SOIL HEALTH AND AGRICULTURE

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ABSTRACT

For over ten thousand years humans have manipulated soil and plants to sustain a growing population of people. We know this as agriculture. However, sustainable and conventional methods of agriculture have a significantly different impact on the soil health. Soil is more than just the dirt we walk on every day. It is a complex material distinguished by color, texture, pH, and structure. These characteristics vary between the 6 major horizons of soil and the top, crucial horizons need specific quantities of nutrients in order to be viable for agriculture. Particle size also plays important role in determining the quality of the soil. Connecticut has soil qualities very unique to New England. Because of the detrimental effects of conventional agriculture, Connecticut should use sustainable agriculture to support its people.

Another aspect of agriculture is how it directly effects a surrounding community both in terms of impact on environment and what it actually provides for its people. Many believe there is a disconnect between food and humans, and the Food Corps aims to educate elementary school children by growing gardens at their schools using only sustainable methods.

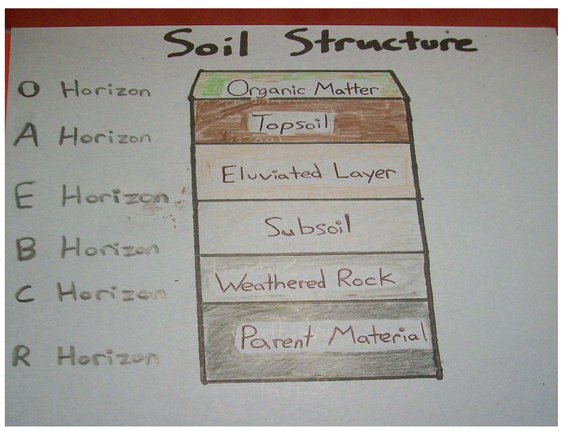
INTRODUCTION

The greatest human impact on soil health in New England is from agriculture. Growing products for human consumption often alters soil color, texture, pH, structure, particle size, thickness of soil horizons, and soil nutrients. Both sustainable and conventional methods do this, however, the severity differs greatly.

-Color- Dark rich soil, such as that found in compost, often indicates a proper amount of nutrients while pale or white colors often mean leaching or little organic matter.

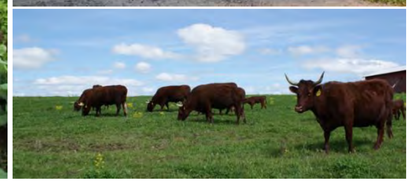
-Texture- Soil Texture is determined by particle size. Within soil there are four categories of particle size; the smallest is clay, followed by silt, sand, and organic matter. An ideal combination of all four categories is called loam. Texture is crucial to agriculture because of the water holding capacity of each particle.

-Structure.- The compaction of soil can inhibit plant roots and deter water absorption while the abundance of earth worms and other organisms in soil can help structure.



MATERIALS AND METHODS

Conventional Agriculture- The methods used by conventional agriculture are likely to cause soil degradation. In order to sustain massive monocultures, large machinery is used to plow countless acres of soil, making it more susceptible to wind and water erosion. Also, this repeated disturbance compacts the soil making surface run-off easier and plant growth more difficult. Lack of plant biodiversity also makes them very susceptible to disease. Farmers fight this using herbicides, insecticides, and fungicides that have unintentional negative effects on other organisms. These chemicals can infiltrate the soil and waterways causing further damage to local ecosystems. Combining soil erosion, lack of trees or grasses, and constant tillage, the organic matter layer of soil quickly disappears in conventional agriculture. This layer is crucial because it harbors detritivores and helps add new nutrients to the soil. Without new nutrients, farmers are forced to add billions of pounds of artificial fertilizer into the soil. The problem with this is that the majority of the fertilizer applied will run-off or leach into layers of soil not reachable by plant roots. Fertilizer run-off causes eutrophication and population damage to water ecosystems.



Sustainable Agriculture- Much like the goal of the Food Corps, the goal of sustainable agriculture is to provide healthy foods raised or grown in a way so that it is beneficial or neutral to the soil and all other aspects of the environment. Sustainable agriculture is free of pesticides and artificial fertilizers that degrade soil. Sustainable agriculture methods also minimize soil erosion and protect soil health. Viable sustainable methods in Connecticut are:

Drip Irrigation- The direct application of water to plants to minimize evaporation loss and protect against erosion, water logging, and salinization.

Crop Rotation- Moving types of crops around a farm each year helps add vital nutrients back into the soil as well as end cycles of disease among a crop.

Intercropping- It is impossible for a conventional farm to support intercropping because of the numerous crops in a small area. Intercropping utilizes many different crops to cover exposed soil and naturally reduce disease.

Windbreaks- Often coupled with intercropping, tall crops or trees are strategically placed to prevent wind from eroding soil.

No-Till Agriculture- By conservatively using ploughs and tractors to till farmland, farmers can benefit their crops as well as air and water health. By tilling soil, it exposes vast amounts of topsoil making it vulnerable to erosion. Farmers believe they must till soil to produce the highest amount of crop possible, however, no-till farming yields the same, if not more, per acre. Conservation tillage strengthens the O Horizon and maintains a healthy A Horizon which is why it is such a prominent technique in sustainable agriculture.

Local Fertilizer- Instead of importing artificial fertilizers, manure and compost work just as well at supplying plants with nutrients in fewer applications.

FOOD CORPS AND COMMUNITY

Agricultural techniques, products, and materials play a role in determining the affect on soil. The Food Corps' vision is "a nation of well-nourished children: children who know what healthy food is, how it grows and where it comes from, and who have access to it every day." We can tell that their goal is sustainable because conventional methods aren't healthy for the soil or the people. Since 2012, the Food Corps has initiated 230 elementary school garden projects providing knowledge, access, and local food to 44,318 children.

I have personally volunteered my time and support to Norwich Elementary Schools with the help of Liz Broussard, the coordinator for these schools. She heads the Food Corps' involvement in Norwich. Because of the winter, not much could be done to prepare for the gardens this upcoming year. However, as spring fast approaches, maintenance of the gardens and heavy lifting is needed to make a successful garden for the year.

Plans for an updated garden at Kelly Middle school are being made for this year. This entails a soil analysis to ensure safety as well optimal growing conditions for Kelly Middle School. Liz and I plan to work with University of Connecticut to complete a soil testing so we can make amendments to the soil as needed.

CONCLUSIONS

- There are two different goals in agriculture. The goal pursued by conventional methods of agriculture is to feed as many people as possible as cheaply as possible with little or no regard to the damage being caused to our natural resources. The other goal, pursued by sustainable agriculture, is to mimic a natural ecosystem as much as possible while using effective, yet less harmful methods and materials.
- Although the Food Corps only provides school gardens to low income towns/ cities, it is an accurate representation of sustainable agriculture.
- Providing children with the knowledge of local, healthy, and sustainable food is one of our best investments toward a successful future.

REFERENCES

http://www.devonpointfarm.com/description

https://foodcorps.org/