

Soil Health Research Landscape Tool, v.12-21-16

Data Dictionary

Soil Health Institute

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The Soil Health Research Landscape tool provides up-to-date information on soil health-related research results, while also facilitating identification of research gaps that may need to be addressed.

This Data Dictionary provides definitions of the filters that can be applied to search the resources in the tool. We have sought to include high-quality peer reviewed articles, as well as practical applied research funded by the competitive NRCS Conservation Innovation Grant (CIG) program, Sustainable Agriculture Research and Education Program (SARE), or the National Institute of Food and Agriculture (NIFA) program.

The Soil Health Institute acknowledges the USDA Natural Resources Conservation Service's (NRCS) Soil Health Literature Review project for providing the important foundational work for this tool. Many of the filters were drawn from that project. More information on the NRCS Soil Health Literature Review can be found at: <http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/health/?cid=stelprdb1257753>

I. Soil Health Research Landscape Tool Filters

Problems

Filter/Tag Name	Definition
Erosion	The resource includes information relevant to understanding the relationship between erosion and soil health.
Organic Matter Depletion	The resource contains information relevant to understanding the relationship between organic matter depletion and soil health.
Nutrient Depletion	The resource contains information relevant to understanding the relationship between nutrient depletion and soil health.
Slow Infiltration	The resource contains information relevant to understanding the relationship between slow infiltration and soil health.

Droughty Soil	The resource contains information relevant to understanding the relationship between droughty soil and soil health.
Soil Contamination	The resource contains information relevant to understanding the relationship between soil contamination and soil health.
Compaction, Crusting	The resource contains information relevant to understanding the relationship between compaction, crusting, penetration resistance, and/or rooting depth and soil health.
Low Soil Biodiversity	The resource contains information relevant to understanding the relationship between reduced soil biodiversity and soil health.
Soil-borne Disease	The resource contains information relevant to understanding the relationship between soil-borne disease and soil health.

Indicators

Filter/Tag Name	Definition
Physical	The resource contains information about indicators of physical properties of soil, or is tagged with any of the “Physical” sub-filters/tags (i.e., “Aggregate Stability,” etc.).
Aggregate Stability	The resource contains information about aggregate stability that is relevant to understanding soil health.
Available Water Holding Capacity	The resource contains information about available water holding capacity, or soil water retention that is relevant to understanding soil health.
Bulk Density	The resource contains information about bulk density that is relevant to understanding soil health.
Compaction	The resource contains information about soil compaction, penetration resistance or rooting depth that is relevant to understanding soil health.
Infiltration	The resource contains information about infiltration or drainage water management that is relevant to understanding soil health.
Pore Size/Porosity/Pore Type	The resource contains information about pore size/type, porosity, macropores, or micropores that is relevant to understanding soil health.
Surface Crusting	The resource contains information about soil surface crusting or sealing that is relevant to understanding soil health.

Surface Roughness	The resource contains information about soil surface roughness that is relevant to understanding soil health.
Soil Structure	The resource contains information about soil structure (blocky, platy, granular, overall soil structure) that is relevant to understanding soil health.
Saturated Hydraulic Conductivity	The resource contains information about saturated hydraulic conductivity that is relevant to understanding soil health.
Chemical	The resource contains information about indicators of chemical properties of soil, or is tagged with any of the “Chemical” sub-filters/tags (i.e., “Electrical Conductivity (Salinity),” etc.).
Electrical Conductivity (Salinity)	The resource contains information about soil electrical conductivity, salinity, or soil sodium levels/sodic soils that is relevant to understanding soil health.
Heavy Metals	The resource contains information about the impact of heavy metals from the application of sludge or other organic waste that is relevant to understanding soil health.
pH	The resource contains information about soil pH that is relevant to understanding soil health.
Nitrogen	The resource contains information about soil nitrogen cycle, nitrogen losses, or nitrogen levels that is relevant to understanding soil health.
Phosphorus	The resource contains Information about the soil phosphorus cycle, phosphorus losses, or phosphorus levels that is relevant to understanding soil health.
Biological	The resource contains information about indicators of biological properties of soil, or is tagged with any of the “Biological” sub-filters/tags (i.e., “Microbial Respiration,” etc.).
Microbial Respiration	The resource contains information about microbial respiration that is relevant to understanding microbial activity as an indicator of soil health.
Microbial Community Composition	The resource contains information about microbial community composition that is relevant to understanding microbial activity as an indicator of soil health.
Microbial Food Source	The resource contains information about microbial food sources that is relevant to understanding microbial activity as an indicator of soil health.
Microbial Activity – Bacteria	The resource contains information about non-pathogenic soil bacteria (Nitrogen-fixing soil bacteria such as Rhizobia, free-fixing Nitrogen bacteria, or other). that is relevant to understanding microbial activity as an indicator of soil health. Examples include
Microbial Activity – Fungi	The resource contains information about non-pathogenic soil fungi (Arbuscular Mycorrhiza Fungi, or other types of fungi, fungal hyphae, saprophytic fungi, or other) that is relevant to understanding microbial activity as an indicator of soil health.

