



# Intensive Vegetable Gardenin on the Homestead

#### Sarah Brackney

Ag & Natural Resources Educator Daviess County

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**PURDUE EXTENSION - Intensive Vegetable Gardening** 

# **Learning Goals**

- · Alternative Method to Tillage
- · Assessing Household Food Needs
- Seed Starting Options
- · The Art of Succession Planting
- Saving tomato, pepper, bean, potato, and garlic for replant



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### PURDUE EXTENSION - Intensive Vegetable Gardening

# **Back to Eden Gardening Method**

#### **Background & Principles**

- Method introduced by Paul Gautschi, author and master arborist, Washington State.
   Christian-based principles
- Decrease in "toiling," Psalms 127:2
- Mimics forest nutrient cycling
   Creation of soil humus
- Preserve soil, nutrients, and water by replacing what is removed – Sustainable Permaculture





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Back to Eden Gardening method is similar to other layering methods, with unique differences in the depth of layers and the frequency in which they are applied. The QR Code takes you to Paul Gautschi's video about the method.

For this discussion, we are interested in how this method works, scientifically-speaking. The basic aim here is to keep soil healthy and in place, mimicking forest nutrient cycling, although at a much slower pace.

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|--|---|
| Site Preparation   | Mar Mar Mar Martin  |
| <ul> <li>Base Layer</li> <li>Cover the ground</li> <li>Cardboard</li> <li>Newspaper</li> </ul> |   |
| Nutrient layer (4-6")  | Protective layer (4-8")                                     |
| Can be:  | Can be:   |
| Compost  | Yard clippings  |
| Manure (in fall)   | Leaves  |
| • Topsoil  | Pine needles  |
|  | Wood chips     An Equal Access/Equal Opportunity University |
| Base Layer – When beginning with either a previously-tilled ga                                 | rden or a patch of lawn, the starting step is identical.    |

Cover the ground with a base layer of cardboard to keep out weeds. This layer will break down over time. Sourcing local cardboard from stores can keep your materials close to home. Once base layer is down, cover immediately with nutrient layer.

When we start, it's probably a previously-tilled garden or patch of lawn.

**Nutrient Layer** – This is a layer of nutrients you will plant into your first year. Compost is a great option, as is topsoil. If you apply manure, do it in the fall.

**Protective Layer** – On top of the nutrient layer, place the protective layer. Any organic, plant-based material with high Carbon content will do. Wood chips are my favorite, as they stay in place well. Wood chips can be sources from tree services. A mixture of woody and green material is best. Avoid black walnut, as it contains juglone, a growth inhibitor, especially for nightshades like tomato.



This method, especially in the beginning, takes a lot of wood chips. If you or a neighbor have a tree cut down, save the chips. Wood chips are like gold to a Back to Eden Gardener.

If you don't have your own supply, tree services are very happy to bring them to you.

Check into county/city mulch programs.

# **Planting Your Garden**

- First year: Don't plant directly into the mulch.
  - Move mulch aside and plant into the nutrient layer.
- Seedlings & transplants
  - After planting, surround the plant with mulch.
- · Seeds
  - Leave mulch aside as your seeds germinate and grow. Gravity and rain will back-fill the furrow.





Some folks get disheartened when their plants don't thrive the first year. It may take a little time to build up to the incredible results that others are having, but a few planting tips will help you get on the right track. In the first year, you shouldn't plant directly into the mulch.

The mulch, at this point, is the covering and has not broken down into usable nutrients yet. As time goes on, you'll find that planting into the mulch causes no problem at all. Because all the layers are porous, constantly decomposing, and holding water, seedlings can eventually be planted directly into the mulch and will find the nutrient layer on their own.

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|------------------------------|--|
|                              | Watering & Weeding   |
| Photo by ANBARASU THIRAMIYAM | <ul> <li>Less water <ul> <li>SOM (Soil organic matter) and wood chips retain moisture in dry conditions</li> <li>Release excess in overly wet conditions</li> </ul> </li> <li>Weeding is EASY <ul> <li>Weeds seeds are still present, but they do not germinate until a rain.</li> <li>A garden rake or hand pulling removes entire root systems with ease.</li> </ul> </li> </ul> |
| PURPUERSITY. Extension       | Photo by Sarah Brackney<br>An Equit Access/Equil Opportunity University  |

The wood chips in B2E are suppressing weeds and conserving water, like a soil blanket.

In 9 years, I have never watered my garden. The soil is moist enough to germinate seeds in spring, and the soggy mess you have to wait out until planting is not a thing with this method.

Weeding is a breeze. Of course, wind carries seeds that will germinate after a rain, but a quick metal rake over the top uproots them, and you can go about your day.



