



## ATTRA Soil Resources

By Omar Rodriguez, NCAT Agriculture Specialist

Looking for resources related to soil? ATTRA can help! This publication highlights some of the many resources available on the ATTRA website at [www.attra.ncat.org](http://www.attra.ncat.org).

### Sustainable Soil Management Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

Conservation Tillage (CT105), 37 pages

Nutrient Management Plan (590) for Organic Systems (IP472), 30 pages

Soil Management: National Organic Program Regulations (IP270), 20 pages

Soil Moisture Monitoring: Low-Cost Tools and Methods (IP277), 12 pages

Sustainable Management of Soil-borne Plant Diseases (IP173), 16 pages

Sustainable Soil Management (IP027), 31 pages

Symphyllans: Soil Pest Management Options (IP283), 16 pages

Tipsheet: Assessing the Soil Resource for Beginning Farmers (IP509), 4 pages

### Videos and Webinars

Gabe Brown: Farming in Nature's Image

[www.youtube.com/watch?v=GxIyKfWf9kU&feature=youtu.be](http://www.youtube.com/watch?v=GxIyKfWf9kU&feature=youtu.be)

Hear soils expert Gabe Brown speak at the Connecting Soils and Profits: No-till, Cover Crops, Soil Health & Grazing Conference, held in Danville, PA, on March 18, 2015.



Photo: Rex Dufour, NCAT



Photo: Rex Dufour, NCAT

#### Soil Aggregate Stability: Visual Indicator of Soil Health

[www.youtube.com/watch?v=giDduFw1Ybo](http://www.youtube.com/watch?v=giDduFw1Ybo)

This short video shows dramatic differences in aggregate stability that result from different management practices of the exact same soil type. The narration explains why aggregate stability is so important as an indicator of soil health, and how soil health can be supported.

#### Columbia County, Penn., Conservation District Panel Discussion

[www.youtube.com/watch?v=i4kcBMurFds](http://www.youtube.com/watch?v=i4kcBMurFds)

Conference speakers and local producers answer questions during the Columbia County, Pennsylvania, District Soil Health Conference, held in March 2016 in Danville, Pennsylvania. The conference was entitled "Connecting Soils and Profits: No-till, Cover Crops, Soil Health and Grazing."

#### Year 2 & Beyond: High Tunnel Soil Health for the Experienced Grower

[www.youtube.com/watch?v=oXtsjpWPe2s](http://www.youtube.com/watch?v=oXtsjpWPe2s)

Christopher Lent with the National Center for Appropriate Technology leads this September 29, 2015, webinar produced for experienced growers and featuring important information about maintaining high tunnel soil health.

#### Carbonomics

[www.youtube.com/watch?v=lxfrmWovqQM&feature=youtu.be](http://www.youtube.com/watch?v=lxfrmWovqQM&feature=youtu.be)

In this video, Keith Berns of Green Cover Seeds in Nebraska talks about "Carbonomics," a big-picture view of soil health.

He compares the economy of a country with what's going on in the soil. "The soil operates as an economy. And when we can look at it that way, we will fundamentally understand it better."

## Tutorials

Available at [attra.ncat.org/tutorials/index.php](http://attra.ncat.org/tutorials/index.php)

### Soil Health

This two-lesson tutorial includes an introductory lesson that provides an overview of the types of practices that maintain and perhaps even increase the health of your soils. In addition, it provides some compelling reasons, both economic and environmental, to implement the types of practices that support soil health--it's basically about investing in the most important piece of "capital equipment" you have on the farm: the soil. The second lesson teaches farmers and ranchers several on-farm assessments they can quickly and easily perform to determine the level of their soil's health.