Microbial Activity – Other	The resource contains information that is relevant to understanding microbial activity as an indicator of soil health, but not adequately captured by specifying activity of bacteria or fungi.
Soil Organic Matter	The resource contains information about soil organic matter, soil carbon, or carbon sequestration in soils that is relevant to understanding soil health.
Enzymes	The resource contains information about soil enzymes that is relevant to understanding soil health.
Glues	The resource contains information about soil glues that is relevant to understanding soil health.
Earthworms	The resource contains information about earthworms that is relevant to understanding soil health.
Soil-borne Plant Pests & Pathogens	The resource contains information about soil-borne plant pests and pathogens (e.g., fungi, bacteria, nematodes, weeds, insects, rodents, etc.) that is relevant to understanding soil health.

Actions

Umbrella categories (i.e., “Disturb Soil Less,” “Keep Soils Covered,” “Use Diversity of Plants,” “Keep Living Roots,” “Integrate Grazing,” and “Other”) are adapted from NRCS’s summary of soil health management practices. All other filters, except for “Soil Amendment,” are conservation practices from the NRCS National Handbook of Conservation Practices. Peer reviewed literature and other resources typically do not include the exact conservation practice name, so a correlation was made by soil specialists. Multiple conservation practice entries are possible. Refer to the links below for more information:

National Handbook of Conservation Practices: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/cp/ncps/>

NRCS Soil Health Management Practices: <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/mgmt/>

Filter/Tag Name	Definition
Disturb Soil Less	The resource contains information about conservation practices that disturb soil less, and may also be tagged with any of the following: <ul style="list-style-type: none"> - Residue and Tillage Management, No-Till - Residue and Tillage Management, Reduced Till
Keep Soils Covered	The resource contains information about conservation practices to keep soils covered, and may also be tagged with one or more of any of the following: <ul style="list-style-type: none"> - Cover Crop

	<ul style="list-style-type: none"> - Residue and Tillage Management, No-Till - Residue and Tillage Management, Reduced Till - Alley Cropping - Conservation Crop Rotation - Contour Farming - Contour Buffer Strips - Riparian Herbaceous Cover - Mulching
Use Diversity of Plants	<p>The resource contains information about conservation practices that use a diversity of plants, and may also be tagged with any of the following:</p> <ul style="list-style-type: none"> - Cover Crop - Conservation Crop Rotation - Alley Cropping - Forage and Biomass Planting
Keep Living Roots	<p>The resource contains information about conservation practices that keep living roots, and may also be tagged with any of the following:</p> <ul style="list-style-type: none"> - Cover Crop - Conservation Crop Rotation - Alley Cropping - Forage and Biomass Planting
Integrate Grazing	<p>The resource contains information about conservation practices that integrate grazing, and may also be tagged with any of the following:</p> <ul style="list-style-type: none"> - Forage and Biomass Planting - Prescribed Grazing
Other	<p>The resource contains information about other practices to improve soil health, and may also be tagged with any of the following:</p> <ul style="list-style-type: none"> - Riparian Forest Buffer - Filter Strip - Grassed Waterway - Irrigation Water Management - Forest Harvest Management - Nutrient Management - Integrated Pest Management - Terrace

