

Sustainable Vegetable Gardening

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Dr. Kristina Beuning (krbeuning@gmail.com)

Sustainable vegetable gardening does not JUST mean “organic production”. Sustainability has a much broader context: responsible interaction with the environment to avoid depletion or degradation of natural resources. The practice of environmental sustainability helps to ensure that the needs of today's population are met without jeopardizing the ability of future generations to meet their needs.

SOIL CONSERVATION

What do plants need to grow? Space, light, water and nutrients (9 macronutrients and 9 micronutrients) – these nutrients come from the soil.

Unlike flower gardening, as vegetable gardeners we are growing food to nourish our bodies. And every piece of produce we pick and eat provides that nutrition for us, but in doing so removes nutrients from the soil! If we want to maintain this resource so we can keep growing nutritious food, nutrients have to be added BACK to the soil. How to do this?

- Add compost – especially for P and K
- Add nutrients in a mineral form – BUT ONLY after soil testing
- Rotate your crops
 - o Heavy feeders (most vegetable crops we like to eat) followed by heavy givers (nitrogen fixers – beans and peas) followed by Light feeders (most root crops). Add compost and nutrients FOLLOWING heavy feeders. Can rotate in space or time.
- Use cover crops – even in small spaces like walkways, but make sure all of your micro- and macronutrients are in adequate supply or vegetable crops will not do as well.

Soil testing options:

<https://uwlab.soils.wisc.edu/soil-samples/field-soil-sampling/>

This is a UW lab in Marshfield and their basic farm/vegetable soil test option does include add on costs for most of the required micronutrients, but not all.

Another option: <https://midwestlabs.com/our-industries/agriculture/soil-testing/> Choose S3C option.

All of these nutrients we are working hard to make sure are in the soil are only made bioavailable to the plants through the work of bacteria and fungi (mycorrhizae). So we also need to create an environment that is hospitable for these microbes!

Top three reasons to NOT till your soil:

1. Loss of carbon/organic matter (it is oxidized when exposed to the air)
2. Destruction of valuable fungal networks - mycorrhizae
3. Weeds – when you till you bring viable weed seeds to the surface where they can germinate and grow.
4. Earthworms – as mentioned by your colleagues!

One alternative to tilling is using a rotary harrow, which stirs the dirt rather than turning it over!

WATER CONSERVATION

We are lucky to live in an area where water shortage is usually not a problem....at least for now. Vegetables are high water demand crops and any shortage is likely to damage crop potential.

One of the best ways to deliver water without excessive evaporative loss is via drip irrigation. However if your water is mineral-rich or has a lot of particulates the holes will clog easily. Also, may not work as well for tender greens which get too much water right near the house and not enough further away.

Another option: whole log composting. BURY whole logs or twigs in your gardens (trench them into the soil) or raised beds (fill the bottom of your bed with these before adding soil). Logs/twigs act like sponges. Roots from your plants will wrap around the logs and draw moisture as needed. Watch for signs of N deficiency. During initial year of log decomposition you may need to add more N than expected due to decomposition activity of microbes on the wood.

If want a more precise method, measure water availability in the soil and only water when needed. Can buy a tensiometer, around \$50. Want to keep values in your tensiometer between 30 and 70 mPA.

GARDEN DESIGN

Here we draw on some of the central tenets of permaculture... development of an agricultural ecosystem intended to be sustainable and self-sufficient by utilizing the patterns and features observed in the natural ecosystem. WORK WITH NATURE.

- Slope/topography of the land
- Predominant wind direction
- Climate

Plant selection

We have developed a food system around **annual** plants that require lots of water, lots of labor (we have to do it over and over again each year and often multiple times in one year, and this process of repeated replanting makes it difficult to conserve and build soil.

Expand your eating horizons by

1. Eating more heavy givers and light feeders, but also
2. Consider planting and eating more perennial vegetables!

Most permaculture books have plenty of examples of permanent/perennial food plots, but most of these are made up of nut trees and fruits.

We have quite a selection of perennial vegetables that can be grown successfully in zones 3 and 4! The obvious ones that you probably know about are: asparagus, rhubarb, ramps, and Jerusalem artichokes (sunchokes). But there are at least 30 others that are discussed in *Perennial Vegetables* by Eric Toensmeier. Some examples:

Caucasian mountain spinach (*Habitzia tamnoides*)

- 6-9 feet tall vine
- can harvest leaves for 2-3 months starting in very early spring.
- Seed available from: www.fedcoseeds.com (go to vegetable, herb and flower seeds)

American ground nut (Potato Bean) (*Apios Americana*)

- Vines 4-8 ft tall
- Nitrogen fixer!
- Require 2-3 years to start harvesting,
- Requires wetter soil, vines 4-8 ft tall
- Dig root around plants and harvest walnut size tubers – 16% protein
- I found tubers available now at:
<https://perennialpleasures.net/product/american-ground-nut/>

Skirret (*Sium sisarum*)

- Dense crop of finger shaped tubers
- Tender blend of potato and parsnip
- Relative easy to find seed
- First year seed grown has a woody core
- Small white flowers which are attractive to beneficial insects.
- Also available from fedcoseeds.com or restorationseeds.com

For more information see the book: *Perennial Vegetables* by Eric Toensmeier