

Soil Health in Appalachia – Grasslands and High Tunnels

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Content

Why Soli Health? Foundation of a Sustainable = Healthy Soli Assessing Soli Health Selecting What to Measure **Grasslands and High Tunnels** Issues in Assessing Soli Health Conclusions Future?



Sustainability/ Sustainable Agriculture

Sustainability consists of fulfilling the needs of current generations without compromising the needs of future generations while ensuring a balance between <u>economic growth, environmental care and social</u> <u>well-being</u>.

Sustainable agriculture: meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs.

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Sustainable Production Systems

- Maintain productivity in time!
- Foster the environment!
- Economic household support.

Goal Producing for the future!!

How to achieve this?

How to achieve this? Knowledge and management





Benefits of sustainability

 Sustainable practices will protect natural resources, prevent environmental degradation, and reduce our carbon footprint.

 Can increase efficiency, reduce costs, and enhance profitability.

- Can help to improve the quality of life for individuals and communities by ensuring access to basic needs like clean water, food, and shelter.
 - Addressing sustainability issues requires global cooperation and collaboration, leading to a shared commitment to a sustainable future.













The Soil Health Concept is Integrated



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Factors Related To Soil Health

- 1. Soil characteristics
 - a. Physical
- b. Biological
- c. Chemical
- 2. Management
- 3. Environment

Handback and the second second



Soil Health

• the continued capacity of the soil to function as a vital living system within land-use boundaries (Doran and Zeiss, 2000; Karlen et al., 2001).

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The Soil Health Concept is Integrated

Soll Health is more than the simple sum of the contributions from a set of specific components.

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The Soil Health Concept is Integrated

Soil Health is more than the simple sum of the contributions from a set of specific components.

Soll is a very complex system: Multicomponent and Multifunctional

What makes a soil healthy or not healthy?

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Soll Health for Similar Solls:

- Unlikely to determine exact thresholds for individual measures to define Soil Health! OR combinations of individual measures.
- For example:

•<u>potentially</u> very productive soils (deep, well drained and have a favorable texture and nutrient content) may be healthy or not.

•in bad health: may delivery of ecosystem services at levels below that of a "less productive" soil that is in excellent (healthy) condition.

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Sustainability of the system

• The design, construction, development, and maintenance of high tunnels, grasslands, and green belts all depend on soil properties, their spatial distribution, and their management.











Introduction

High Tunnels/Hoop Houses:
 structures covered by clear plastic film, heated by solar radiation, and used to protect crops from extreme weather conditions.

Characteristics:

- Range from 30 to 1000
 m² in size
- Internally leveled area (during construction)



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Sustainability of the system

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Sustainability of the system

• Understanding soil health means <u>assessing and</u> <u>managing</u> soil so that it functions optimally now and is not degraded for future use.

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Six areas in which Soil Health influences agriculture sustainability

- 1. Water balance (conservation and runoff)
- 2. Plant Selection
- 3. Maintenance/Management
- 4. Reduce fossil-fuel energy use
- 5. Deal with "waste" in a sound way

Six areas in which Soil Health influences agriculture sustainability

- 1. Water balance (conservation and runoff)
- 2. Plant Selection
- 3. Maintenance/Management

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Water in your fields

- Quantity How much
- Time When and
- Health Soil:
 - Structure
 Porosity



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Water in your fields

- Quantity How much
- Time When and
- Health Soil:
 - Structure Porosity
- Defines functions of the soil and life in the soil!















If you build it, they will come!



lf you build a good habitat, soil microbes will flourish.

Create a healthy soil habitat (pH, soil structure, organic matter) to promote beneficial soil microbes.

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If you build it, they will come!

- Biology/organisms and soil chemical and physical factors drive the breakdown of organic matter and release of plant-available nutrients.
- Although biology is critical to plant health, soil pH, organic matter, nutrients, temperature and moisture control their activity.
- Microbes are a lot like us, they need air and water and a diversity of foods. A well-structured soil with lots of organic matter provides these essentials.

Six areas in which Soil Health influences garden sustainability

- 1. Water balance (conservation and runoff)
- 2. Plant Selection
- 3. Maintenance/Management

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Plant Selection

Are the soil properties favorable for establishing and maintaining crops, and grasslands without extensive and expensive soil modifications

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Understanding soil health of Grasslands and High Tunnels

• Understanding soil health means <u>assessing and</u> <u>managing</u> soil so that it functions optimally now and is not degraded for future use.

Soil Health Assessment is required

The ultimate purpose of assessing soil health is to provide the information necessary to protect and improve long-term water quality, habitats for people and other organisms; foster land uses such as recreational areas (sport fields, parks), agriculture or landscaping, buildings, even roads.

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Is your Soil Healthy?

- Some factors to consider:
 - a near-neutral pH (not too acid or alkaline)
 - good soil structure
 - ability to hold and release nutrients to plants
 - appropriate level of organic matter
 - · biodiversity of soil life







<figure>

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Soil Health in High Tunnels and Grasslands QUESTIONS:

- What do we know about sampling and soil health?
- What do we know about indicator selection for Soil Health assessment?
- What do we know about indicator combinations and values?
- What do we know on "how" to use the data we get from assessment?













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