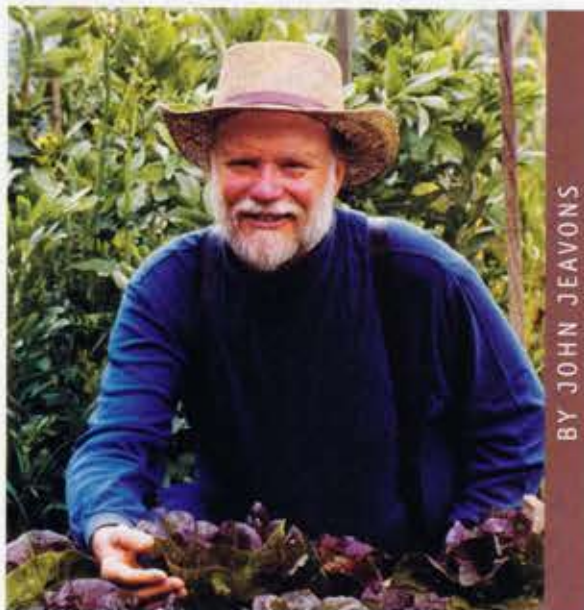


BACK TO BASICS

Maximize your land's growth potential with the Grow Biointensive method.



BY JOHN JEAVONS

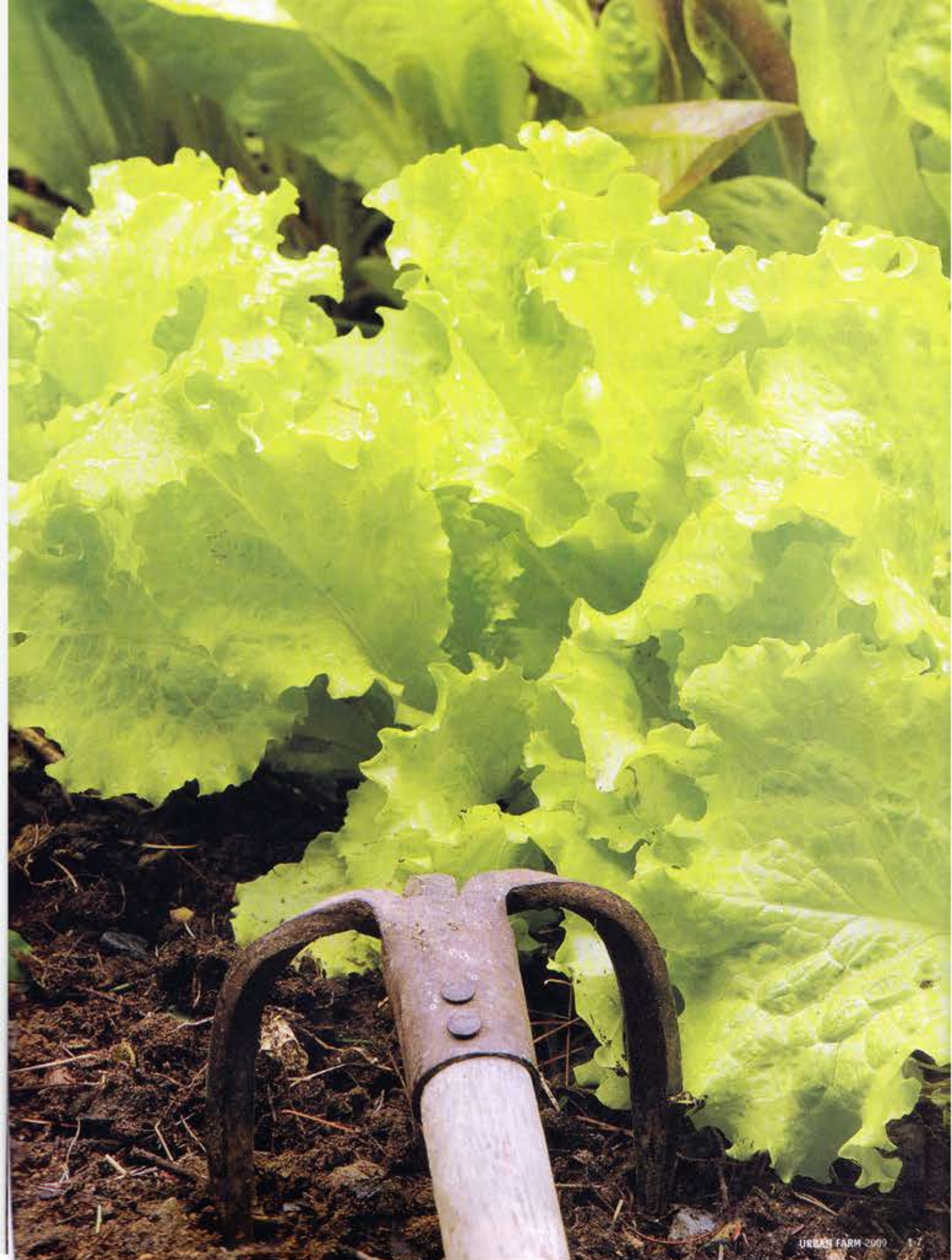
What will create a strong foundation for the new millennium? We've all heard of the fundamental three Rs. Well, here's a new version: return, resource, remember.

