

# THE TENNESSEE VEGETABLE GARDEN

## SITE SELECTION AND SOIL TESTING

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*Vegetable production is increasingly popular for Tennessee residents. Growing vegetables at home provides financial and nutritional benefits through the bounty of a fresh harvest, and the activity enhances personal health and well-being. However, a basic understanding of soils, site selection and crop maintenance is required before backyard growers can take full advantage of these benefits of home food production. To meet these needs, this series of fact sheets has been prepared by UT Extension to inform home gardeners and propel them to success in residential vegetable production.*

### WHAT TO LOOK FOR IN A GARDEN SITE

#### LIGHT

Selecting a garden location with adequate sunlight can be one of the most important factors in home vegetable production — and sometimes one of the most challenging. Not only does sunlight provide energy for plant production and growth, but it also provides heat through solar radiation. Full sunlight is best for a garden, and a minimum of six to eight hours of daylight should be provided for most crops. The garden should be located away from buildings or trees that

provide shading. During summer when the sun is high in the sky, trees will shade a smaller area. However, during fall to spring seasons when the sun is lower in the sky, trees and other objects will cast longer shadows. This is an important consideration if you plan early or late season production in your garden.

Another way to consider lighting in your garden is the aspect. Garden sites that face south or southeast often have sun for longer periods of the day and soils also commonly warm up and dry out faster than soil on more protected northern sites. Temperatures may be more variable on southern sites, though.





**Figure 1.** Medium textured soil that is workable for at least 6 to 8 inches is most desirable for gardens.

## SOIL CHARACTERISTICS

In addition to available light, soil characteristics of a potential garden site are also quite important. Not all soils are the same, and sites can vary in their ability to provide for plants. Soil provides physical support as well as access to water, nutrients and air. Successful vegetable production is possible across a range of soils, but some may take more amending than others or require modified management.

Ideal garden soils are a medium texture, meaning a mixture of sand, silt and clay, which is often referred to as a loamy soil. High levels of clay can result in a soil that holds water so tightly that it may not be available for plants, and sandy soils may not retain enough water or nutrients. Loamy soils provide good middle ground for plant production.

The way soil fits together — or its structure — is also important for gardening. Soils with good structure have plenty of spaces for water and air to be held and accessed by plant roots. Organic matter can improve soil structure, and this is one of the reasons why adding materials like compost or peat can benefit the garden. Soil with more organic matter can lead to better water and nutrient holding capacity.

Soils can vary significantly across the state of Tennessee. It is important to understand the characteristics of soils in your location. Soil test results (discussed on page 4 and in UT Publication W 346-C, *The Tennessee Vegetable Garden - Managing Plant Nutrition*) give specific recommendations for management. Additionally, your county Extension agent will be able to provide valuable information on soil management in your area. Both of these types of

information are important to get the most out of home vegetable production.

## DRAINAGE

Ideal garden soils are those that allow water to drain through the profile but also hold some water for plant use. Soil texture greatly influences drainage, as large sand particles tend to allow water to drain faster but retain little moisture for plant growth. In contrast, soils rich in silt and clay particles trap water and are slower to drain, but retain moderate to large amounts of water for plant growth. Loamy soils that have a mix of clay, sand and silt often provide good intermediate drainage and available water for plant growth. Organic matter can improve the ability of soil to hold water while also supporting structure and better drainage.

## PREVIOUS SITE ACTIVITY

Previous site activity is important because construction may have compacted the soil and reduced the spaces for water and air, or native soil may have been removed to accommodate construction or been buried by development. In these cases, a completely different soil profile might now be present. The term profile refers to soil layers (Figure 2). For plant production, the A horizon (topsoil) generally provides the best conditions for water, air and nutrient access. It often has the highest amount of organic matter and the best structure. The B layer (called subsoil) may not be as well-structured and usually doesn't contain as much organic matter. Layer C is material that is only one step away from bedrock. Most management for vegetable gardens focuses on the upper 6 to 8 inches of the soil profile (Figure 1), which may include soil from

both A and B horizons. Over time, organic matter can be added and properties of sub-soils improved, but vegetable gardening in native topsoil is ideal.

Additional considerations in regard to previous activity include whether or not the garden site was used for recent pasture production, or if it was an old orchard, a refuse area, or previous or current uses include powerline or railroad right of ways. In all of these cases, the potential for residual insecticides, herbicides or other materials could impact vegetable production.

