AT LEFT:

NMSU's Extension Agronomist Dr. John Idowu examines cover crops that were planted to improve soil health on cropland.

What is **soil health**, and why does it matter?

Dean Bruce and Katie Goetz, co-leads
Healthy Soil Program
New Mexico Department of Agriculture

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Who we are

- Dean Bruce
  - New Mexico Department of Agriculture
  - Works on the **natural resources side of NMDA's Healthy Soil Program**
  - Background: Grew up raising crops and cattle, and still does; worked for NRCS; studied range science

- Katie Goetz
  - New Mexico Department of Agriculture
  - Works on the **communications side of NMDA's Healthy Soil Program**
  - Background: Grew up on commercial cattle ranch; worked as a reporter; studied agriculture + journalism

- Jonathan C. Romero *(unable to attend)*
  - Pueblo of Jemez
  - Range program manager at the pueblo
  - Background: Raises cattle, chile, and corn; managed the pueblo's wildlife program; studied biology
  - **Contracted to promote NMDA's Healthy Soil Program to tribal governments and members**

What is soil health?

BELOW:
Various soil samples pulled from cropland in Taos County

Photo courtesy of Taos Soil and Water Conservation District

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Why does soil health matter?

- **The healthier the soil, the better it can do its many jobs:**
  - Absorbing and storing water
  - Sustaining diverse, productive plant and animal life
  - Providing physical stability and support to plant roots
  - Storing, transforming, and cycling nutrients (nitrogen, phosphorus, potassium, etc.)
  - Filtering and detoxifying waste materials (industrial waste, etc.) in the environment

ABOVE:
Researchers are trying various combinations of cover crops, compost, and biochar at NMSU's Leyendecker Plant Science Center in Las Cruces to see which combination is best for soil health.

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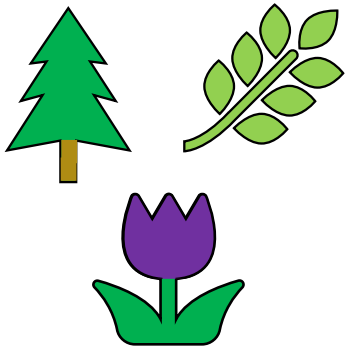
Applying the “soil health principles” can help you **improve** your soil health

1.
Keep soil covered

- Leave plant residue
- Plant cover crops
- Use organic mulch

2.
Minimize disturbance on cropland and **minimize external inputs**

- Limit tillage
- Rotate livestock
- Limit synthetic inputs

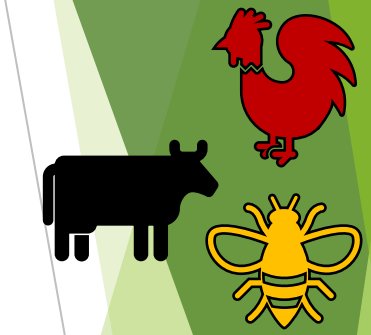


3.
Maximize biodiversity

- Use diverse crop rotations
- Plant diverse cover crops
- Integrate livestock

4.
Maintain a living root

- Reduce fallowing
- Plant cover crops
- Use diverse crop rotations



5.
Integrate animals into land management, including grazing animals, birds, beneficial insects or keystone species, such as earthworms

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Examples of **the 5 soil health principles being applied** in New Mexico

- The photos on the following slides are examples of how some people in New Mexico have applied the 5 soil health principles.

- Note that each photo may show *several* soil health principles being applied at once.

Soil health principle 1: Keep soil covered

- **EXAMPLE:**

  The Pueblo of Tesuque **left behind plant residue** on one of its fields.

  Keeping soil covered minimizes soil erosion and compaction; regulates soil temperature; and minimizes the risk of weeds taking over.