Begin by returning to what we have always known in our bones and returning or giving something back. Then re-source, or reconnect with the sources of all of life: soil, water, minerals, air and sun. Finally, remember, or choose once again to be a member of the web of life and find the joy in that relationship. Now take a deep breath and step into your backyard with new eyes

as you see the possibilities before you for feeding your stomach, your soul and your soil—all of which contribute to the sustenance of the planet, as well as your self.

Ecology Action (EA), a research and education nonprofit in Willits, Calif., has spent the past 37 years remembering or bringing together ancient agricultural knowledge with new understandings of how to grow the highest yields of food in the smallest areas, in any climate or soil type, while rebuilding the crucial topsoil. The method is known as Grow Biointensive® (GB), or biointensive mini-farming. It's a nutrient-return system, where the garden is fed by itself rather than bringing in soil amendments from somewhere else and depleting that area. The beauty of this method is that it doesn't matter whether you live rurally or are an urban dweller. It's designed to be effective in small spaces. While you may not meet the objective of growing a complete diet for yourself in your own backyard, there are wonderful opportunities for remembering that, together as a community, we can pool our resources. One of the primary goals of EA is to empower people to feed themselves locally and to strengthen community, while simultaneously being a part of the solution to world food, water, energy and climate-change concerns.

LEFT: COURTESY ECOLOGY ACTION; RIGHT: TERRY WILD



The way station between your kitchen scraps and the compost bin outside is a compost crock with a tight-fitting lid.

Utilizing sustainable, organic GB techniques, you have the potential to:

- ☐ Use 67 to 88 percent less water
- ☐ Use up to 50 percent less purchased fertilizer
- ☐ Use 94 to 99 percent less energy per unit of production
- ☐ Substantially increase yields
- ☐ Create a 100-percent increase in soil fertility

There are many details for refining the method and maximizing potential. However, don't get bogged down by the details and think you have to know everything before you begin. It is, after all,



PHOTOS BY JESSICA WALLISER



an ongoing learning experience for us all, and the most important thing is paying attention and listening as a part of the new relationship you're establishing. If the listening part seems a bit esoteric at this point, it will become clearer as you progress. The essential points to know in getting started are outlined as follows.

☐ DEEP SOIL PREPARATION

If you feed and nurture the soil, it will feed you. Soil fertility and organic matter are the fundamental keys to a regenerative, life-producing ecosystem. Double-digging is one way to develop deep soil structure, which makes air, water and nutrients more available to plant roots and soil microbes. According to the International Institute of Rural Reconstruction's Sustainable Agriculture Extension Manual (www.iirr.org/saem/page134-137.htm), "Double-digging is a

method of deep soil preparation in which the soil is fertilized with organic matter and is loosened to a depth of 60 cm (2 feet)." The GB method, when mastered, is actually easy and enjoyable and is less disruptive to soil microorganisms than mechanized tilling.

The question often comes up about whether double-digging negatively impacts soil microbes and mycorrhizal threads that feed root systems. When done properly, this digging method actually enhances the soil environment because the soil is loosened, but not turned, so that the microbial strata are mixed as little as possible. The Royal Horticulture Society in England has stated that, from their experience, double-digging makes a significant, positive difference in crop production. Many people start out with highly compacted and demineralized soils, since that is more the standard with today's soils than the exception. Gently creating air-pore space in the soil increases the availability of air and water to the soil microbes and plant roots and helps them access nutrients stored deeper in the soil.