	<ul style="list-style-type: none"> - Salinity and Sodic Soil Management - Soil Amendments
Alley Cropping	The resource contains information about alley cropping (NRCS Conservation Practice number 311) that is relevant to understanding soil health.
Conservation Crop Rotation	The resource contains information about conservation crop rotation (NRCS Conservation Practice number 328) that is relevant to understanding soil health.
Contour Buffer Strips	The resource contains information about contour buffer strips (NRCS Conservation Practice number 332) that is relevant to understanding soil health.
Contour Farming	The resource contains information about contour farming (NRCS Conservation Practice number 330) that is relevant to understanding soil health.
Cover Crop	The resource contains information about cover crops (NRCS Conservation Practice number 340) that is relevant to understanding soil health.
Filter Strip	The resource contains information about filter strips (NRCS Conservation Practice number 393) that is relevant to understanding soil health.
Forage and Biomass Planting	The resource contains information about forage and biomass planting (NRCS Conservation Practice number 512) that is relevant to understanding soil health.
Forest Harvest Management	The resource contains information about forest harvest management (NRCS Conservation Practice number 511) that is relevant to understanding soil health.
Grassed Waterway	The resource contains information about grassed waterways (NRCS Conservation Practice number 412) that is relevant to understanding soil health.
Integrated Pest Management	The resource contains information about integrated pest management (NRCS Conservation Practice number 595) that is relevant to understanding soil health.
Irrigation Water Management	The resource contains information about irrigation water management (NRCS Conservation Practice number 449) that is relevant to understanding soil health.
Mulching	The resource contains information about mulching (NRCS Conservation Practice number 484) that is relevant to understanding soil health.
Nutrient Management	The resource contains information about nutrient management (NRCS Conservation Practice number 590) that is relevant to understanding soil health.
Prescribed Grazing	The resource contains information about prescribed grazing (NRCS Conservation Practice number 528) that is relevant to understanding soil health.
Residue and Tillage Management, No-Till	The resource contains information about no till residue and tillage management (NRCS Conservation Practice number 329) that is relevant to understanding soil health.
Residue and Tillage Management, Reduced Till	The resource contains information about reduced till residue and tillage management (NRCS Conservation Practice number 345) that is relevant to understanding soil health.

Riparian Herbaceous Cover	The resource contains information about riparian herbaceous cover (NRCS Conservation Practice number 390) that is relevant to understanding soil health.
Salinity and Sodic Soil Management	The resource contains information about salinity and sodic soil management (NRCS Conservation Practice number 610) that is relevant to understanding soil health.
Soil Amendments	The resource contains information about soil amendments that is relevant to understanding soil health.
Terrace	The resource contains information about terraces (NRCS Conservation Practice number 600) that is relevant to understanding soil health.

Functions

Filter/Tag Name	Definition
Filter and Buffer Pollutants	The resource contains information relevant to understanding soil's ability to filter and buffer physical and chemical pollutants.
Cycle Nutrients	The resource contains information relevant to understanding soil's ability to cycle nutrients.
Physical Stability and Support	The resource contains information relevant to understanding soil's ability to provide physical stability and support to plant roots.
Supply Water	The resource contains information relevant to understanding soil's ability to supply water.
Sustain Plant and Animal Life	The resource contains information relevant to understanding soil's ability to sustain plant and animal life.

Outcomes

Filter/Tag Name	Definition
Increase Resilience to Extreme Weather	The resource contains information relevant to understanding the role of soil health in increasing resilience to extreme weather.
Reduce Erosion	The resource contains information relevant to understanding the role of soil health in reducing erosion.
Enhance Water Quality	The resource contains information relevant to understanding the role of soil health in enhancing water quality.

Enhance Productivity, Yield Stability, and Profitability	The resource contains information relevant to understanding the role of soil health in enhancing productivity, yield, stability, and profitability.
Increase Nutrient Availability	The resource contains information relevant to understanding the role of soil health in increasing nutrient availability.
Increase Available Water Holding Capacity	The resource contains information relevant to understanding the role of soil health in increasing available water holding capacity.
Increase Water Infiltration	The resource contains information relevant to understanding the role of soil health in increasing water infiltration.
Soil Rehabilitation	The resource contains information relevant to understanding the role of soil health in rehabilitating polluted or depleted soils.
Improve Human Health	The resource contains information relevant to understanding the role of soil health in improving human health.
Reduce Greenhouse Gas Emissions	The resource contains information relevant to understanding the role of soil health in reducing greenhouse gas emissions.

