all the magazines.

**COMING  
UP NEXT**



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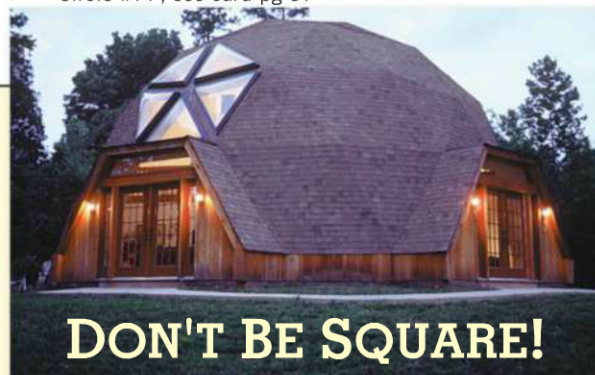
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Now, when most everyone else my age is retiring, I have made the commitment to finally getting that farm of my own. I've decided not to leave this Earth without fulfilling my dream. Thank you for giving me back all those years of MOTHER EARTH NEWS.

Rae Ellis  
Arvada, Colorado

## Blessed With a Wonderful Life

I listened to MOTHER EARTH NEWS Publisher Bryan Welch's video interview with Joel Salatin (<http://goo.gl/XJKG3s>) about physical work trumping intellectual cyberspace. I could not agree more, as I have lived it myself. Years ago, I turned off my beeper, left a career in medicine and bought a Wood-Mizer sawmill, which proved to be the most "working fun" I've had to date.

I'm writing to tell you how utterly shocked I was to have heard Jesus' name mentioned in Welch's interview with Salatin, along with the frequent use of the word "creation." I am so pleased, because I am a huge fan of Jesus and the biggest fan of your publication!

MOTHER EARTH NEWS remains the most relevant magazine I've ever received, and I treasure every issue. There isn't a single page that doesn't completely grab my attention, and staying at task and getting my work done is becoming more and more difficult. The problem is getting even worse as I bookmark wonderful how-to articles from your website.

I feel I must retire tomorrow or I'll simply explode—but, alas, I can't retire. I really need all of that cash to buy pumps for my pond and plastic for my underground greenhouse that I need to build, which will be next to the biogas plant that will feed my reflux ethanol still and biodiesel plants, which will provide fuel for my off-grid generator, which will supplement my grid-tied solar array, which will be on top of the garage, which will house my fish tank for the aquaponics beds out in the garden that's next to the pergola woodshed that's attached to the garage, south of the 25 raised garden beds.

It really is a wonderful life, even if I have to work hard, and even if it is ridiculously busy all the time. It is "creative work," and I do enjoy it and feel blessed.

Wayne Johnson  
North Liberty, Iowa

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Circle #51; see card pg 97

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Like a picked flower cut from the source, we gradually wilt physically and mentally and become vulnerable to a host of degenerative diseases, that we simply weren't susceptible to in our early adult years.

Modern medical science now regards aging as a disease that is treatable and preventable and that "aging", the disease, is actually a compilation of various diseases and pathologies, from everything, like a rise in blood glucose and pressure to diabetes, skin wrinkling and so on. All of these aging symptoms can be stopped and rolled back by maintaining Growth Hormone levels in

the blood at the same levels HGH existed in the blood when we were 25 years old.

There is a receptor site in almost every cell in the human body for HGH, so its regenerative and healing effects are very comprehensive.

Growth Hormone first synthesized in 1985 under the Reagan Orphan drug act, to treat dwarfism, was quickly recognized to stop aging in its tracks and reverse it to a remarkable degree. Since then, only the lucky and the rich have had access to it at the cost of \$10,000 US per year.

The next big breakthrough was to come in 1997 when a group of doctors and scientists, developed an all-natural source product which would cause your own natural HGH to be released again and do all the remarkable things it did for you in your 20's. Now available to every adult for about the price of a coffee and donut a day.



