Caring for Your Garden Soil

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A good garden soil needs-
- Firmness for support of plants
- Ability to hold water
- Good drainage
- Ability to exchange air

All soil is made of-
- Minerals of various sizes
- Organic material
- Air
- Water

Minerals are sized as-
- Sand (relatively large particles)
- Silt (smaller particles)
- Clay (the smallest particles)
A forgiving, easy to work with soil with good natural drainage and good water holding capacity is a loam to sandy loam (on the loamy side).

Many gardens outside of major metropolitan areas in North Dakota are probably in this category.

Don’t forget the organic residue component

Soil is a biological creation

Minerals by themselves do not make a soil

Soils are alive, and if they are not alive, their productivity will be low and their requirement for nutrient inputs is higher.

Organic inputs-

Manure- fresh
Highest in N, but often with objectionable smells for a community, and degrades faster.

Too high a rate may injure seeds and seedlings due to ammonia release.

Composted manure and compost in general

Good source of nutrients.
Slow release and slow degradation.
Good source of ‘biology’ to encourage plant growth and nutrient cycling.

Sphagnum peat moss-

A renewable resource-

Excellent water holding capacity.
Aids aeration.

No smell

Good source of ‘biology’

Peat grows in areas with very high water tables and relatively cool temperatures. If managed correctly, peatlands can be temporarily drained, a depth of peat harvested, and then the land is reflooded and the peat grows back over years.
If you are of a mind that peat is not a renewable resource, then an alternative is coir, which is derived from coconut husks. It is more difficult to work with, but has some of the same benefits of water holding capacity.

In the Red River Valley, and other towns and cities built near river valleys with higher clay soils, or in areas that have salts in the backyard due to poor drainage and high water tables, amending the soils to improve them may not be enough. You may have to consider the raised bed strategy.
Tilling the garden—

Less is more

Clay soil- till when not too wet, and not too dry. Too wet = clods. Too dry = clods

Shallow tillage is better than deep.

Google "Self watering containers plans plastic tub" Choose Making a self watering container or Earthbox
My soil mix (high clay backyard)

About 1/3 volume of high clay soils
About 1/3 volume of kids play sand
About 1/3 volume sphagnum peat moss

- Peat moss should be replenished each spring to height of original soil.
Mix very thoroughly before planting.

Fertilizing?
Organic?
Inorganic?
I consider it a personal choice

All fertilizers must be sold with a guaranteed analysis-

Example-

10-10-10 means 10% N, 10% phosphate and 10% potash
Any other nutrients must also appear on the bag.
Soils in North Dakota may have most of the micronutrients already available. However, vegetable gardening puts an intense strain on soil supplies and the source of topsoil that is available at the garden center is generally unknown. Therefore, a multi-nutrient fertilizer, similar to Miracle-Gro, might help to fill in gaps that normal N-P-K fertilizers might miss.

Foliar sprays are generally not needed if the garden is fertilized well and small amounts are added through the season before watering. An exception might be calcium on tomato to help avoid blossom end rot. A dilute spray of gypsum (calcium sulfate) might help alleviate this problem. A regular system of watering is most helpful.

Another item to be aware of is the presence of cadmium in some of our soils. The region most rich in cadmium is near the Canadian border in the Langdon, Walhalla areas in a triangle from with a point at Devils Lake and extending to the NW and NE to the border. Leafy vegetables are most susceptible to cadmium accumulation. Fruity vegetables are not (like tomato). If I gardened in this region, I would construct raised beds with imported soil for lettuce, spinach, broccoli, cabbage and similar leafy vegetables.