Community Gardener's Guide

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Sustainability 350: Service in Sustainability
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Introduction

In this guide we will answer the following questions: what is needed to start a garden; what tools are required, and what are simply there to make gardening easier; and what can be used within a garden to grow. An important point to remember is, if possible, to start smaller and work your way up. Even a small plot or garden can grow abundantly! Taking stock of your plot and being aware of what is available to you to use is essential in planning a garden. Within taking stock, there are three basic points to consider: land size, organization of labor, and design structure. Here is a breakdown of each of those terms for you to consider:

Land

First is location: is the garden visible and on a relatively quiet street? Are there any pest or animal concerns to be addressed such as deer, slugs, or rabbits? Does your back yard or front yard have ample sunlight most of the day? Full sun exposure to at least part of the garden is preferable, though plenty of plants and vegetables will tolerate some shade with little complaint. On the flip side, do will any of your plants need shading from the afternoon sun? Some plants will bolt, or go to seed if exposed to too much sunlight or mid-afternoon heat, rendering the plant inedible.

If it is a newly-developing community garden, it is advisable to look into permitting or local ordinance: will you need permits to use the land for agriculture? Water availability is an essential point to note when planning where and what to grow. Many crops require frequent watering, and do not tolerate negligence in this field well. This is especially important in areas prone to summer droughts, or where water usage limitations are frequently in effect.

Soil is the last item to really keep in mind when planning a garden. There are multitudes of ways to use different soils, and each has its benefits and disadvantages. We will go into this more further on in the guide.

Organization

Proper organization and labor planning will help to make your plans and ideas real. The first step is to survey your neighborhood and the people in it. Would anyone else be passionate benefit from a personal garden? This is a great time to take stock of materials needed for your garden as well. Reaching out to the wider community can produce benefits; even if the people are unavailable to help, they may have supplies available that are unused and would like to donate. For small to medium size gardens, hand tools will probably do the job. For larger gardens you might want to use some power tools, yet doing it all with hand tools will be more rewarding.

Our suggested list of gardening tools includes:

- Work gloves, cotton or any other breathable material with a gripping palm
- Shovels/spades
- Garden and/or metal leaf rakes
- Hoes or a square-tipped shovel
- Pitchforks – primarily used to turn over the soil and mix in fertilizers and compost
- Wheelbarrow – allows for easy transportation of heavy goods such as compos
- Pruners – both hand-sized and garden shears are handy to have around
- Long-handled weeding tool- though a spade and some muscle work just as well
- Work Shoes/Boots - comfortable, water-resistant and protective materials make up most important features

Design

Designing what you would like to grow is essential to success, be it a small sustenance plot for yourself or a larger for-profit business farm. After selecting a space, it is time to plan and design how the garden is to look in both planning and growing stages. This will allow you to maximize your space, and estimate how much will be available during harvest seasons. Designing is especially important in gardens with

rotating crops or multiple growing seasons.

Types of Gardens

Before you decide what to grow, you need to know what type of garden best suits the environment available to you. Factors such as soil quality, space and pests will help determine the most efficient and fitting type of garden to operate. The two most common types of gardens, raised beds and in-ground gardening, both have many advantages, but for different situations.

Raised Bed Gardening

In some cases, ground soil quality may inhibit a community garden to function due to toxicity due to pollution or poor nutrient quality. Raised beds are a great alternative to growing in the ground. These gardens are most commonly elevated boxes filled with a sufficient amount of soil to sustain plant growth. Raised beds generally do not use the soil below the base, which can be beneficial to gardeners working with a poor quality soil. The frames are generally constructed of a sturdy building material, such as wood or plastic.

Because of the relatively small size of raised beds, they are more useful for gardeners with limited space. The smaller, concentrated size is also useful in conserving water, fertilizer and other materials or resources. If prepared properly, raised beds can improve otherwise poor soil drainage and enable an individual to grow a wider variety of crops. This can also assist in decreasing the populations of weeds over time, as there will be less area for the seeds from weeds to germinate in. Raised beds also can create longer growing seasons, as the beds warm up quicker than deeper soils allowing for faster germination and root protection for the seedlings.