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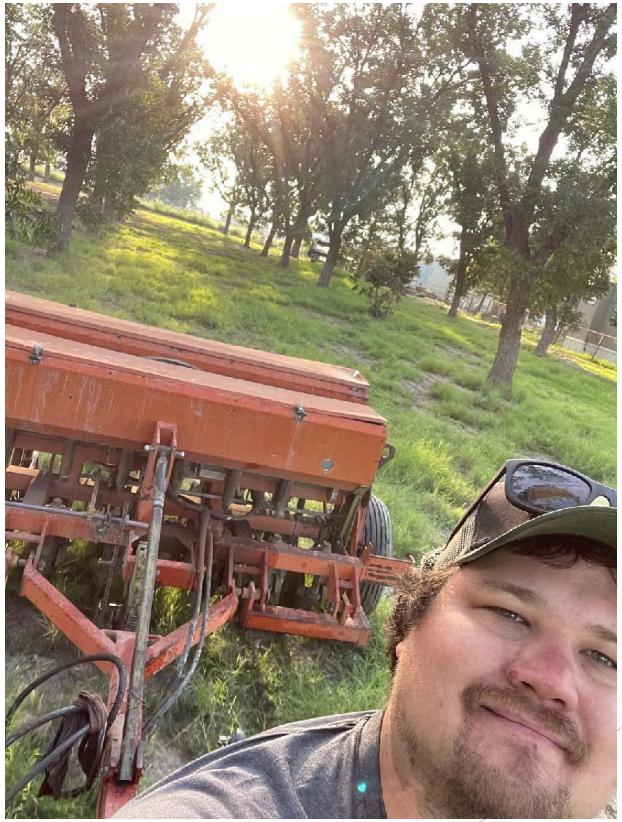
Soil health principle 2:
Minimize disturbance on cropland and minimize external inputs

- **EXAMPLE:**

  This pecan grower in southeastern New Mexico **used a no-till drill to plant** a cover crop between the rows of his orchard.

  The no-till drill is a great tool for planting seeds in a way that minimizes disturbance – thus minimizing harm – to the soil and all the life it holds.



Soil health principles 3:
Maximize biodiversity

- A farmer in Albuquerque's South Valley **applied mulch and living mulch around the base of various trees.**

  The variety of trees and mulches means that a variety of nutrients are cycling back and forth between the soil and the plants, as well as area animals both big and small.

Soil health principle 4: Maintain a living root

- At NMSU's Leyendecker Plant Science Center in Las Cruces, researchers **planted cover crops in the "off season" of planting cash crops**. Their goal is to determine which cover crops are best for soil health in an arid environment.

  Living plants "harvest" the sun's energy, transform it into carbon, and give off some of that carbon through their roots.

  The many microorganisms in the soil feed on this carbon feast, then give back critical nutrients to the plant.

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Soil health principle 5:

Integrating animals into land management, including grazing animals, birds, beneficial insects or keystone species such as earthworms

- These **goats mob-graze** a patch of open space in downtown Santa Fe.

  Animals of all sizes fertilize soil through their waste.

  Grazing animals stimulate plant growth when they graze. They also work seeds and nutrients into the soil when they move.

  Small animals above ground help to pollinate plants, while even smaller animals below ground create pore spaces within the soil. That allows water and nutrients to reach plant roots more easily.

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Soil assessment + soil testing can determine your soil health

- Soil **assessment**
  - Happens in the field
  - **Free!**
  - Evaluates the soil's ***physical*** properties
    - What does it ***look*** like? (structure, color, etc.)
    - What does it ***smell*** like?
    - What does it ***feel*** like? (is it compacted, etc.)
    - Does it aggregate (hold together) well?
    - Does it infiltrate water easily?
- Soil **testing**
  - Happens in a lab
  - Costs around $50 per soil sample
  - Evaluates the soil's ***chemical*** and/or ***biological*** properties
    - Nitrogen
    - Phosphorus
    - Potassium
    - Soil organic matter
    - Soil organisms

ABOVE: The Canadian River Soil and Water Conservation District performs a "slake test" to see how well a soil sample taken from near Tucumcari aggregates (holds together). Good soil structure is an indicator of good soil health.

Photo courtesy Canadian River SWCD

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What **resources** can help you improve your soil health?

- USDA's Natural Resources Service (NRCS)
- NMDA's Healthy Soil Program
- Your local soil and water conservation district (SWCD)
- New Mexico State University—Cooperative Extension Service

- Indian Nations Conservation Alliance
- Intertribal Agriculture Council

- NM Healthy Soil Working Group
- Quivira Coalition

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Have questions about NMDA's Healthy Soil Program?
Come see Dean and Katie at the NMDA booth.

Visit the New Mexico Department of Agriculture's website
and search *Healthy Soil Program*:
www.nmdeptag.nmsu.edu

Reach out to NMDA's Healthy Soil Program:
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