## SLOPE

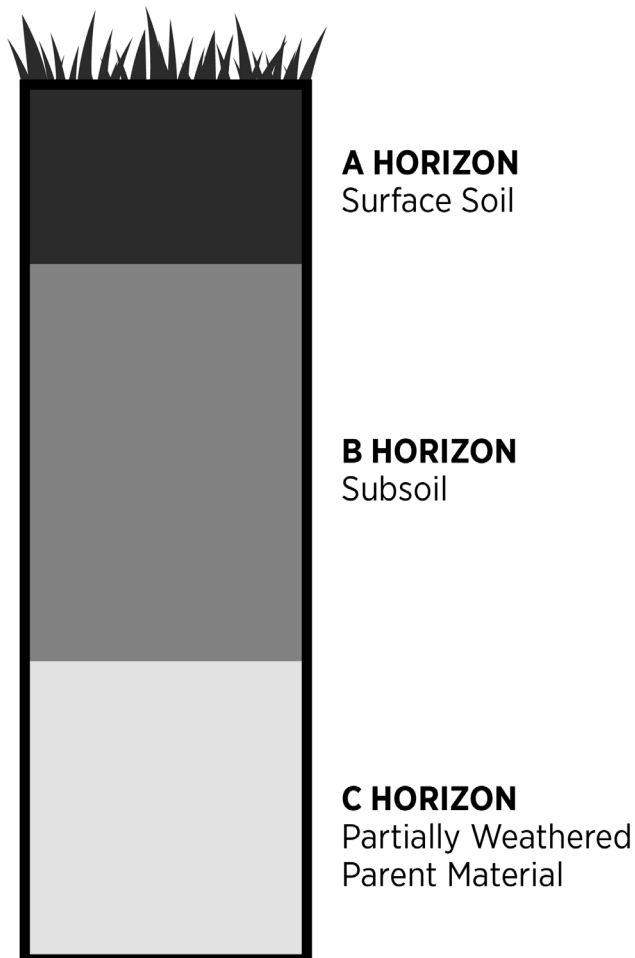
Slope, or change in elevation over distance, influences water infiltration. Precipitation is much more likely to

run off rather than enter and move through the soil profile on steep slopes. Less infiltration and higher runoff of precipitation reduces available water for plants in the soil, and water moving across the soil surface also leads to erosion of topsoil. Losing soil to erosion can dramatically alter the landscape and the productivity of soils over a short period of time. Gardening in an area with steep slopes and frequent erosion can reduce crop productivity while degrading soils for future use. In these situations, it is often best to select another location for the garden or add terraced beds.

Slope can also influence the environment in the immediate area. A slight slope can often allow cold air to drain downward and prevent it from settling and forming what is called a frost pocket. Small differences in temperature can be important in protecting crops in the spring and fall. Other methods for protecting crops and extending the season will be discussed later in this series.

## OTHER CONSIDERATIONS

Accessibility for maintenance, proximity of water for irrigation, and avoiding areas where soil has been degraded by previous use are also important. Look for weed problems, rocky or shallow areas or other challenges that would reduce the potential for success. Keep in mind that poor soil conditions and heavy weed pressures can be addressed, but the time investment may significantly outweigh the benefit early in the gardening journey.



*Figure 2. Example of a common soil profile with A, B and C layers.*



# SOIL SAMPLING AND SOIL TEST REPORTS

Soil testing can provide the gardener with important information needed to optimize productivity on their site. The most important thing to remember when soil sampling is that soil test results are only as good as the soil sample.

## SAMPLING LOCATION

Inspect the area(s) that have potential as a home vegetable garden and determine if the soil in those areas appears to be consistent. If the area is similar, a composite sample can be prepared.

Collect 10 to 15 subsamples using the method described below and in Figure 3. Be systematic in sampling. A sampling grid or zigzag pattern across the area can be used to ensure equal soil from each portion of the growing area are sampled.

If areas in the potential site have had different types of plant material grown in them or the soil appears to be quite different in texture or color,

then take separate samples. Only make composite samples where the soils and previous management are similar.

## SAMPLING PROCEDURE

Samples may be taken in the spring or fall, but it is more common to take fall samples so that amendments can be made before the next growing season. If using a soil probe, simply take soil cores 6 inches in depth. This is the vertical space that most plants will be growing in and the most important area to test. If using a spade, remove an area of soil 6 inches in depth. Then take another thin slice of the soil with the spade that covers the whole 6 inches of the hole. The middle portion of this slice is often the most accurate for sample (see Figure 3). Be sure to exclude surface debris and plant material and place the samples in a clean (non-galvanized) bucket or container. The equal 10 to 15 subsamples can be mixed together if they were taken from a consistent area. Repeat this sampling procedure as needed for areas of the site that have been managed different, disturbed, or where the soil appears different.