Once you have established good soil structure, only surface cultivation will be needed. At that point, weeding becomes even easier since the soil is looser.



By starting seeds in flats, you'll have stronger plants with which to start your beds.

☐ COMPOSTING

Composting is essential, especially when you're aiming for sustainable higher yields. Chemical inputs deplete soil over time, and most are petroleum products. Proper composting creates a holistic nutrient-return system to minimize inputs that need to be brought in from somewhere else, which depletes another area. The basic principle of a good compost pile is to layer it with three things: dry, mature material (slower breakdown); kitchen and yard waste, such as grass clippings (faster break down); and soil (to introduce microbes, help keep it cool, reduce odor



DOUBLE DIGGING

1. After spreading compost over the entire area to be dug, use a spade to remove the soil from the first upper trench 1 foot deep and 1 foot wide across the width of the bed.
2. After loosening the first lower trench 1 foot deep with a spading fork, shift the soil from the second upper trench into the area above the first lower trench.
3. Clear out the remaining soil from the second upper trench.
4. Loosen the second lower trench 1 foot deep with a spading fork.

For full details, see *How To Grow More Vegetables ...* (book information on page 23).

PHOTOS BY DAVID CAVIGNARO

The basic principle of a good compost pile is to layer it with three things: dry, mature material; kitchen and yard waste; and soil.



anaerobic and becoming very smelly. You may also want to put grass clippings in this bin. A cooler composting system, as described above with the layered, built pile, is preferable because it can produce more cured compost than a hot compost pile, which is turned often, resulting in the loss of much of its nitrogen and carbon into the atmosphere.

In urban settings where you may not have a lot of room for building compost piles, worm boxes can be a wonderful way to help recycle wastes. The worm castings can be used as a soil amendment. The important thing to understand about worm composting (aka vermiculture) is that the worm castings make nutrients super-available for the plants, but available nutrients cannot be easily retained over time. Cured compost made from plants, on the other hand, is a time-released nutrient supplement and is more reliable. Earth worms (different from compost worms) are very important in the soil, as are microorganisms. When you create good soil, using cured compost, all of these elements will be there.

☐ CLOSE PLANTING

Close planting protects the microbes in the soil from sun damage and helps to create a living sponge for more efficient utilization of water. It

