RURAL LAND ACCESS

BEGINNING FARMERS

Soil Scorecard Handout

KEY TERMS

Soil texture

Texture is how the soil feels. There are three soil textures: sand, silt and clay. Loam is a mix of two or three types. Knowing your soil texture helps you to better manage drainage and nutrients.

Soil drainage

How quickly water drains from the soil. Sand drains fast and clay drains slowly. Using compost and cover crops with deep roots improve drainage.

Soil hard-pan

If soil is tilled or plowed or rototilled repeatedly, a hardened layer can form, keeping water from draining and blocking root growth.

Soil erosion

Soil can be moved by wind and water, known as erosion. Improving organic matter and keeping soil covered by cover crops or mulch reduce erosion.

Cover crops

Cover crops are grown to improve soil. Cover crops hold nutrients, compete with weeds, increase organic matter, fix nitrogen & improve drainage and water holding in soils.

Organic matter

Soil organic matter was once living, like manure, compost, or crop residues. Organic matter improves soil health by feeding soil life, releasing nutrients and improving drainage and water holding during droughts.

SUPPLIES NEEDED

- Site to assess soils
- Handouts
- Shovel

Alternate Supplies

- Zoom or other online meeting room
- Google documents or other online document sharing tool
- Each participant would need a handout and a site to assess on their own

MSU Organic Farmer Training Program **Rural Soil Scorecard**

Adapted from the Michigan Soil Health Progress Report, Wisconsin Soil Health Scorecard and Nebraska Soil Quality Card

DATE:_____ CROP:_____

FIELD LOCATION:_____ YEAR OF PLANTING:_____

SOIL MOISTURE AT TIME OF SAMPLING:_____DRY ___ADEQUATE ___WET

	Timing	Observations	Poor – Fair (0–3)	Fair – Average (4–7)	Good – Excellent (8–10)	Score
Soil Life						
Worms	During growing season		Little or no sign of worms, holes or castings	Some worms, holes or castings	Many worms, worm holes and castings	
Soil Life	During growing season		No sign of soil life (insects, white threads of fungal hyphae, etc.)	Some signs of soil life (insects, white threads of fungal hyphae, etc.)	Lots of soil life (insects, white threads of fungal hyphae, etc.) and diverse species	
Decomposition & Biological Activity	During growing season		Residue like corn stalks, broccoli stems, manure or cover crop do not decompose even when buried in soil	Residue like corn stalks, broccoli stems, manure or cover crop decompose slowly or at average rate when in soil	Quick decomposition of residue like corn stalks, broccoli stems, manure or cover crops when in soil	
Residue	Anytime		Soil surface is bare, no mulch, crops or residue few roots in subsoil	Surface has little to moderate residue, mostly buried, mulch rarely used Moderate roots	Surface is trashy, lots of residue, mulch or cover crop Dense roots and tunnels of decomposed roots	
Smell	During growing season		Soil has a sour, putrid, chemical or rotten smell	Soil has no odor or a mineral smell	Soils has an earthy, sweet, fresh smell from organic matter and actinomycetes	
Wildlife	Anytime		Signs of wildlife rare, animals do not appear healthy	Infrequent signs of wildlife; songbirds, deer, turkey etc. uncommon	Wildlife is abundant; gulls, songbirds, deer, turkey, etc. are common	
Soil Observation						
Soil Texture	Anytime; best after rain or irrigation		Texture is a problem, extremely sandy, clayey or rocky	Texture is too heavy or too light, but presents no problem	Texture is loamy, excellent for growing crops, tilling, etc.	
Soil Structure	After rainfall events or irrigation		Soil is hard, dense or solid, will not break between two fingers Large, hard clods Very hard to prepare seed bed Powdery when dry	Soil crumbles with light to moderate pressure Lacks tilth and does not hold together	Very crumbly Soil is soft, crumbles easily under light pressure, Soil has tilth and is not powdery Mellow, ready to plant	