In-Ground Gardening

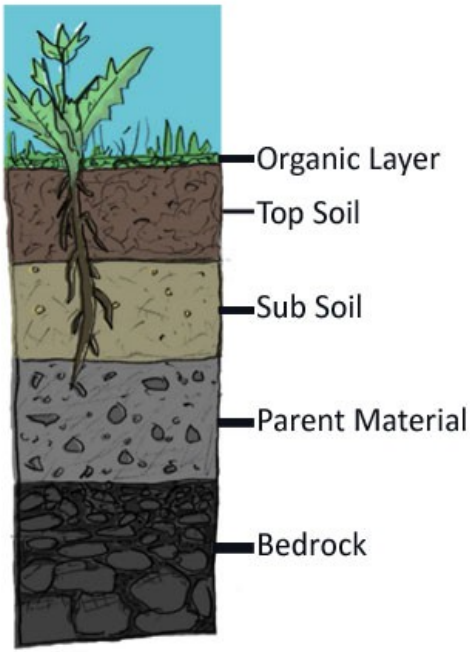
Growing an in-ground garden can be highly economical method of farming. Purchasing topsoil from another location to fill containers can be expensive and may include chemicals unwanted by the farmer. By working with the topsoil that is on your site, the money saved by this method may be used to improve what is already present. By doing this, you not only save yourself money, but improve the surrounding environment as well.

In some cases, in-ground gardening requires less initial labor. A decently flat and well-drained area can be prepared quite easily with a

tractor or large roto-tiller. Another benefit is that in-ground gardens can be altered in size or dimensions much easier than a raised-bed garden, when are constrained by structures that contain the soil. Additionally, due the large total area of soil it is easier to irrigate and drain the soil, and may allowing for more efficient watering methods.

Soil Basics

Soil can vary from state to state, city to city, and even yard to yard. A great way to tell what kind of soil you have is by performing a simple profile, which is done by removing a chunk of your soil and observing what is contained within. Does the soil drain well, or does the mineral content inhibit deep root structures? Is the soil very rocky, or is the soil easy to work and smooth? By asking yourself these questions and looking carefully at the soil, you will save yourself a large amount of hassle and head-scratching later when trying to figure out why some plants do well and others fail spectacularly.



There are three noteworthy layers of soil that make up the basis of any decent garden: topsoil, subsoil and clay. Generally, in the first six inches of soil your topsoil is full of living organisms that are valuable allies in creating healthy sediment. To encourage this beneficial relationship, it is helpful to add various organic materials to your topsoil periodically. These materials may be things such as that found in compost, which may include anything from grass clippings to egg shells. The living organisms (i.e., earthworms, bacteria) will feed off of this material and allows them produce valuable resources to enrich your soil.

The next layer of soil, the subsoil, is important for the root structures of your plants. Your crops' drainage and nutrient absorption depends

heavily upon the thickness and material makeup of the subsoil. It is important to turn over your soil yearly or bi-annually with a garden fork to keep this consistent. A loose subsoil layer also enables for a greater availability of oxygen to less privileged portions of the plant's root system.

The last layer of soil is made up of mostly clay and rocky material. This layer fine, thick, and rather difficult for deep roots to penetrate. Too much clay in the upper layers of soil can be detrimental to your crops' root systems. Roto-tilling is one method used to mix the clay with the existing soil and allow for better aeration and root production. However, too frequent disturbance of the deeper layers of soil can deplete the topsoil and leave the soil nutrient deficient and unsuitable for farming.

Compost Yourself

It is also worth noting that the quality of soil used for your garden does not necessarily have to be what you have been left with or have purchased. There are many things you as a gardener can do to improve the quality of the soil used to nurture your crops. There are different procedures taken depending on the type of garden you have chosen to create, but the basic steps to superior soil remain the same for most plants and climates.