DAVID LAVAGNARO



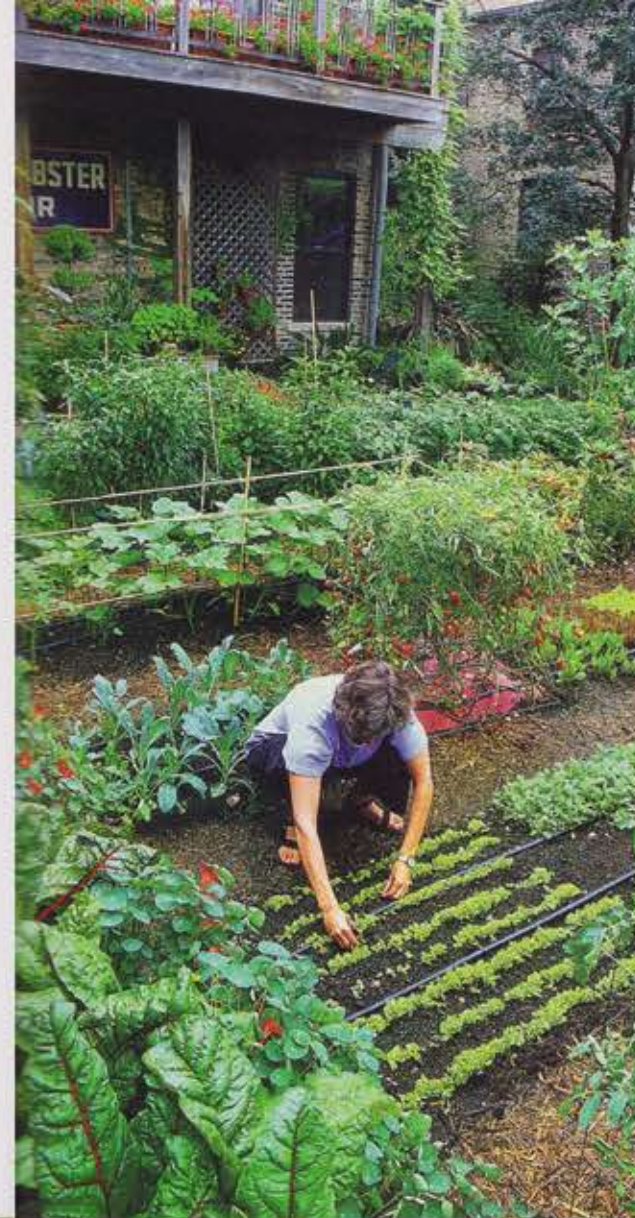
JOE WILD

Top: Close planting protects the microbes in the soil from sun damage and creates a living sponge for more efficient water use.

Right: GB methods encourage beneficials like butterflies and bees.

and hold moisture). An example of dry, mature material in your backyard might be the leaves you rake up in the fall or stalks from corn and other plants that reached their maturity and have been harvested or cut back.

It's also important to keep the pile moist to assist the microbes that break down the material. Once the pile is built, it will take about three months until you can "harvest" compost for the garden. Not all of the mature material will have broken down in this time; simply recycle it into the next pile you build. The kitchen wastes you accumulate after your pile has been built can be stored in a container with a tight-fitting lid. When that's full, transfer it to an outside bin with air holes until you're ready to build your next layered pile. The air holes will keep it from going



DAVID LAVAGNARO

If you have a small growing area (200 square feet), you can grow all of the vegetables and soft fruits eaten annually by the average person.

produce a large amount of good material for compost, as well as food for you. Corn, wheat, amaranth, millet and oats are some of the best to use. Growing your own compost materials will be increasingly more important, since large amounts of organic matter and nutrients are currently being "mined" from other areas. According to a study published in *Population and Environment: A Journal of Interdisciplinary Studies* in May 1994 by David Pimentel, et al., estimates show that we now have as little as 35 to 52 years of arable topsoil remaining, so rebuilding fertile soil is a high priority.

The efficient production of sufficient calories in a small area is facilitated by planting special root crops in 30 percent of the growing area. These crops include potatoes, sweet potatoes, leeks, garlic and parsnips.

If you have a very small growing area (200 square feet), you can grow all of the vegetables and soft fruits eaten annually by the average person. To grow a complete diet with the 60/30/10 distribution of crops, you'll need about 4,000 square feet. Planning with friends who are gardening or as a neighborhood can be useful for obtaining more food to eat and for providing more variety. While there'll be some crop variance depending on the climate of the growing region, the optimal percentages apply for each category of crops.

also enables you to get higher yields. Starting seedlings in flats and pricking them out also makes it possible to use less water and to have the transplanted starts fill the bed area more quickly so that bare soil isn't exposed for as long. The flat-ted seedlings will also give you stronger plants with which to start your beds.

☐ OPTIMAL PLANTING RATIOS

Ideal ratios are 60 percent grain and seed crops for food, compost material and seed to be saved; 30 percent special root crops for calories; and 10 percent vegetables and fruits for remaining nutritional requirements and variety.

Soil fertility is facilitated by planting approximately 60 percent of the growing area in dual-purpose seed and grain crops. These key crops

☐ COMPANION PLANTING

This concept is important, no matter how small the growing area. Research shows that many plants grow better when they're near certain other plants. Some plants are useful in repelling pests, while others attract beneficial insect life. Also, many wild plants have a healthy effect on the soil; their deep roots loosen the subsoil and



OPEN-POLLINATED SEEDS

With GB techniques, significantly higher yields, such as those promised by the “Green Revolution,” can be obtained with normal open-pollinated seeds that have been selected over generations for their characteristics. Open-pollinated seeds produce true to type, whereas plant characteristics from hybrid seeds are more variable. Some open-pollinated seeds may be referred to as “heirloom” varieties. The use of open-pollinated seeds also helps ensure genetic diversity, which is essential to the vitality and resiliency of ecosystems. For generations, families have saved seeds from their favorite fruit and vegetable varieties and passed them down. You may find varieties you’re particularly fond of; saving your own seed is a way to ensure that you’ll be able to enjoy those foods for years to come.