## Cover Crops

### Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

Overview of Cover Crops and Green Manures (IP024), 16 pages

Cover Crop (340) in Organic Systems (IP471), 20 pages

Cover Crop Options for Hot and Humid Areas (IP 535), 20 pages

### Videos and Webinars

#### Cover Crops, No-Till, and Our Soil Health Journey

[www.youtube.com/watch?v=35x5KLxNh3k&feature=youtu.be](http://www.youtube.com/watch?v=35x5KLxNh3k&feature=youtu.be)

In this video, Keith Berns of Green Cover Seeds talks about his operation's soil health strategies in South Central Nebraska. Berns no-tills 2,500 acres of irrigated and dry-land corn, soybeans, rye, triticale, peas, sunflowers, and buckwheat.

#### Cover Crop Options for Hot and Humid Areas

[www.youtube.com/watch?v=ERXyjX0rHI&feature=youtu.be](http://www.youtube.com/watch?v=ERXyjX0rHI&feature=youtu.be)

Hot, humid areas need especially large and frequent inputs of organic matter to maintain soil fertility, yet standard cover crop recommendations don't always work in these locations. Drawing on his own organic farming experience in Texas, NCAT Sustainable Agriculture Specialist Justin Duncan explains how to choose and use cover crops in hot and humid areas, describing many crop options (including some unfamiliar in the United States) that do well in USDA Hardiness Zones 8, 9, 10, and beyond.

#### Terrapin Farm Cover Crop Tour Near Whitefish, MT

[www.youtube.com/watch?v=iOMHr9W1Thk&feature=youtu.be&list=PLDu0ElBiEy9yUN3wl\\_NRqyp-6SGrVijxD](http://www.youtube.com/watch?v=iOMHr9W1Thk&feature=youtu.be&list=PLDu0ElBiEy9yUN3wl_NRqyp-6SGrVijxD)

Judy Owsowitz, owner of Terrapin Farm near Whitefish, MT, talks about her certified organic operation and cover crops during a farm tour funded by USDA RMA in August 2014.

#### Cover Crop Uses for Small-Scale Producers

[www.youtube.com/watch?v=oTEWiqNLNRI&feature=youtu.be](http://www.youtube.com/watch?v=oTEWiqNLNRI&feature=youtu.be)

Tammy Howard, an NCAT agronomy specialist, spoke about how small-scale producers can use cover crops during an August 2014 farm tour at Terrapin Farms near Whitefish, Montana. The tour was part of a USDA RMA funded project, presented by NCAT and a number of partners. Howard discussed various uses for cover crops, including fertility, weed, management, and increasing biomass.

#### Cover Crop Research by Montana State University. Part 1

[www.youtube.com/watch?v=ROJBWz7Yr80](http://www.youtube.com/watch?v=ROJBWz7Yr80)

Dr. Perry Miller of Montana State University discusses cover crop research at a college research field near Conrad, Montana, in July 2014. The field day was part of a project funded by USDA RMA and organized by NCAT and several partners.

#### Mixed Cover Crops: An Introduction

[www.youtube.com/watch?v=JWMT-uXyWZM](http://www.youtube.com/watch?v=JWMT-uXyWZM)

This informational video discusses the pros and cons of planting mixed cover crops, which are often used to replace fallow. Focus is on effects of cover crops on soil quality in semi-arid regions.

#### Increasing Diversity and Enhancing Stewardship with

Cover Crops [www.youtube.com/watch?v=5mIV8Vt0lXk](http://www.youtube.com/watch?v=5mIV8Vt0lXk)

Doug Crabtree and partner Anna Jones-Crabtree operate Vilicus Farms, a diverse dryland crop farm based 36 miles northwest of Havre, Montana. Growing certified organic heirloom and specialty crops within a five-year rotation of small grains, oilseeds, broadleaf, and legume crops, Vilicus Farms practices advanced land stewardship at a scale that matters. Doug and intern Nathan Austin-Powell spoke about the operation during the 2013 Montana Farmers Union annual meeting in Great Falls, Montana.

#### Mixed Cover Crops

[www.youtube.com/watch?v=GJNw4mByH8s](http://www.youtube.com/watch?v=GJNw4mByH8s)

During the October 2013 Montana Farmers Union state meeting in Great Falls, Montana, Dr. Clain Jones of Montana State University discusses past and ongoing research projects in the state on the effectiveness of cover crops.