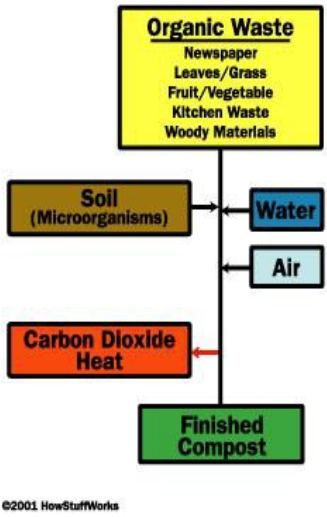
For beginner gardener's store-bought chemical fertilizers will work just fine. The problem with these options, however, is that they are not always the most effective and may have a significant negative impact on the environment. If you are serious about creating a self-sufficient community garden, composting is a great option that can be extremely cost-effective and beneficial to your crops.

So what is composting? Composting is the controlled process of breaking down of organic material and waste. The end product, rich in nitrogen and other nutrients, is used as a natural fertilizer for crops. Composters utilize ecological processes to create the safest, most cost-effective and environmentally friendly fertilizer for plants. Compost is the byproduct of aerobic and anerobic bacteria along and other living organisms. Layers of nitrogen-rich

organic waste (e.g. grass clippings, wasted produce, other greens) are layered with carbon-rich materials (e.g. woodchips, straw, paper) in a compost bin.

Why should you compost? Besides reducing the overall solid waste you produce, composting is a very economical way to keep your garden organic and healthy. There is no need to use expensive and possibly harmful fertilizers when you can use your waste to feed your plants. It is a potentially free endeavor if you use recycled materials to construct the compost bin, which are relatively simple to construct. A compost bin can be easily constructed from recycled materials. The general guideline is that it be at least 3'x3' with access to sufficient sunlight and water. Larger compost bins may allow for quicker compost cycles, but that can all depend on available space, materials and even local composting regulations.

The general process may vary widely in the amount of time required to fully break down the organic waste depending on the quality and size of the compost bin. From a few weeks to many months, the composting process speed is ultimately dependent upon the internal temperature.



As organic materials are broken down, heat is produced in what is known as an exothermic reaction. The higher the internal temperature, the faster and more vigorous the bacteria are working, resulting in a more expedient composting process. Temperatures will often rise as high as 100 to 150 degrees Fahrenheit in the most effective compost piles.

Compost bins should also be watered regularly and well have sufficient air exposure. Water allows for a stronger bacterial culture, and sufficient aeration ensures that the compost bin receives the proper balance of aerobic and anaerobic bacteria. Items added to the compost bin, while alternating nitrate and carbon layers, should be broken down to ensure quicker decomposition.

What to grow

Outlined below are nineteen vegetables and one herb plants to assist you in designing your garden. This is simply the tip of the iceberg on what is available to grow, but will hopefully outline a few of the basics. Herbs and other flowers were generally avoided in this guide in

order to focus on more nutritionally-dense foods.

Beets:

Planting season: The seeds are the most productive if soaked for one to four hours before planting. The beet plant (the main edible part is a root) gets woody and tough in hot weather. As such, beets are best used as an early summer or late fall harvest crop. Planting the seeds 2-4 weeks before the last frost of spring and sowing directly will yield and early crop; plant the seeds 2-3 months before the first frost date when aiming for a fall crop. When the seedlings reach ½"-¾", thin plans to 1 ½ to 2" apart.

Harvesting: Beets are ready when the shoulder of the plant begins to come above the soil or after approximately 60 days. The leaves are also edible and are best eaten when they are approximately 6" long.

Pests: None of note.

Broccoli:

Planting season: Broccoli prefers to be a fall vegetable in many climates. In cooler areas, spring crops are possible as warm weather causes rapid flowering and inedible flower head. Seeds can be started indoors 6 weeks before the last killing frost. Broccoli will withstand light frosts, though a freeze kill the plant.

Harvesting: When the head is fully developed, use a sharp knife to separate the head from the main stalk. Make sure to cut at an angle, as this will prevent water from standing on the stalk and causing an early rot. Smaller flowers will form around the side after the terminal head has been removed, ensuring continued harvests.

Preventing pests: Using wood ash sprinkled around the soil under the mulch will deter most beetles and maggots. To avoid most

worms, keep cabbages covered with a floating row cover. If you notice black rot or spotting, remove the entire plant entirely and clean the tools used to do so to keep the bacteria from spreading to other cabbages. Yellowing plants are often a sign of soil-born diseases or over-fertilization (also called plant burn).