II. Advanced Search Filters

Filter/Tag Name	Definition
System <ul style="list-style-type: none"> - Cropland - Pasture - Rangeland - Forest - Horticulture - Urban - Organic - Orchard 	Cropland may also include hayland and vineyards; Pasture may include silvopasture; Rangeland may include savannahs and shrub lands; Forest may include woodland, land used for agroforestry, forest utilized for grazing and other purposes, and silvopasture.
Crop – Commodity <ul style="list-style-type: none"> - Corn - Cotton - Soybeans 	Commodity crops include corn, cotton, soybeans, wheat, sorghum, peanuts, rice, tobacco, potatoes, and other commodity crops.

<ul style="list-style-type: none"> - Wheat - Sorghum - Peanuts - Rice - Tobacco - Potatoes - Other 	
<p>Crop – Specialty</p> <ul style="list-style-type: none"> - Tree Fruit & Nut - Other 	<p>Specialty crops include tree fruits and nuts, and other specialty crops.</p>
<p>Region of Interest</p> <ul style="list-style-type: none"> - Corn Belt - Northeast - Southeast - Great Plains - Pacific Northwest - Mississippi River Basin - Chesapeake Bay Watershed 	<p>Regions of interest are tagged if identified in the resource; otherwise it is only tagged with a region of interest if the study/project takes place within a covered state:</p> <ul style="list-style-type: none"> - Corn Belt: Iowa, Illinois, Indiana, Michigan, Ohio, Nebraska, Kansas, Minnesota, Missouri - Northeast: Virginia, West Virginia, Pennsylvania, Delaware, Maryland, New Jersey, Connecticut, New York, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine - Southeast: Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida, Tennessee, Kentucky, Arkansas, Louisiana - Great Plains: Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Wyoming - Pacific Northwest: Washington, Oregon, Idaho - Mississippi River Basin: Minnesota, Wisconsin, Illinois, Iowa, Missouri, Kentucky, Tennessee, Arkansas, Mississippi, Louisiana - Chesapeake Bay Watershed: New York, Pennsylvania, Maryland, Delaware, West Virginia, Virginia, District of Columbia
<p>Geography (State)</p>	<p>Includes all U.S. states and the District of Columbia.</p>
<p>Geography (Country)</p>	<p>Includes the U.S. and all international countries.</p>
<p>Irrigation</p> <ul style="list-style-type: none"> - Irrigated - Non-Irrigated 	<p>Irrigated refers to treatment that were irrigated; Non-irrigated refers to treatments that were rain-fed/dryland.</p>

<p>Temperature Regime</p> <ul style="list-style-type: none"> - Cold (average annual soil temperature generally <8°C) - Moderate (average annual soil temperature generally between 8-15°C) - Hot (average annual soil temperature generally >15°C) - NA 	<p>Soil temperature classifications are tagged if named in the resource or else only if identifiable by soil specialists reviewing the resource’s study methods. Listing the temperature regime the study was conducted in does not necessarily imply that the findings can be extrapolated to anywhere the temperature regime occurs.</p>
<p>Climatic Moisture Regime</p> <ul style="list-style-type: none"> - Arid - Semi-Arid - Sub-Humid - Humid - NA 	<p>Climatic moisture regimes are tagged if named in the resource or else only if identifiable by soil specialists reviewing the resource’s study methods. Listing the moisture regime from where the study was conducted does not necessarily imply findings can always be extrapolated anywhere the moisture regime occurs.</p>
<p>Lead Institution</p>	<p>The lead institution (e.g., university) of the principal investigator or lead project coordinator.</p>
<p>Resource Type</p> <ul style="list-style-type: none"> - Literature review/Meta-analysis - Peer Review - Applied Research - Economics Research - Soil Health Assessment/Method - Education/Outreach 	<p>Literature review/Meta-analysis is a comprehensive analysis of pre-existing resources and data related to a specific topic; Peer-reviewed resources are those that have been accepted and published in a reputable academic journal following several rounds of review by subject experts; Applied research resources focus on reporting the findings of experimental trials that are designed to test current theories in practice; Soil Health Assessment/Method resources are detailed protocols related to the measurement of physical, chemical, and/or biological indicators of soil health; Education/Outreach materials are those designed to share information with management practitioners or other interested stakeholders.</p>