GOOD TOOLS

Not only do well-made tools last longer, but they make your job so much more enjoyable. You want to put as little strain as possible on your body, and having tools with the proper handle length for your height will help you achieve that goal. Also, learning the proper technique for tasks like double-digging will drastically change your experience in the garden. It’s better to start slow with only one or two beds and to feel your way into the flow of the activities. Pay attention to your body; then gardening becomes a meditation that sustains you on many levels.

The basic tools you’ll need are a D-handled spade, a D-handled fork, a 12- to 15-inch bow rake, a 2-inch trowel, and a 5-foot digging board made of 5/8-inch plywood with a carrying handle and rounded corners, which you will place over the bed you’re preparing to keep from compacting the soil.

Left: Marigolds and nasturtiums are beneficial plants for deterring pests.

Right: Open-pollinated seeds are also known as heirlooms.

bring up previously unavailable trace minerals and nutrients. A few examples of beneficial plants for deterring pests are marigolds, which have a strong aroma that “repels” insects; nasturtiums for repelling squash bugs; and rosemary for repelling the cabbage worm butterfly. When you use an ecosystem-friendly approach like this, you aren’t deterring beneficial insect life, such as bees, butterflies and other pollinators; instead, you’re encouraging a vitally alive, interactive system.

Also, don’t be too quick to pull out “weeds” that may be beneficial, such as purslane, which can act as a living mulch while corn plants are establishing and is also high in nutrients and can be nicely incorporated into salads and stews. Sow thistle has dandelion-like seeds that attract beneficial birds that eat both the seeds and harmful insects, too.



WATERING

Just as with topsoil, water is becoming an ever more precious resource. Efficient water usage is one of the key benefits of the GB method. When you have good soil structure and use a close spacing arrangement, you create a living sponge that holds water longer. Because soil is the focal point for the health of the garden, always think in terms of watering the soil more than watering the plants. A Haws watering can, which provides a gentler, more effective delivery of the water, is a good choice. If you’re in a very arid climate, then a drip-irrigation system with the emitters placed on 18-inch, offset centers may be better. The best time to water is two hours before sunset, and if you’re working a regular job and can’t manage this, the next best thing is to water early in the morning. The reason for this is that when you water late in the day, there is more time for the water to soak in deeply, providing more available water for both plants and soil microbes.

Aside from the obvious benefits of providing nutritious food for yourself and your family, there are multiple other benefits you may not have considered with gardening. For one, slowing down and being present during the creation of a living environment is inexpensive stress therapy. The medical profession acknowledges that stress is a

A Haws watering can, which provides a gentler, more effective delivery of water, is an essential tool for the garden.

contributing factor in a high percentage of illness. To the beginning gardener, this benefit may not yet be apparent, but for the more seasoned land steward, it’s an essential relationship that feeds the soul.

For many people, the primary motivation to garden may be to save on food costs, particularly in these times of rapidly escalating prices. Others may simply enjoy the convenience of stepping out onto a balcony to harvest fresh herbs from a container garden to give their meals more flair. Greenhouse windows in sunny kitchens or laundry rooms can keep herbs growing year-round and can be good places to get seedlings started for a new growing season.

Urban areas provide a lot of ground for creativity—or in some cases, a lack of ground, but don’t get discouraged. As mentioned earlier, local food production can become an axis point for establishing a deeper sense of community, and from it, ideas will sprout about how to maximize what you have while sustaining yourself and the Earth. Grow Biointensive is not just a technique for teaching people how to efficiently produce food locally, it’s about growing people and beneficial relationships. It is good to remember that we are all in this together and that we’re connected to the same vital web.

John Jeavons is the executive director of Ecology Action and author of *How to Grow More Vegetables* (and fruits, nuts, berries, grains and other crops)* Than You Ever Thought Possible on Less Land Than You Can Imagine* (Ten Speed Press, 2006). For more information about Ecology Action and the Grow Biointensive method, visit www.growbiointensive.org. To order books, seeds and supplies, visit www.bountifulgardens.org or call 707-459-6410.