Notes: Most homegrown varieties of broccoli will not produce flowers as large as those found in commercial markets. Be sure to harvest the broccoli before the flower buds open, as it quickly becomes inedible.

Brussels Sprouts:

Planting seasons: A cool-weather vegetable, fall harvests are the most productive. Start the seeds indoors in early to mid-May and set out in late June or early July. Hot, dry weather will cause the plant to stunt, so be sure to keep it decently hydrated and protected from the worst of the sun during the hot-weather months.

Harvesting: When the sprouts begin growing, cut off the lower leave should be removed. Sprouts will mature from the bottom of the stalk up, and should be picked when approximately an inch in diameter. Frosts will improve quality and flavor so picking after two frosts is recommended.

Preventing pests: See Broccoli.

Cabbage:

Planting season: Plant seeds indoors in early February, then transplant as soon as the soil is workable. This is a front tolerant vegetable, though it does not appreciate a hard freeze. *Suggested outdoor planting date:* April 1st, mid-May, and early July.

Cabbage cultivation: Cabbage likes to be fed and watered the entire growing season. Mulch is suggested to keep the soil moist and to discourage weeds from forming. Roots are shallow and spread horizontally, so dry conditions are not well tolerated by this plant.

Harvesting: From the time it is sprouted until harvest takes 3-4 months. When the head feels solid and firm, take a sharp knife and remove the head of the plant. If left too long, the flowers will open and the plant will become unusable.

Preventing pests: See Broccoli.

Carrots:

Planting seasons: Deep, fertile soils are a must for carrots; ideal soils are light, as rocks and heavy clays will impede growth. Carrots do well with frosts and light freezes, and can be sown as soon as the soil is

workable. Germination requires 10-21 days, so patience is a key when starting carrots. Indoor starts are not recommended.

Harvesting: Carrots will be one of your first crops and are ready to go in as early as 1 ½ to 2 months. Late summer crops can be overwintered if covered with straw or mulch for a sweet overwintered carrot. The larger and darker the greens are, the larger your carrot is likely to be.

Pests: None worth noting.

Cauliflower:

Planting season: Cauliflower can be a tricky vegetable to grow, though it does tolerate frosts and light freezes very well. Though possible as a spring crop, cauliflower is better suited to fall temperatures as warm springs promote bolting of the plant. Start the seed in mid-June or set out your transplants in later July. Depending on the frost cycle, give 2-3 month's worth of grow before the first frost date to ensure a hearty crop.

Harvesting: Cauliflowers require blanching as soon as the head (what will be the edible portion) reaches roughly apple-sized. Simply tie the surrounding leaves loosely around the head to protect from the sun. Harvest when the head looks full, but still slightly smooth.

Pests: See Cabbages.

Celery:

Planting Season: Celery seedlings are very prone to the cold, so seeds should be started around 10 weeks before they are to be moved outside. Soak your celery seeks overnight, then keep the seed in a closed container with moist soil in order to keep the seedlings well-hydrated. When the seedlings are 4-6 inches tall and nightly temperatures are about 40F, move the plants outdoors.

Harvesting: Celery is generally harvestable after roughly 3m months once the transplants are set out. Remove the plants from the base with a sharp pair of gardening shears or a sharp utility knife.

Pests: If any blighting/wilting or unusual stunted growth occurs, pull up the entire plant and discard. Any worms or insects should be hand-picked in order to ensure plant's vitality.

Notes on Celery: This plant requires nutrient-dense, well hydrated soil. River bottom and bog soils are generally considered ideal celery substrate, as celery thrives in well-decomposed, dense soils. More than weather or climate, the soil that celery is planted in will determine the quality of your harvest.

Chard:

Planting season: Sow directly into the soil two weeks before the last frost, or start indoors four to six weeks before last frost date. Chard 'seeds' produce more than one plant, so spacing may be necessary. If you plan to harvest whole plants at a time, spacing sowing over a few weeks or a month will work in your favor.