GHR now available in America, just in time for the aging Baby Boomers and everyone else from age 30 to 90 who doesn't want to age rapidly but would rather stay young, beautiful and healthy all of the time.

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GHR is a natural releaser, has no known side effects, unlike the synthetic version and has no known drug interactions. Progressive doctors admit that this is the direction medicine is seeking to go, to get the body to heal itself instead of employing drugs. GHR is truly a revolutionary paradigm shift in medicine and, like any modern leap frog advance, many others will be left in the dust holding their limited, or useless drugs and remedies.

It is now thought that HGH is so comprehensive in its healing and regenerative powers that it is today, where the computer industry was twenty years ago, that it will displace so many prescription and non-prescription drugs and health remedies that it is staggering to think of.

The president of BIE Health Products stated in a recent interview, I've been waiting for these products since the 70's. We knew they would come, if only we could stay healthy and live long enough to see them! If you want to stay on top of your game, physically and mentally as you age, this product is a boon, especially for the highly skilled professionals who have made large investments in their education, and experience. Also with the failure of Congress to honor our seniors with pharmaceutical coverage policy, it's more important than ever to take pro-active steps to safeguard your health. Continued use of GHR will make a radical difference in your health, HGH is particularly helpful to the elderly who, given a choice, would rather stay independent in their own home, strong, healthy and alert enough to manage their own affairs, exercise and stay involved in their communities. Frank, age 85, walks two miles a day, plays golf, belongs to a dance club for seniors, had a girl friend again and doesn't need Viagra, passed his drivers test and is hardly ever home when we call - GHR delivers.

HGH is known to relieve symptoms of Asthma, Angina, Chronic Fatigue, Constipation, Lower back pain and Sciatica, Cataracts and Macular Degeneration, Menopause, Fibromyalgia, Regular and Diabetic Neuropathy, Hepatitis, helps Kidney Dialysis and Heart and Stroke recovery.

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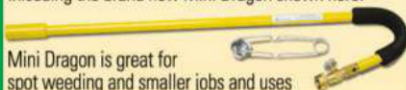
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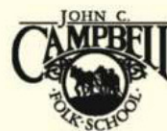
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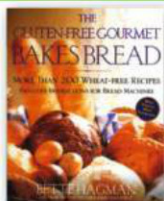
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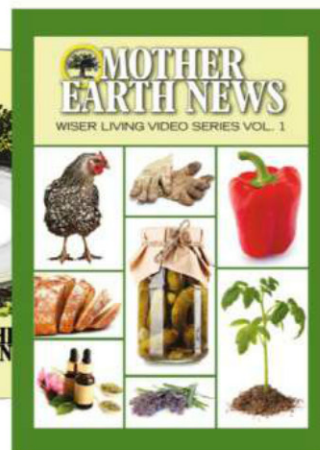


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For more information on these ads, see card page 97.

# A Few Solar Generators With Slight Scratches At Astonishing Discounts!

There has never been a better time to get a "Solar Generator" from Solutions From Science. Why are Solar Generators spreading like wildfire among off-the-grid-enthusiasts across the country? There are a lot of good reasons. Here are just a few of them:

- **Generate Free Electricity From The Sun**
- No Dangerous Fumes
- **Life-Saving Back Up Power When You Need It Most**
- Portable - Take It Anywhere
- **Runs Quietly In Your Home**
- Electricity Prices Are At All-Time Highs
- **Plug-And-Play Means "Easy To Use" Instant Power**
- Gas Stations Can't Pump Gas Without Electricity

I'm so convinced every American household needs a Solar Generator, that I've arranged for a truly incredible offer for Mother Earth News readers.

## Once A Year We Let A Handful Of People Buy A Solar Generator For Very Little Money

Here's the exciting story:

In the rush and excitement of selling several thousand Solar Generators in the last year, there was no time to pay attention to the units that were slightly scratched or had dented boxes except to put them aside in our warehouse.

Some of the units have only slight scratches on the outside shell — so slight that you would have to make a real close inspection to discern the damage, but still... you know how it is... they cannot be sold as perfect "new" Solar Generators.