# **OTHER BENEFITS**

| Continuous, slow-release soil nutrition. | Cleaner produce  |
|--|--|
| Closer Planting                          | More predictable yields  |
| Earlier and later plantings              | <mark>B2E Soil Temperature Late July-</mark><br><mark>Average 77</mark> .1<br>Lawn Temperature <i>–</i> 83.1 |
| Photo by ANBARASU THIRA/IYAM             |  |
| PURDUE Extension                         | Photo by Sarah Brackney<br>An Equal Access/Equal Opportunity Univer  |

When we layer compost and wood chips, instead of mixing them, it's a slow, continuous release of nutrients.

At that boundary, earthworms, fungi, and bacteria break down material year-round.

That breakdown releases heat, so soil is warmer earlier in spring. In the summer, soil temperature is much lower than that of the neighboring lawn, which makes nutrient and water uptake easier for plants.



# **Assessing Household Food Needs**



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Let's discuss how to determine the amount of food you need to make it to the next year's harvest.

Bottom line: This takes time and recordkeeping to accomplish.

Many factors beyond your control will affect the outcome, even with the most careful planning.

First, we need to be realistic.

We can be super creative, grow up trellises, grow in containers, etc to make the most of our space.

But if you've got a patio and a 10x10 raised bed, you're not going to be fully producing enough for your family's total need. It will be a very useful supplement no matter what, so don't be discouraged.

When we start out homesteading, we romanticize this huge garden, spending all day canning, etc. But, that's usually unrealistic and undesirable long-term, and that's okay.

Being a half-time Homesteader is also beautiful, and it doesn't mean you're failing.

Take your time and please enjoy.



- Meal frequency
- Portion sizes
- Seasonal variation
- Dietary preference
- Waste habits





Being honest about how you eat and use food RIGHT NOW is important, not just how you want to eat.

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| Vegetable<br>Production Chart<br>www.canr.msu.edu  | Create a Li<br>What do yo  | st of Staple V<br>u eat/purchase   | Vegetables the most?   | *Numbers are per<br>adult per year<br>Fresh/ Preserved  |
| Tomato 24/ 36 lb<br>- Sauce<br>- Paste<br>- Diced<br>- Crushed<br>- Whole<br>- Juice<br>- Soup<br>- Ketchup<br>- Salsa | Potato 25/ 75 lb  Fresh Fries Chips Mashed Salad Pasta Starch Soup | Beans<br>Snap 15/ 18 lb -<br>- Pickled<br>- Canned<br>Dry<br>-<br>Sweet Corn<br>25 ears / 50 | Squash<br>Summer 10/3<br>- Zuchinni<br>- Yellow<br>- Crookneck<br>Winter 6/3 lb<br>- Butternut<br>- Acorn<br>- Spachetti | Greens<br>Ib - Kale 1/2 Ib<br>- Spinach 3/5 Ib<br>- Swiss Chard 3<br>/4.5 Ib<br>- Lettuce 6 /<br>- Turnip 5/7 Ib<br>- Etc |
| - Fresh  | - Flour  | ears   | - Hubbard  | 3/19/2024 <b>  16</b>   |

Track and estimate which staple crops you use the most. This is a list of products that can be made or bought by type of common produce staples.

WHEAT – takes a lot of space.1 lb of wheat = about 1.5 Cups ; 2 cups per every 1000 square feet.



If we're learning how to grow what we eat, we might want to change our eating habits too. Both of those things require significant time and mental energy. So, Start small and gradual.

Example: Increase tomato production, learn how to can whole ones, and then plan Italian Thursday every week.

Next, let's **prioritize**: be aware of what you've got coming up and going on. Buying goats soon? Overhauling finances? It all doesn't have to be done at once.

Set realistic expectations – If you are working swing shifts outside the home for long hours, maybe consider setting aside one evening to plan a menu. Keep it simple – Consider creating 6 weeks of meal plans on rotation **\*\*Chat GPT (if you use it) - menus based on your preferences,** allergies, eating in-season shopping lists and recipes.

# **Assessing Household Food Needs**



Keeping records of food consumption might mean something easy like logging on a sheet like this from CDC or using a free app.

Maybe make it part of homeschool plans. The Garden Record Keeping topic could take an entire session's worth of time.

Variables are endless, but get growing and you'll see trends IF you record and reflect back on them.

Crop Rotation Plan -help prevent the build-up of soil-borne diseases and pests.

Ex) Nightshades like tomatoes, pepper, and potato share some diseases.

Planting Dates – Record when you planted each crop. It helps you estimate maturity, plan for succession planting, and allow for continuous harvest.