Harvesting: There are two methods to harvesting chard: whole plant and leaf removal. Either method works well, it merely depends on how much you need. If you choose to harvest the whole plant, cut the tops off, leaving 3" of stems behind for the plant to regrow. Harvest the outer leaves and work your way into the middle should you choose to go the leaf harvesting route.

Pests: Use wood ash or diatomaceous earth to discourage beetles and slugs.

Cucumbers:

Planting season: Cucumbers require warm soil, and do not tolerate transplanting well, so an outdoor start is nearly required. Plant in early to mid-June for a solid summer crop. As cucumbers require a large amount of space, trellises and poles are recommended for gardeners lacking space. Cucumbers also require frequent watering or access to a watering source. If the soil becomes dry, plant production will halt and the cucumber will 'hold ground' until more moisture is available.

Harvesting: Cucumber are edible only when immature. When the fruit becomes yellow, then the the fruit is only usable for seed production. It is also worth noting that frequent picking is recommended as once a fruit matures, the plant will stop flowering. In ideal conditions, cucumbers can double in size every day. Simply pull the fruit when the desired size is met.

Pests: Cucumbers are susceptible to many beetles. Handpicking and complete removal of vines is necessary to keep the plant healthy and to reduce the number of eggs laid.

Notes: Cucumbers make excellent rotation crops, especially after cabbage, broccoli, cauliflower, and other *brassica* family plants.

Eggplants:

Planting Season: This plant is cold-weather intolerant. Seedlings should be planted indoors 8-10 weeks before the last frost. Once the plants reach 3" in height, transplant each individual into peat-heavy pots; at 6", the plants are ready to be planted outdoors.

Harvesting: During flowering, ensure that the plant only

produces 4-6 flowers. Any excess flowers should be removed to ensure quality fruit. Eggplant requires patience, as the average time to harvest is 80-90 days. The fruit should be glossy and smooth; seeds or a dull coating mean the fruits are overripe.

Pests: As eggplants are in the same nightshade family as potatoes and tomatoes, they are susceptible to verticillium wilt. The best preventative is to ensure crop rotation with a minimum of three years in between plants of nightshades in that location. Potato beetles can also be an issue; hand pick or use diatomaceous earth to discourage these pests.

Kale:

Planting season: Sow seeds in early to mid summer. Kale deals very well with frosts and light freezes, and can overwinter easily in even more mild climates.

*Harvesting***:** Kale can be harvested within a month of establishing itself. Firm texture and dark green leaves are a sign of ready kale. Simply off leaves at a regular pace to encourage good growth, however avoid removing the top stem (unless there are signs of flowering) to avoid stunting the growth.

Pests: See broccoli.

Lettuce:

Planting season: Begin planting outside four to six weeks before the first frost date., or six to eight weeks before the first frost date. Lettuce prefers a cool, moist environment, so if rain is scant then watering is essential. Hot or even warm weather can encourage flowering, which renders the plant inedible.

Harvesting: For all varieties but leaf lettuce, pull the entire plant from the soil. For leaf varieties, cut away the older, mature leaves when ready and allow center leaves to continue to grow.

Pests: Aphids can be a problem as lettuce leaves are tender. Plant nasturtiums nearby to discourage aphid populations. As lettuce is so close to the ground, slugs can also be an issue. Empty a beer can into shallow dishes at dusk, and empty the drowned slugs in the morning into the soil where they will compost.

Melons:

Planting season: Start plants four to five weeks before transplating outside. The weather should be warm during the evenings, as melons are very vulnerable to frost damage. Adding a row covering for a week or two until plants are established can help by raising the

temperature and reducing insect populations that have access to the plant.

Harvesting: When the plants have three to four leaves, trim the growing end to encourage side shoots. Repeat this twice. When the fruits have begun to grow, elevate them off of the ground or set on a pot to encourage ripening and discourage disease. Cantaloupes and muskmelons are easiest to tell ripeness by the color. Once the flesh becomes tan and fuzz has disappeared, the fruit is ready. Watermelons are ready when the tendril attached to the fruit begins to shrivel.