So rather than send them back to our manufacturing plant in Canada and give Canadian workers the job of putting new outside shells on the units, we have decided to pass a huge discount on to a few people who really don't care about a minor scratch, but are just interested in having reliable backup power... and to offer these units at "below wholesale" pricing.

## Only 33 Units In The Warehouse!!!

We currently have 33 PowerSource1800 "scratch and dent" Solar Generators to sell at a drastically discounted price. Once we sell out, it'll be very hard to buy a Solar Generator at such a steeply discounted price. But while the inventory of these slightly scratched units lasts, you can pick one up for very little money. (Less than half of a new one.)

## All Scratch And Dents Have Full "New Unit" Warranties!

We also guarantee every PowerSource1800 Solar Generator to be in like-new condition. As we mentioned earlier, in some cases, only the box was "dinged up" a little, so the units inside the box are absolutely perfect. In fact, in most cases not even one of our techs could find anything wrong, except that the box doesn't look new. (But if you think about it, you will probably throw the box out anyway.)

We know how important solar backup power is to our Mother Earth News readers, so we wanted to offer this to you right away. Now, the truth is, these special "scratch and dent" units aren't going to last very long when priced this low.

The price is just \$995.00 plus \$162.50 shipping and handling. (Total \$1,157.50) But I've decided to sweeten the deal even more this year. I'm also going to give you \$1,000.00 in Heirloom Seeds absolutely free and a way to get \$1,250.00 in free LED bulbs. All of this may seem too good to be true... but I can assure you it's very real. You can even see a video we made about this very unusual offer at:

## ScratchAndDentSolar.com

Please understand, quantities are definitely limited, so we must receive your order as soon as possible in order to help guarantee a unit.

Here's what you should do right now. For the absolute fastest way to get one of these discounted "scratch and dent" units is to go to this website right now...

## ScratchAndDentSolar.com

If you would like to order by phone, you can call toll-free by dialing 800-219-8767. Tell whoever answers that you want one of the



2013 Scratch and Dent models, \$1,000.00 in free seeds, and the bonus LED bulbs.

Please call even if you plan to pay by check or money order so we can put your name on a unit. But don't take too long to think about it. Every year when we sell our "scratch and dents" they go very quickly.

If you want to order by check or money order, after you call, have your check or money order made out to "Solutions From Science" and mail it to...

**Solutions From Science  
Dept. Scratch & Dent ME124  
2200 IL Route 84  
P.O. Box 518  
Thomson, IL 61285**

Warm Regards,

Bill Heid  
President, Solutions From Science

P.S. You can pick a unit up at our showroom if you'd like. (Please call first.) We're in Thomson, Illinois on Route 84, one block north of the bank.

P.P.S. If you have any questions at all, don't hesitate to call the office at 800-219-8767. But please... watch the video before you call.

**ScratchAndDentSolar.com**  
Circle #60; see card pg 97

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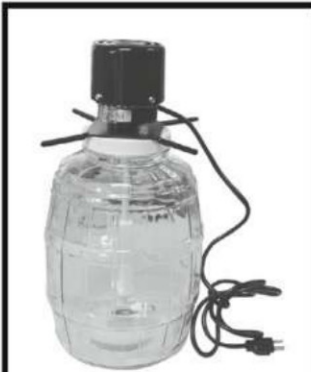


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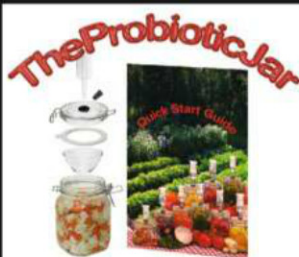


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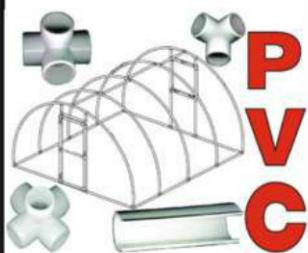
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