Varieties Planted – Know what you planted, if you liked it, and how much it produced.

A cheap 20 lb food scale is handy to weigh what you bring in.

Harvest Date - When will the crop be done so you can be ready with more seeds and different crops?

Weather – If you have a bad hail storm, you won't remember why your yield was so crappy 5 years ago if you skip this step.

**Soil Amendments/ Testing** – Knowing what's up with your soil chemistry is important when you're growing intensively. If you don't keep an eye, things will go south over time.

Pests/Disease - When you log pests and diseases, you've got a better idea next year of when to control them. Consider calendar reminders

Succession Planting Plan – Planning out your planting helps prevent downtime in garden real estate if high production is what you're after.

# **Assessing Family Food Needs**



#### http://www.all-americaselections.org/

If you want to save seeds, get heirloom/open-pollinated varieties. Other things to think about when you choose plants are whether they have a track record of doing well in your local conditions. AAS is a non-profit that tests new varieties nationwide each year and picks the best performers, and most catalogs will proudly state that on varieties who win.



If you grow or buy your transplants, you'll want to select the healthiest plants for the best chances of higher yields.

When choosing plants, select specimens that have been given a healthy start.

Root bound - They will grow if you loosen them up, but it may be slower to reach reproductive stages.



To start, where does each type of seed go: Indoors or in the ground, also called "direct sow"

Not a hard and fast rule, but a decent guideline. Large-scale growers do start cucurbits in a greenhouse.

Also, greens can be planted either indoors or out. Sweet corn and root crops don't tolerate transplant.



Assuming we're seed starting on a small scale with electricity, here's a basic guide.

Get an artificial light source and keep it a few inches above the plant. An inexpensive wire shelf with shop lights on adjustable chains is an easy way to start. LEDs are fine, if that is what you have. 12 hours per day.

Ideally, having both cool and warm bulbs in each fixture is recommended.

Water seedlings from the bottom to prevent fungal problems. Put your pots in a tray and add water to the tray when it dries out.

Airflow and sterile medium prevent disease. You can also soak pots and tools in a 10% bleach solution for 10 minutes for extra measure.

When plants have 3 sets of leaves, most are ready to move outside. Give them ¼ strength soluble fertilizer prior to transplanting.



Cold, wet soil is the perfect environment for fungal organisms that cause damping off. Some varieties live in soil.

Keep tools clean, keep air moving, and water from below. Check seedlings every day.

\*Personal anecdote: I keep a spray bottle of 1:3 household hydrogen peroxide: water handy. If anything looks shady (white patchy soil), I give a good spray. Never lost a single seedling to damping off.



As the weather warms up, set them out on sunny, calm days so their leaves and stems can strengthen to the elements. Bring them in at night and gradually increase the length of time they are outside.

# **Starting Seeds Without Electricity**

#### Hot Beds & Cold Frames

- Box with no bottom
- Slanted lid that allows in light
- Sun heats air and soil in day; Soil releases heat at night
- Vent by propping lid open
- Thermometer to track temp
  - Cool season crops- 50-60
  - Warm season crops-70-75



Publication CORNELL – Cold Frames & Hot Beds

Tips

- Well-drained soil

- Southern exposure
- NW wind protection
- Remember to water regularly
- Direct sow thick-eat what you thin (greens)

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Two ways to start seeds are with miniature greenhouses called hotbeds and cold frames.

Difference:

Hot beds use an additional heat source, like heated cables or a compost system, for example.

Seeds can be started earlier in a hot bed, and they are well-suited to warm season crops.

Cold frames - start seeds a bit later / Cool season crops/ Greens

If you put either of these in a larger greenhouse, it will regulate even better.

Browse YouTube to see what others are doing or join a homesteading FB group. Cornell also has a plan layout publication listed here.



Folks started seeds well before electricity was invented, and I think as homesteaders, its important to understand how we can utilize natural heat and light sources to get long-season crops going in our growing zone and how to extend the season.

The photo on the right is from Mississippi Department of Archives, showing how growers built a hot bed atop their garden plot.

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# **Succession Planting**

- Keeping the garden in continuous production
- Crop out/Crop in
- Continued growth throughout the growing season







West Virginia Extension Succession Planting

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# PURDUE EXTENSION MASTER GARDENER PROGRAM

## WHAT IS OUR GROWING SEASON?



#### **PURDUE EXTENSION - Intensive Vegetable Gardening**

#### PLANNING GARDEN LAYOUT

- Group by growing season
- · Plan to replace early harvest with summer or fall crops
- Keep an eye on soil fertility





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Basically, when a warm-season crop is done, you plant a cool season one. You can group perennials (ones that reproduce every year)

Grouping by growing season can help simplify your plans. Soil fertility is very important to keep an eye on, too, as nutrients are being continuously removed in intensive systems.

