



Soil and Climate Change!

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PGC2017 Day 16 Greener

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Modern Agriculture and Climate Change

- Modern agriculture contributes to climate change through:
 - Deforestation
 - Fossil-fuel dependent machinery
 - Methane emissions from livestock
- Pests and plant diseases are developing increased resistance to synthetic, industrial chemicals
- Climate change further exacerbates farming instability and inequity



Deforestation of the
Amazon Rainforest

The background of the slide is a close-up photograph of several ripe, red tomatoes. The tomatoes are clustered together, with some showing their green stems and leaves. The lighting is bright, highlighting the smooth texture and vibrant red color of the fruit. The tomatoes are positioned around the edges of the slide, framing the central black text area.

Case Study: Tomatoes

“The True Cost of Tomatoes” Mark
Bittman

One-third of tomatoes in the US are raised in Florida, along the banks of the Immokalee River. The land is based on white sand soil that does not hold nutrients or water. The tomatoes therefore require large quantities of fertilizer and pesticides. The soil acts as little more than a structural support.

The reductionist approach to agriculture generates egregious working conditions and low-quality produce, with little regard for sustainability.

**Soil has the potential to combat climate
change!**

What Is Soil and Why Should We Care?

- *“The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants”* -- Soil Science Society of America Glossary of Soil Science Terms
- Roles soil plays:
 - Serves as media for growth of plants
 - Modifies the atmosphere by emitting and absorbing gases, including carbon dioxide, methane, and water vapor
 - Provides habitat for organisms that live in the soil
 - Absorbs, holds, releases, alters, purifies most of the water in terrestrial systems
 - Process recycled nutrients, including carbon
 - Acts as a living filter to water before it moves into an aquifer

An Alternative: Carbon Farming

- **Carbon Farming:** Agriculture that aims to sequester atmospheric carbon and improve soil quality.
- Soil has the potential to absorb 3-8 gigatons of CO₂ per year - enough to fully offset carbon emissions!
- These practices yield carbon-rich soil with many benefits:
 - Requires less fertilizer
 - Drought resistant
 - Soil organism ecology
 - Improved crop yields



Soil Hero: Gabe Brown

5 Key Points of Building a Healthy Soil:

1. *No-till*
2. *Organic mulch*
3. *Compost*
4. *Livestock rotation*
5. *Cover crops*



