

ALBERTA SOIL QUALITY CARD



Soil Quality...
the foundation of sustainable agriculture

WHAT IS A SOIL QUALITY CARD?

- A soil quality card is a simple, non-technical method to assess soil quality in the field.
- It uses sensible, farm level indicators and descriptions that qualitatively measure soil quality.
- It allows soil quality to be assessed without the use of technical or laboratory equipment.
- It is a tool to raise awareness of soil quality and increase the working knowledge of soil.

WHY SHOULD I USE A SOIL QUALITY CARD?

- Assessing soil quality is important to the development, performance and evaluation of sustainable land and soil management systems.
- Regular (every 1 to 5 years) use allows assessment of current soil quality conditions, records changes in soil quality over time, identifies potential problem areas, and provides a measure of soil quality to compare fields and management practices.
- The soil quality card can be used to make informed management decisions.

HOW DO I USE A SOIL QUALITY CARD?

- Step 1)** The only tools required to complete this card are a pencil and a spade.
- Step 2)** Refer to the indicator assessment timetable for the appropriate time to assess each indicator.
- Step 3)** Divide the farm or fields into separate sections for assessment based on soil type, topography, tillage, crop rotations and management practices.
- Step 4)** Complete the field identification and management notes section on the Alberta Soil Quality Card with information regarding the field or area being assessed.
- Step 5)** Rate each indicator based on your judgment of the soil and circle the ranking that best describes the soil condition. Include other indicators that you feel would help evaluate your soil quality.
- Step 6)** Follow changes in each of the indicators over time, note those indicators that need improvement, and consider management options, which might improve the soil quality in those areas.

NOTE:

- Assessments are qualitative and are most effective when consistently completed by the same person over time and under similar field conditions.
- Assess more than one spot in a field to obtain more accurate results.
- The scoring of indicators does not represent an absolute measure or value; its purpose is to assess the ability of each individual soil to function within its environment.



"Each soil is an individual body of nature, possessing its own character, life history, and powers to support plants and animals."

Hans Jenny
(1899 - 1992)



SOIL INDICATOR ASSESSMENT TIMETABLE

INDICATOR	MOST APPROPRIATE TIME TO ASSESS
Crop/Weed Vigor	during growing season
Residue Cover	anytime
Organic Matter Color	anytime with moist soil conditions
Drainage/Infiltration	anytime after a significant rainfall
Water-Holding Capacity	during growing season, after rainfall
Aggregation	anytime
Earthworms/Soil Life	spring or fall, with moist soil conditions
Compaction/Rooting	during growing season with moist soil
Crusting/Emergence	during spring after a rainfall event
Tilth/Workability	spring or late fall with moist soil
Wind Erosion	after a high sustained wind
Water Erosion	after heavy rainfall
Salinity	during growing season, 30 days after emergence



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FIELD IDENTIFICATION AND MANAGEMENT NOTES

Field ID: _____

Current Crop: _____

Crop Rotation: _____

Tillage Practices: _____

Pesticide(s) Applied: _____

Fertilizer(s) Applied: _____

Manure Applied: _____

Past/Present Yield Data: _____

Type of Residue Management: _____
(baled, chaff spread etc.)

Number of Years in Similar Management: _____

Past Farming Management: _____

Soil Variability: _____
(soil type, topography, management, etc.)

Field Map
(mark areas of special interest and assessment points)

Additional Comments or Notes:

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Name _____ Date _____ Field/Site _____