Consider planting a cover crop mix in the off-season and using it as green manure (nutrient) the following year. And get your soil tested at least every 3 years at the same time of year.



Why the north end? - Late season sun decreases its angle; want to be sure all plants are receiving optimal sunlight.

Sweet corn is wind pollinated, so putting it in a block increases the chances of pollination success over single-row planting.

Reach center of row – think about the final size of your plants

Perennial crops and herbs – oregano, asparagus, rhubarb, etc. – out of the tiller's way.

Rotation – crops in the same family, like tomato and potato (nightshades) – **Verticillium** wilt – fungus that can overwinter in soil and plant debris and cause issues for the next crop. V-shaped lesions on edges of leaves with yellow halo; wilt, dieback; brown inside stem



Grow vertically in an east-west orientation so other crops aren't shaded.



How to save seeds from the plants that you love.



#### Why?

- Cost-savings
- Preserve varieties
- Site-adapted plants
- Closing the loop
- Tradition
- · So you know how





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Why do it? Although seeds aren't typically heinously expensive, in bulk and over time, it adds up. Pinch some pennies.

Preserve the biodiversity of food crops. Seed companies that sell these varieties can only grow so much. If you save the seeds, you help their mission, in essence. If you pay attention and select for what thrives in your area and is most desirable to eat and use, you'll end up with site adaptations.

Savings seeds has been part of what it means to be human forever. You can join a long line of folks who've been saving seeds.

Lastly, you do things and you learn. And then you share what you know.



Growing plant stock for reproduction is like raising breeding cattle: They need to be at top performance, themselves.



### **Controlling Pollination for Seed Purity**



Corn, as a seed, is the only crop whose product characteristics **can be changed within a single growing** season by cross-pollination with other varieties.





**Cross Pollination Resource** 

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Control pollination – Why? Seed purity

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| Controlling Pollination for Seed Purity                          |           |   |  |
| Hybrid   | Vs.       | Heirloom  |  |
| Parent plants are selected and crossed                           |           | A seed with a story   |  |
| Results in predictable<br>offspring for first<br>generation (F1) |           | Retains basic characteristics<br>from generation to<br>generation |  |
| Seeds produce random   |           | Not precise   |  |
| collection of traits   |           | Can cross-pollinate   |  |
| Some do not produce seeds at all.                                |           | Genetic "drift" over time leads to new varieties.                 |  |
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#### **Understanding Heirloom vs. Hybrid**

The plants you grow will be hybrid, heirloom, open-pollinated, etc. Seed catalogs will tell you. If you buy a plant, the tag may not say, so you can look it up or call the company to see.

**Hybrid** – specifically crossed plants, aimed at producing an offspring with a set of desirable characteristics. Done in controlled conditions. The seeds will not display the characteristics of the current plant; they will display random characteristics of the *plant's* parents. You can save them but know that you are most likely not to get a predictable plant. Some hybrids do not produce viable seeds.

**Heirloom** – describes a seed's heritage, or where it came from. To be considered an heirloom, a plant must be able to retain basic characteristics from generation to generation, not as precisely similar as hybrids. Many of these can cross-pollinate, so to retain the heirloom qualities, distance or exclusion may be needed from very different varieties. With heirlooms, genetic "drift" happens, and that's how varieties change over time.

### Common Open Pollinated and/or Heirloom Varieties

| Tomato          | Pepper            | Beans           |
|-----------------|-------------------|-----------------|
| Brandywine      | California Wonder | Blue Lake       |
| Black Krim      | Gourmet           | Tendercrop      |
| Cherokee Purple | Purple Beauty     | Scarlet Emperor |
| Green Zebra     | Chocolate Bell    | Provider        |
| Beefsteak       | Alma Paprika      | Kentucky Wonder |
| Roma            | Early Jalapeno    | •               |
| Rutgers         | Habanero          |                 |
| Amish Paste     |                   |                 |



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# Know How Far Apart to Plant for Seed Purity



#### Know how far apart they need to be

Tomatoes can cross-pollinate with other varieties, but they usually self-pollinate before that happens. 10 ft distance as a rule.

Beans are highly unlikely to cross-pollinate, as well, so distance is not a factor.