#### Equipment Innovations for Soil Health: Colombia County Conservation District

[www.youtube.com/watch?v=UnShq8UQf\\_c](http://www.youtube.com/watch?v=UnShq8UQf_c)

John Wallace of Penn State University discussed equipment innovations for soil health during the Columbia County, Pennsylvania, District Soil Health Conference in March

of 2106 in Danville, Pennsylvania. The conference was entitled “Connecting Soils and Profits: No-till, Cover Crops, Soil Health and Grazing.”

#### **Innovative No-Till: Using Multi-Species Cover Crops to Improve Soil Health**

[www.youtube.com/watch?v=zjI2zWf4uMI](http://www.youtube.com/watch?v=zjI2zWf4uMI)

This webinar addresses multi-species cover crops that can be used to improve soil health, increase biological diversity, and benefit the bottom line in no-till grain operations. An increasing number of grain farmers are experimenting with these “cocktails” of cover crops such as legumes, grasses, and companion crops to keep the soil covered year-round.

#### **Mimicking Nature: One Farmer’s Cover Crop History**

[www.youtube.com/watch?v=ZOuJ2bUGcTc&t=1292s](http://www.youtube.com/watch?v=ZOuJ2bUGcTc&t=1292s)

Dave Brant discusses long-term cover cropping in annual crop systems during the March 2016 Columbia County Conservation District Soil Health Conference. Brant’s decades of experience comes to life with anecdotes and reflections on how he has built his soil by using more than 40 cover crops, reducing tillage, and maintaining soil cover all year.

#### **Organic Crop Rotations: Conservation Benefits**

[www.youtube.com/watch?v=Bao8GxgTfPg](http://www.youtube.com/watch?v=Bao8GxgTfPg)

This webinar discusses crop rotation strategies that many types and scales of organic farms can use to meet conservation objectives, market needs, and USDA Organic requirements. Specific strategies used by organic farms in different parts of the United States are provided.

#### **Five Benefits of Cover Crops**

[www.youtube.com/watch?v=81L97RV3Mns&feature=youtu.be](http://www.youtube.com/watch?v=81L97RV3Mns&feature=youtu.be)

University of Texas-Rio Grande Valley graduate student Savannah Rugg explains five main benefits of using cover crops.

#### **Four Warm Season Cover Crops**

[www.youtube.com/watch?v=kpaYUfydWoM&feature=youtu.be](http://www.youtube.com/watch?v=kpaYUfydWoM&feature=youtu.be)

University of Texas-Rio Grande Valley graduate student Savannah Rugg shows four cover crops with good potential for South Texas and other hot, humid areas: Sudangrass, Sunn Hemp, Lablab, and Pearl Millet.

#### **Bye Farm Cover Cropping Near Kevin, Montana**

[www.youtube.com/watch?v=HBi1fmm6-Sk&feature=youtu.be](http://www.youtube.com/watch?v=HBi1fmm6-Sk&feature=youtu.be)

Griff Bye, a farmer who operates on about 11,000 acres near Kevin, Montana, talks about his cover-crop strategy during a farm tour in August 2014. The tour was part of a project funded by USDA RMA and organized by NCAT and its partners.

#### **Vilicus Farms: Cover Crops and Tour**

[www.youtube.com/watch?v=q1Sp\\_AiQ7xA&feature=youtu.be&list=UU7otu4uBCVQI2QaS\\_uy0dw](http://www.youtube.com/watch?v=q1Sp_AiQ7xA&feature=youtu.be&list=UU7otu4uBCVQI2QaS_uy0dw)

Doug Crabtree and Anna Jones-Crabtree are owners of Vilicus Farms, an organic grain operation about 25 miles north of Havre, Montana. They discuss their operation before a farm tour sponsored by USDA RMA in June 2014.