## SAMPLE HANDLING AND MAILING

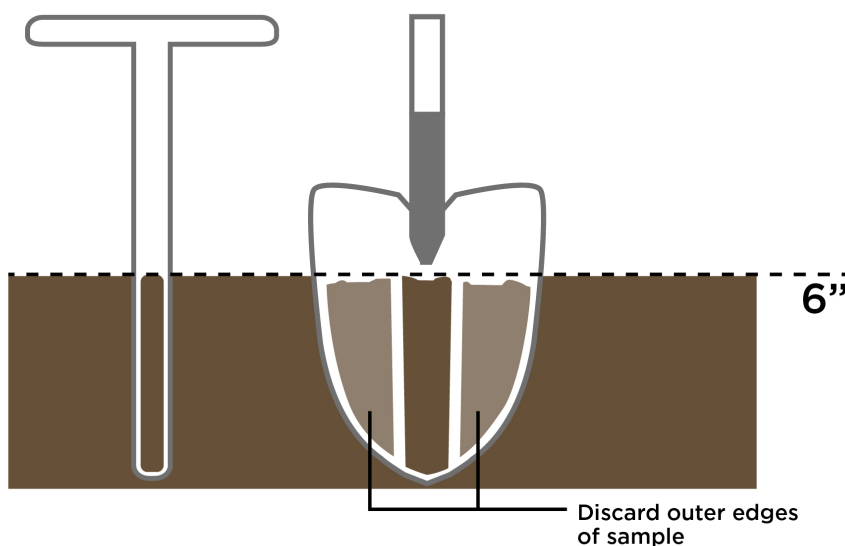
Before packaging the soil sample, mix moist subsamples and allow them to air dry on a paper plate (do not oven dry or use a microwave as these steps can impact results). In Tennessee, soil test boxes can be obtained from the local Extension office. The UT Soil, Plant and Pest Center ([ag.tennessee.edu/spp/Pages/default.aspx](http://ag.tennessee.edu/spp/Pages/default.aspx)) has all the needed testing and mailing information. For home gardens, the basic test provides pH, phosphorus, potassium, calcium and magnesium levels as well as lime and fertilizer recommendations. The basic plus test provides those results as well as zinc, manganese, iron, sodium and boron. These micronutrients as well as the optional organic matter and nitrate tests can also be useful for the home gardener.

## SOIL REPORTS

A soil test report will provide several areas of valuable information to improve gardening success. The two main areas of information will be the current conditions of the soil and recommendations for amending this soil to reach optimum productivity for the crop. Over many years, soil labs gather information on crop use and production to establish ideal target ranges of soil nutrients. More information on interpreting soil test results can be found at ([ag.tennessee.edu/spp/Documents/soilrptexplanation.pdf](http://ag.tennessee.edu/spp/Documents/soilrptexplanation.pdf)) and in W 346-C, *The Tennessee Vegetable Garden - Managing Plant Nutrition*.

## SITE PREPARATION

Proper preparation of garden soil helps germination and growth, but can also help reduce maintenance during the growing season. All debris including rocks, any previous mulches or plants supports should be removed. Plant material should only be plowed into the ground if it is disease free. If there was disease in the previous crop, dead plant materials should be disposed of elsewhere.



**Figure 3.** Methods of soil sampling using either a soil probe or a spade.



If the selected site is not currently in production, sod should be killed by herbicides, solarization (see UT Extension publication W 346-D, *The Tennessee Vegetable Garden - Plant Management Practices*) or plowed under. It is important to allow adequate time for the sod to break down after killing or tilling. Planting a new garden into recently tilled sod is a challenge for the gardener and can also potentially reduce crop productivity.

Garden soil should be mechanically tilled or worked by hand to provide

approximately 8 inches of uniform soil pieces and a smooth seed bed (Figure 4). Moisture at preparation is critical because working with soil when it is too wet can cause compaction and reduce water infiltration and aeration. If a handful of soil sticks together when rolled into a ball and does not easily crumble, then the site is likely too wet to prepare. Patience in waiting for soil to dry to a level appropriate for working will reduce compaction and provide future gardening benefits.

**Figure 4.** *A smooth seed bed in a well-tilled and prepared garden.*