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Soil Observation						
Topsoil Depth	Anytime		Subsoil is exposed or near surface	Topsoil is shallow (2 to 4 inches)	Topsoil is deep (5 or more inches)	
Aeration	Anytime		Soil is tight, closed, almost no pores	Soil is dense, has a few pores	Soil is open, porous, breathes	
Feel	Anytime		Soil is mucky, greasy, sticky or powdery	Soil is smooth or grainy, compresses when squeezed	Soil is loose, fluffy, opens up after being squeezed	
Crust	Anytime		Crusts in most areas after even light or average rains Soil surface is hard, cracked when dry, compacted	Crust only wheel tracks or after very hard rains Surface is smooth with few holes, thin crust	No Crusting Surface is porous, digs easily with hand	
Soil Color	Anytime		Soil color is tan, light yellow, orange, or light gray	Soil color is brown, gray, or reddish	Soil color is black, dark brown, look like chocolate	
Erosion	After rain, wind, tillage, harvest or planting		Severe erosion, topsoil loss, gullies throughout field	Some eroded areas or erosion only after hard rains or wind Erosion partly controlled with cover crops, mulch, berms, etc.	Excellent control after hard wind or hard rain Little erosion, topsoil resists erosion even after hard rain or wind	
Soil Compaction	Anytime Best in spring until plants are about 10" tall		Hard pan stops roots, roots grow horizontally Soil is tight & compacted, cannot dig, thick hardpan	Few roots grow through hardpan, roots grow horizontally at hardpan Soil packs down with some hardpan Difficult to dig or pull root crops	Roots grow straight down Soil stays loose, no hardpan, Easy to dig or pull root crops	
Tillage ease	Anytime		Rototiller, disk and implements bounce without digging in; cannot work soil;	Needs extra passes with rototiller, disk or implements; requires more horsepower than expected to work soil	Easy to rototill, disk and use implements	
Water						
Water infiltration	Anytime		Ponding frequent and long-term Water does not soak in, sits on top or runs off	Some ponding after heavy rain Water soaks in slowly, some runoff, puddling or crusting after a heavy rain	No ponding Water soaks right in, soil is spongy	
Drainage	Anytime		Poor drainage, Soil is often waterlogged or oversaturated	Soil drains slowly, slow to dry out	Soil drains at good rate for crops, water moves through	

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Water						
Water Retention	Anytime		Soil dries out too fast, droughty	Soil is drought prone in dry weather	Soil holds water well, gives and takes water easily	
Surface water	Anytime		Surface water is very muddy or slimy	Surface water is brownish with dirt and silt	Surface water is clear and clean	
Water-Holding Capacity	During growing season		Crops wilt and curl quickly when dry Plants never completely recover	Crops curl or wilt in dry weather Plants recover at a slow to average rate	Crops withstand dry weather, Plants fast to recover	
Irrigation Water Contamination			Contaminated surface or well water is used for irrigation regularly	Unsure if irrigation water is contaminated (test to find out!)	Irrigation water is tested and is not contaminated; contaminated wells or surface water is not used	
Flooding	Anytime		Flooding from river, sewer, streets or livestock areas	Flooding from natural site (forest, etc)	No flooding	
Refuse						
Trash	Anytime		Lots of trash, litter or garbage bags	Some trash, litter or garbage bags	Little or no trash litter or garbage bags on site	
Auto Waste, Fuel and Pesticide Containers	Anytime		Pesticide containers are leaking or outdoors, abandoned cars or small motors, leaking fuel storage	Pesticide containers are in a barn and not leaking but need disposal, fuel storage needs improvement	Little or no evidence of pesticide or fuel storage onsite OR storage meets MAEAP standards	
Plant Observations						
Plant Health	Summer to late summer		**Yellow, Discolored Leaves,** few leaves **Stems** are short, spindly, lodging **Crop** is poor, stunted, discolored and in an uneven stand	**Yellow-green leaves**, small, narrow leaves Stems are medium thin, weak or leaning to one side Small plants in a thin stand	**Dark green leaves** are full and lush Thick stems that are tall and standing straight Large, tall plants in a dense stand	
Plant deficiencies	Summer to late summer		Crop shows severe deficiency (blighted, streaky, spotty, discolored, dried up)	Crop shows deficiencies or discolors as season progresses	Crop has what it needs, shows little signs of deficiencies	
Seed Germination	1 to 3 weeks after planting		Germination is poor, poor emergence	Uneven germination or emergence	Quick germination, good emergence	
Growth Rate and Maturity	During growing season		Crop slow to start, never mature Seedheads, pods, vegetables or leaves misshapen, shriveled, poor color	Uneven growth, late to mature Seedheads and vegetables are small, stunted or show partial color	Rapid, even growth, matures on time Seedheads and vegetables ripen to full color and size	