INDICATOR	RANKING			SCORE Circle one
	Low (L)	Medium (M)	Preferred (P)	
CROP / WEED VIGOR	Stunted growth, uneven stand, consistently poor yields	Some uneven or stunted growth, inconsistent yields	Healthy, vigorous and uniform stand, consistently good yields	L M P
RESIDUE COVER	Little or no surface residue, bare soil present	Some surface residue present, but soil surface not completely covered	Soil surface covered year round, little bare soil present	L M P
ORGANIC MATTER COLOR	Topsoil color similar to subsoil		Topsoil clearly defined, darker than subsoil	L M P
DRAINAGE / INFILTRATION	Soil absorbs water very slowly, lots of runoff or erosion, excessive wet spots in field, ponding	Soil absorbs water slowly, some runoff or erosion, some wet spots in field and soil profile	Soil absorbs water quickly, very little runoff or erosion, water is evenly drained through field and soil profile	L M P
WATER-HOLDING CAPACITY	Soil has limited capacity to hold water, plant stress a couple days after a good rain	Soil has moderate capacity to hold water, water runs out after a week or so	Soil holds water well, holds water for a long period of time without ponding	L M P
AGGREGATION	Soil surface is hard, clumps and does not break apart, very powdery when dry	Soil crumbles in hand, few aggregates	Soil surface has many soft small aggregates which crumble easily	L M P
EARTHWORMS / SOIL LIFE	Very few worms, insects or visible soil life per shovel. Little evidence of activity (holes or worm casts)	Some worms, insects and other visible soil life per shovel, some evidence of activity	Many worms, insects or visible soil life per shovel	L M P
COMPACTION / ROOTING	Hard layers, severely restricted root penetration, very few roots, mostly horizontal	Firm soil, slightly restricted root penetration, more roots, some horizontal and some remaining vertical	Loose soil, unrestricted root penetration, many vertical and horizontal roots, deep rooting	L M P
CRUSTING / EMERGENCE	Soil surface seals easily after tillage or rain, seedling emergence inhibited	Some surface sealing, minimal effect on seedling emergence	Soil surface has open or porous surface all season, seedling emergence not affected	L M P
TILTH / WORKABILITY	Crusting, large clods, tills with difficulty	Some crusting, small clods, medium pull	Mellow, crumbly, tills easily, leaving no clods	L M P
WIND / WATER EROSION	Obvious soil drifting, shallow topsoil, subsoil showing at surface, or large gullies present	Some evidence of soil drifting, few gullies, some colored runoff	No obvious soil drifting, no gullies, clear or no runoff	L M P
SALINITY	Visible salt, dead plants	Stunted growth	No visible salt or plant damage noted	L M P
OTHERS				L M P





HOW CAN I IMPROVE MY SOIL QUALITY?

Organic Matter/Residue Cover

Increase organic matter in soil by continuous cropping, including forages in crop rotations, additions of manure, returning crop residues to the soil, use of green manuring, using reduced tillage practices and by decreasing frequency of summerfallow.

Drainage/Infiltration

Increase drainage and infiltration by increasing organic matter and aggregation and by decreasing crusting and compaction problems.

Water-Holding Capacity

Increase water-holding capacity by using practices that add organic matter to soil.

Aggregation/Tilth

Increase aggregation and tilth by using practices that add organic matter to soil and by using reduced tillage practices.

Earthworms/Soil Life

Earthworm populations vary with site characteristics. Not all sites contain earthworms because they have not been introduced or environmental conditions are not favorable. Earthworms are considered to be beneficial to the soil by increasing microbial activity, soil chemical fertility, and enhancing soil properties such as aggregation and soil porosity. Generally, earthworm populations are higher in undisturbed systems than in disturbed systems.

Compaction/Rooting

Reduce compaction by utilizing practices that add organic matter to the soil, growing deep rooted crops, decreasing tillage frequency and not tilling when soil is wet.

Crusting/Emergence

Reduce crusting through additions of organic matter and the use of residue management.

Erosion

Reduce erosion by increasing organic matter, using reduced tillage practices, adding forages to crop rotations and decreasing the frequency of summerfallow. The use of grassed waterways, buffer zones, shelterbelts, strip cropping, cover crops, fall-seeded crops, permanent cover crops and green manuring can also help reduce soil erosion.

Salinity

Decrease salinity by continuous cropping, growing deep-rooted, high moisture crops in recharge areas and salt tolerant crops in discharge areas, and by decreasing the frequency of summerfallowing.

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If you have any questions or comments, contact
Karen Cannon
Soil Quality Program Coordinator
Alberta Agriculture, Food and Rural Development
780-427-3432
karen.cannon@gov.ab.ca

For more information, contact Alberta Agriculture's Ropin' the Web website at
<http://www1.agric.gov.ab.ca/app21/rtw/index.jsp> (search using "soil quality")

For general agronomic questions, contact:
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Alberta Agriculture, Food and Rural Development,
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7000-113 Street,
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