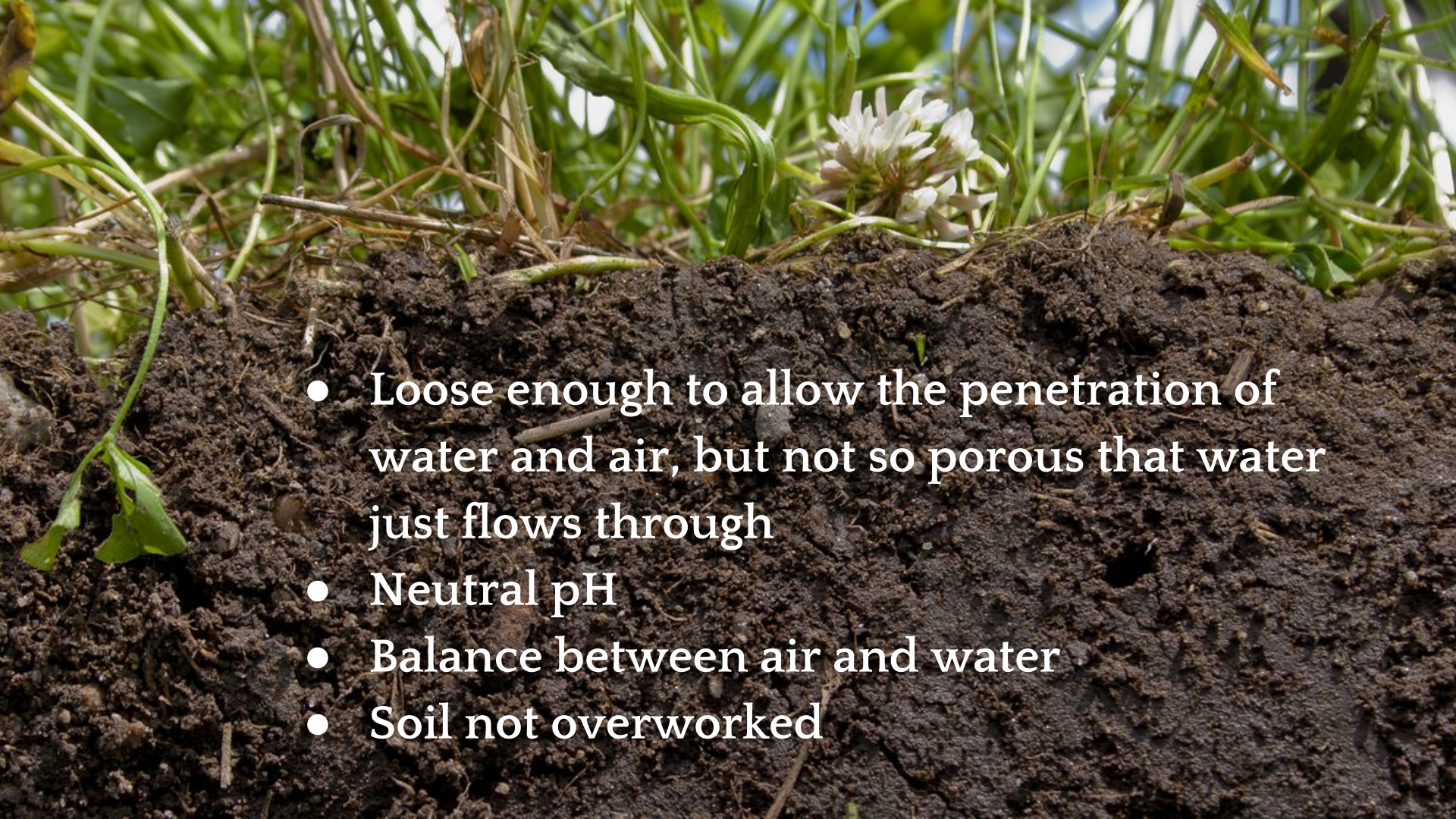
Soil Hero: Howard Lyman



"I saw the birds die, the trees die, and the soil die. I had become the problem, not the solution. I decided that I would get my farm back to what it once was - living birds, living trees, and living soil. We need to farm with nature."

So what's your role in all this?

*Maintain healthy soil in your
yards or gardens!*

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- A close-up photograph of a soil profile. The soil is dark brown, moist, and has a crumbly texture. Several green plants with long, thin leaves are growing from the soil. A small, white, daisy-like flower is also visible. The background is slightly blurred, showing more greenery.
- Loose enough to allow the penetration of water and air, but not so porous that water just flows through
 - Neutral pH
 - Balance between air and water
 - Soil not overworked

The types of weeds present indicate:

- The fertility of the soil
- Moisture problems
- Lack of certain nutrients
- pH that varies from neutral.



- Actinomycetes, fungi, nematodes, and earthworms play critical roles in:
 - Decomposition of organic matter
 - Aeration of the soil
 - Bringing organic matter from the soil surface to the plant roots
- Bacteria and algae perform nitrogen fixation, sulfur oxidation, and nitrification processes



- Loose, organic materials in compost provide nutrients, air, and water to microorganisms.
- Compost can remove pollutants from soil and act as a buffer in soil systems, bringing an acidic or alkaline pH to neutral.



References

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Image Citations

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We invited some friends to Julia's apartment for a quick lesson on soil! We followed our Greener Lesson Plan creating and giving this presentation.

They were good-natured and appreciated our enthusiasm.

Question Time:

What's the difference between soil and dirt?

Dirt is soil stripped of any nutrients.

What can we do with compost in Chicago?

It can be dropped off at the University. There are also many community gardens around Hyde Park.



viscous_flo

viscous_flo Healthy soil creates a healthy planet! Through sustainable farming practices, we can sequester greenhouse gases while boosting soil power 🍌🌻

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