#### **Cover Cropping an Almond Orchard**

[www.youtube.com/watch?v=iciPxzO-t9Y&feature=youtu.be](http://www.youtube.com/watch?v=iciPxzO-t9Y&feature=youtu.be)

With support from the USDA, NCAT Agriculture Specialists Marisa Alcorta and Rex Dufour have helped Spanish-speaking farmers in California’s Central Valley experiment with cover crops to improve soil quality and provide habitat for beneficial insects and pollinators. This video documents Elias Cosio, an almond grower from near Modesto who has been collaborating with NCAT and NRCS as he plants the first cover crop in his orchard.



Photo: Rex Dufour, NCAT

# Climate Change

## Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

Drought Resistant Soil (IP169), 7 pages

Agriculture, Climate Change and Carbon Sequestration (IP338), 16 pages

Climate Change and Perennial Fruit and Nut Production: Investing in Resilience in Uncertain Times (IP476), 12 pages

## Power Point Presentations

### Drought Introduction

[attra.ncat.org/downloads/water\\_quality/drought\\_intro.pdf](http://attra.ncat.org/downloads/water_quality/drought_intro.pdf)

Provides an introduction to droughts, impacts on soils, crops, and animals with an overview of management practices to lessen the impacts of drought.

### Soil Health and Drought

[attra.ncat.org/downloads/water\\_quality/healthy\\_soils.pdf](http://attra.ncat.org/downloads/water_quality/healthy_soils.pdf)

Focuses on soil management and tillage practices to conserve water and maintain conditions for productive crop and forage growth during droughts.

### Irrigation

[attra.ncat.org/downloads/water\\_quality/irrigation.pdf](http://attra.ncat.org/downloads/water_quality/irrigation.pdf)

Discusses sustainable irrigation practices and methods for protecting soil and water quality when using irrigation.

### Water, Heat Stress, and Drought

[attra.ncat.org/downloads/water\\_quality/water\\_mgmt.pdf](http://attra.ncat.org/downloads/water_quality/water_mgmt.pdf)

Focuses on animal water needs; water-quality concerns; relationships between water quality, feed quality, and water consumption; and factors affecting heat stress and practices for minimizing it.

## Soil Amendments

### Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

Alternative Soil Amendments (IP054), 12 pages

Biochar and Sustainable Agriculture (IP358), 12 pages

Compost for Sacramento Small Farms (IP540), 2 pages

Composting-The Basics (IP410), 8 pages

How to Add Compost on Your Small Farm (IP155), 2 pages

Manures for Organic Crop Production (IP127), 12 pages

Tipsheet: Compost (IP448), 8 pages

Tipsheet: Manure in Organic Production Systems (IP502), 4 pages

Vermicomposting: The Basics (IP454), 12 pages

## Videos and webinars

### Composting! You Can Do It

[www.youtube.com/watch?v=-y69lLc3n3o&feature=youtu.be](http://www.youtube.com/watch?v=-y69lLc3n3o&feature=youtu.be)

Dave Scott, livestock specialist with the National Center for Appropriate Technology and co-owner of Montana Highland Lamb near Whitehall, Montana, discusses the operation's composting system.

## Pastures

### Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

A Brief Overview of Nutrient Cycling in Pastures (IP221), 11 pages



Photo: Rex Dufour, NCAT

Assessing the Soil Pasture Resource (IP128), 8 pages  
[attra.ncat.org/attra-pub/summaries/summary.php?pub=181](http://attra.ncat.org/attra-pub/summaries/summary.php?pub=181)

Building Healthy Pasture Soils (IP546), 16 pages

Converting Cropland to Perennial Grassland (IP244), 12 pages

Integrating Livestock and Crops: Improving Soil, Solving Problems, Increasing Income (IP475), 16 pages

Nutrient Cycling in Pastures (IP136), 64 pages

Pastures: Sustainable Management (IP284), 20 pages

Irrigated Pastures: Setting up an Intensive Grazing System that Works (IP456), 4 pages