\*Cross Pollinator resource\*

https://extension.uga.edu/publications/detail.html?number=C934&title=Pollination%20of%20Vegetable%20Crops

Pepper flowers are self-fertile and can cross-pollinate, and they do so more readily. Keeping different varieties as far from each other as you can is a good idea (50 feet or so) (Southern Exposure Seed Exchange) You can also use mesh on your plants. Peppers are pollinated by agitation, so wind or insects. Gently shaking or tapping flowers can help with pollination, if you use this method, but probably isn't necessary outdoors. General note: cucumber will *not* cross-pollinate with squash, pumpkin, or melon, and vice versa. Melons will cross with each other. The distance required to

prevent crossing is up to a mile because of insect pollination, so just see what you get, practically. Or cover and hand-pollinate, if you're really serious about it.



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|--|--|--|--|
| Harvesting & Processing<br>Pepper Bean |  |  |  |
|  |  |  |  |
| 1. Harvest wrinkled fruit.             | <ol> <li>Harvest dry, brown pods with rattling<br/>seeds.</li> </ol> |  |  |
| 2. Remove seeds.                       |  |  |  |
| 3. Let dry on towel.                   | 2. Let dry 2 weeks indoors.  |  |  |
|  | 3. Shell or leave in shell until planting.                           |  |  |
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### **PURDUE EXTENSION - Intensive Vegetable Gardening**

#### Harvesting & Processing

#### Cucumber

- 1. Let fruit ripen completely.
- 2. Let sit for a few weeks.
- 3. Cut fruit lengthwise
- 4. Scoop gel and seeds.
- 5. Ferment, as with tomato.



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# PURDUE EXTENSION - Intensive Vegetable Gardening

### Storing Seeds

# Seeds like it cool, dark, and dry

- Paper packets in glass
- Fridge is ideal. Can store at room temp.
- Add silica pack or powdered milk in Kleenex, if desired.
- Label with
  - Type, Variety, Date Collected





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General Timeline for best Germination Rate

- Peppers 2 years
- Everything else 3 years

#### **Storing Seeds**

Seeds do best in paper packets sealed in glass in the fridge. You can add silica packets or powdered milk in a Kleenex.

They can be stored at home temperatures, but their viability and germination rates will be less. Cool, dark, dry.

Label them with Name Variety Date Collected; Using sooner is better.

Share with friends - If you do this every year, you will inevitably end up with more seeds than you need, and they don't keep forever. So, think about sharing with some friends.

Consider halving your collection, packaging, and sharing. They will eventually grow to be a totally different variety over time in a new location ©



Germination test - Because seeds lose some viability over time, you may want to do a germination test before you start them.



Saving Potatoes - https://extension.usu.edu/vegetableguide/potato/potato-seed-handlingtreament#:~:text=Store%20seed%20potatoes%20at%2038,seed%20can%20be%20planted%20immediately.

While you can save and plant potatoes from the store, understand that they are not certified seed potatoes and may carry diseases like wilt, which overwinters in soil and potato blight, which can live on potatoes that are left in-ground over winter.

Seed potatoes can be best stored, uncut at around 40F with high humidity (the basement can work just fine).

Before you cut them, bring them out and warm them up. Plant immediately after cutting with a clean tool (I know there is some contention about waiting for them to callus.... Don't, if you don't have to). If you have to, keep them in an airy place with humidity. I can't think of a location in my house where that would be an easy achievement, so just don't. Each piece should have at least one eye and be around the size of one of those fancy little potatoes (new potatoes) from the grocery store.

#### Saving Garlic for Replant

- Harvest when leaves are 40% yellow (Jul-Aug)
- · Do a test pull
- · Early is better than late
- · Loosen soil and lift bulbs.
- · Be gentle.
- Keep dry and 50F, upside down
- Don't save suspicious bulbs.
- · Replant in October





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#### Saving Garlic https://ag.umass.edu/vegetable/fact-sheets/garlic-harvest-curing-storage

Garlic should be harvested when the leaves start to turn yellow but are mostly still green (July-August). Pull one up to test. Cut through the bulb and make sure the cloves are "filled out". If you wait too long, the bulbs can pop out of their outer wrapper, so early is better than late.

Dig a tool under the bulbs and lever action to loosen up the soil so you don't damage bulbs or the stem-bulb junction. Gently rub dirt off and leave what doesn't come off easily. Cure bulbs by hanging them upside down in an airy, dry place that isn't super-hot. It takes about 2 weeks. When the center of the cut stem is hard, you're good to go. To store for seed, keep bulbs in a dry place in your house. The ideal temperature to avoid odd-shaped or early sprouting is 50F. If a bulb looks bloated, cracked, ringed, or the leaves are misshapen, don't save that one: It may be carrying disease that will affect your next crop. You're going to replant around October anyway, so it won't be long to keep them.



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