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	Timing	Observations	Poor – Fair (0–3)	Fair – Average (4–7)	Good – Excellent (8–10)	Score
Crop flavor and nutrition	At harvest		Crops taste bitter, woody or watery Low nutrition, poor health of livestock that graze the land	Flavor is average Average nutrition, average health of livestock that graze the land	Flavor is excellent High nutrients, excellent health of livestock that graze the land	
Roots	During growing season		Plant roots appear unhealthy (brown, diseased, spotted), poorly developed, balled up	Plant roots are shallow, at hard angles, development limited, few fine roots	Plant roots are deep, fully developed with lots of fine root hairs	
Soil Test Results						
Soil Test – Organic Matter	Test in spring or fall		Organic matter less than 2%	Organic matter 2 to 4%	Organic matter above 5%	
Soil Test – pH	Test spring or fall		Soil pH less than 6.0 or greater than 7.0	Soil pH 6.0 to 6.2 or 6.5 to 7.0	Soil pH between 6.2 and 6.5	
Soil Test – P, K & Ca	Test in spring or fall		Two or more nutrient levels very low P over 300	One nutrient level very low Two or more nutrients low P over 100	All nutrient levels at good levels	
Soil Test – Micronutrients	Test in spring or fall		Severe shortages of micronutrients (magnesium, zinc, sulfur, boron, etc.)	Micronutrients at a minimal level or not balanced	Levels of micronutrients high and balanced	
Other						
Notes:					**Total Score**	
					Total # of questions answered	
					Average score Poor to Fair = 0–3 Fair to average = 4–7 Good to Excellent=8–10	

How do you do this?

Step 1: **Walk a farmsite** with the group and see what you notice about the soil.
Step 2: **Use the Soil Scorecard** to look at a few items in each color category with the full group:

- For **Soil Life**
  - Start by looking for **Worms**
    - Work with the farmers in your group to **decide if the soil is Poor, Fair, Average, Good or Excellent**. The scorecard will give you hints of what to look for!
    - Ask lots of questions
  - Choose one other characteristic to look at if there is time. **Residue** is a good choice!
- For Soil Observation
  - Start by looking at the **Soil Texture**
  - Work with the farmers in your group to **decide if the soil is Sand, Silt, Clay, Loam, Muck or another soil type.**
  - Then decide if the soil is **Poor, Fair, Average, Good or Excellent**. This may depend on your favorite soil types and what you plan to raise on this field.....
  - Ask lots of questions
  - Choose one other characteristic to look at if there is time. **Erosion** or **Compaction** might be a good choice!
- Continue through other sections to discuss 1 item from each section with the group:
  - Water
  - Refuse
  - Plant Observations
  - Soil Test Results
- Ask how to calculate the results before you split into small groups to finish the scorecard.

Step 3: **In small groups, finish several other sections of the soil scorecard** as time allows.
Step 4: **Use the Soil Scorecard at your farmsite.** Don't hesitate to contact a mentor, the class coordinator or a farmer in your circle or to google a word if you're not sure how to judge one of the soil characteristics.
Step 5: Plan to **talk to a farmer** about what you found and discuss what you want to do to improve your soil. It is also a great idea to **talk to another person who has used the Soil Scorecard** to find out about what they learned.

What does it mean for my farm?

Discuss what you learned from your Sol Scorecard with a fellow farmer.

- What did you learn about your soil?
- What are some good or excellent features of their soil?
- What problems did you see in your soil?
- What can you do to improve your soil?
- What new farming practices do you want to try?
- Is there any funding from NRCS to address the Resource Concerns (erosion, soil compaction, etc.) that you noticed in your soil?

Discuss with someone else who used the Soil Scorecard on their farm.

- What did they learn about their soil?
- What are some good or excellent features of their soil?
- What problems did they see in your soil?
- What can you do to improve your soil?
- What new farming practices do you want to try?
- Is there any funding from NRCS to address the Resource Concerns (erosion, soil compaction, etc.) that you noticed in your soil?