Nasturtium:

Planting season: Sow directly into soil as soon as the last frost date has passed. This plant does not tolerate frosts or transplanting, so indoor starts are not recommended.

Harvesting: The entire nasturtium plant is edible. Harvest flowers and leaves throughout summer and into early fall. If you wish the plant to go to seed, simply leave alone for several months.

Pests: Nasturtiums work well as a pest repellant in most areas. Squirrels and rabbits, however, do enjoy snacking on the leaves and flowers.

Onions, leeks, and garlic:

Planting season: Bulbs are the easiest route, but seedlings are the most cost effective. Seeds do germinate easily, however indoor planting is recommended for this method. Onions are fairly frost tolerant and can be set outside two to three weeks before the last frost.

Harvesting: Flowering onions will not keep as well after picking when compared to non-flowered onions, however the flower can attract beneficial insects and butterflies. For better storage, however, remove the entire plant once the flower has begun to form. Onions take around five months to be fully mature, leeks are ready in around four, and garlic in three.

Pests: None of these plants develop deep roots, so weeds and grasses can easily out compete these plants for nutrients.

Peas:

Planting season: Plant indoors two to three weeks before the last frost. Can be planted outside once soil temperatures reach an average of 40°F. Generally, the earlier the peas are planted, the better.

Harvesting: Trellises and poles are the way to go with peas. Plants will grow horizontally otherwise and take up too much room in your garden. Peas are ready as soon as the pods have formed and have

visible peas inside the pod. If left too long, the peas will become starchy and tough to eat. Simply pluck the pod off the vine as often as possible, as peas develop very quickly.

Pests: Aphids can be a problem for the leaves. Plant near nasturtium or flowering onion to help avoid aphids.

Notes: Peas make great rotation crops, as they are capable of nitrogen-fixation in the soil. As such, many legumes like peas are quite capable of making the soil richer than what was there before they were planted.

Peppers:

Planting season: Peppers are notoriously finicky about the cold, and are warm-weather plants only. Start indoors about a month before the first frost. Move peppers outside when the average daily temperature is in the mid-60s or 70s.

Harvesting: Like eggplants, peppers require moist soil, though the fruit production is slower. Sweet and bell peppers are often picked green with a tinge of color on them. If left on the vine, the fruit will change to orange or red, and will be sweeter. Do not allow fruits to be exposed to frost.

Pests: Peppers can be afflicted with tobacco, cucumber, and potato viruses which can cause thick leaves and stringy fruits. This is generally only an issue in warmer climates.

Spinach:

Planting season: Spinach can be sown directly outside just after the last frost, or started indoor for a head start. Spinach will go to seed when 14-16 hours of sunlight are present, regardless of temperatures. For continuous spinach production, sowing seeds every week to every other week will allow for steady harvests.

Harvesting: Cut the leaves from the base, then remove the plant from the soil to compost the roots.

Pests: Aphids can affect this plant in warmer climates.

Squash:

Planting season: Squash is best started indoors a month before, and then moved outside two weeks after the last frost date. Squash leaves are very prone to frost damage, and enjoy warm weather. Squash grows in thick tendrils, so staking or trellises are recommended.

Harvesting: Remove the fruit when the skin has become smooth and waxy to the touch for summer squashes. Warm weather squashes can be ready within two to three days of production. Winter squashes

are best picked when fully ripe with a thick rind. Cut the fruit from the plant, rather than plucking.

Pests: Squash vine borer is a nearly unnoticeable insect until vines begin wilting suddenly. Remove the entire wilted vine and destroy the insect. Cover the split vine with soil to encourage re-rooting.

Tomatoes:

*Planting season***:** Start tomatoes indoors about two weeks before the last frost date. Once temperatures have risen to over an average of 55°F during the night, tomatoes can be moved outdoors. Stake tomatoes once they reach a height of 8-10", and tie loosely to the stake. This will encourage vertical growth and more fruit.

Harvesting: Pick when red and smooth-skinned. Immature fruits will still be slightly waxy and will often be slightly green on the undersides. If there is an impending frost, remove the immature fruits and wrap in newspaper or a paper bag to allow to mature.