Why Intensive Grazing on Irrigated Pastures? (IP457), 2 pages

Managed Grazing in Riparian Areas (IP223), 28 pages

## Videos

Intensive Grazing: One Farm's Set Up  
[youtube.com/playlist?list=PLDu0ElBiEy9w4vhL87vWjzCtyazcvPYGx](https://youtube.com/playlist?list=PLDu0ElBiEy9w4vhL87vWjzCtyazcvPYGx)

Dave Scott, livestock specialist with the National Center for Appropriate Technology and co-owner of Montana Highland Lamb near Whitehall, Montana, discusses the operation's intensive grazing set-up.

## Power Point Presentations

Pasture Health and Drought Protection  
[attra.ncat.org/downloads/water\\_quality/healthy\\_pastures.pdf](http://attra.ncat.org/downloads/water_quality/healthy_pastures.pdf)

This presentation focuses on rotational grazing practices and forage management to protect pasture resources prior to, during, and following a drought.

Pasture and Rangeland Management During Drought  
[attra.ncat.org/downloads/water\\_quality/drought\\_mgmt.pdf](http://attra.ncat.org/downloads/water_quality/drought_mgmt.pdf)

This presentation describes supplement feeding practices, toxic plants, toxic syndromes associated with drought, animal management and selective culling to reduce stress on land resources.



Photo: Robyn Metzger, NCAT

## Tutorials

Available at [attra.ncat.org/tutorials/index.php](http://attra.ncat.org/tutorials/index.php)

### Managed Grazing

Have you heard that changing the way you manage your grazing animals can change the condition of your land and finances for the better? Interested in finding out more about how managing your livestock can improve your soil health, your pasture condition and your bottom line? This tutorial features sessions taught by National Center for Appropriate Technology specialists who are also livestock producers. They share years of experience managing their own pastures to inspire you to start wherever you are and build or refine your own managed grazing systems. Detailed presentations and real-world examples will get you on the road to managed grazing.

## No-Till Case Studies

### Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

No-Till Case Study, Bauer Farm: Cover Crop Cocktails on Former CRP Land (IP 442), 8 pages

No-Till Case Study, Brown's Ranch: Improving Soil Health Improves the Bottom Line (IP440), 8 pages

No-Till Case Study, Miller Farm: Restoring Grazing Land with Cover Crops (IP444), 8 pages

No-Till Case Study, Richter Farm: Cover Crop Cocktails in a Forage-Based System (IP437), 8 pages

# Soils, Miscellaneous

## Publications

Available at [attra.ncat.org/publication.html](http://attra.ncat.org/publication.html)

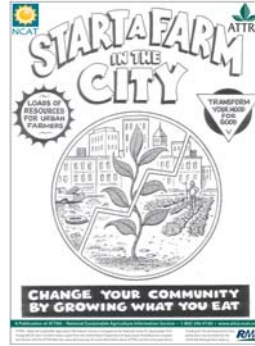
The Organic Chronicles No. 1: Mysteries of Organic Farming Revealed (IP314), 12 pages

Start a Farm in the City (IP350), 20 pages

Farmscaping to Enhance Biological Control (CT065), 40 pages

Equipment and Tools for Small Scale Intensive Crop Production (IP417), 16 pages

Sustainable Weed Management for Small and Medium-Scale Farms (IP490), 16 pages



Photos: Andy Pressman, NCAT

## Notes

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# Notes

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## **ATTRA - National Sustainable Agriculture Information Service**

- Friendly staff, knowledgeable about livestock, horticulture, agronomy, organic farming, marketing, farm energy, and other sustainable agriculture topics.
- ATTRA is a project of the National Center for Appropriate Technology and is funded by the USDA Rural Business-Cooperative Service.
- Visit our website, mail a request to the address at right, or call today for publications, technical assistance, and customized research.
- Become a member! For \$50/year, you receive free access to ALL our publications. Visit <https://attra.ncat.org/subscribe.php>.



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