United States Department of Agriculture
Natural Resources Conservation Service 2013 Ranking Period 1

Soil Quality Enhancement Activity – SQL05 – Use of deep rooted crops to break up soil compaction

Enhancement Description

This enhancement is for the use of deep rooted crops to break up compacted soils and improve soil quality. Deep rooted crops can be perennial plants like alfalfa or annual plants like forage radish.

Land Use Applicability

Cropland

Benefits

Soils can have naturally occurring compacted layers (hard pans) or those that have been created through tillage or other farming activities. Deep rooted crops with large taproots can alleviate the effects of soil compaction by penetrating the compacted layer, creating pore space that allows air, water and crop roots to penetrate deeper in the soil profile. Eliminating soil compaction through the use of deep rooted crops increases infiltration, reduces surface runoff, improves soil tilth and overall soil quality. It also eliminates the need for sub-soiling with a plow, thus saving fuel, reducing erosion and enhancing water quality.

Conditions Where Enhancement Applies

This enhancement applies to all crop land use acres.

Criteria

1. The selected crop must be one that has been identified as having the capability of alleviating soil compaction. State specific lists are available at your local NRCS Field Office.
2. If perennial plants are used and once established, they must be maintained annually by proper fertilization and mowing/harvesting.
3. Annual crops should be seeded early enough in the fall to allow for adequate growth to occur prior to winter. Follow specifications provide by your local NRCS Field Office.
4. No deep tillage is allowed to remove compacted layer.

Adoption Requirements

This enhancement is considered adopted when the selected deep rooted cover crop has been grown in a given rotation on the land use acre.

Documentation Requirements

1. Written documentation for each year describing the following items:
   a. Deep rooted crop(s) used and dated planted.

b. Cash crop planted and method used.
2. A map showing fields where the enhancement is applied.
3. Photographs of a representative number of fields showing deep rooted crops.

References

A. Clark (ed.). 2007. Managing cover crops profitably. 3rd ed. Sustainable Agriculture Network Handbook Series; bk 9.

Magdoff, F. and H. van Es. Cover Crops. 2000. *In* Building soils for better crops. 2nd ed. Sustainable Agriculture Network Handbook Series. National Agriculture Library. Beltsville, MD. pp 87-96.

Sainju, U.M., W.F. Whitehead and B.P. Singh. 2005. Biculture Legume–Cereal Cover Crops for Enhanced Biomass Yield and Carbon and Nitrogen. Agron. J. 97:1403–1412.

SOIL QUALITY ENHANCEMENT ACTIVITY

SQL05 – OR Use of Deep Rooted Crops to Break Up Soil Compaction

General

Soil compaction occurs when moist or wet soil particles are pressed together and the pore spaces between them are reduced. Adequate pore space is critical for the movement of water, air, and microorganisms through the soil. Compacted soils restrict root penetration, making soil moisture unavailable and restricting root growth. Compaction results in increased surface runoff, nutrient losses, and ultimately reduced yields. The use of deep rooted crops with large taproots can alleviate these impacts by penetrating the compacted layer.

Oregon Criteria

The following crops are acceptable for use with this Enhancement:

Alfalfa	Pine lupine
Camelina	Rapeseed
Canola	Red clover
Common vetch	Safflower
Crimson clover	Subclover
Flax	Sugar beets
Forage radish	Sunflower
Hairy vetch	Yellow sweetclover

Other deep rooted crops with large taproots may be practical/feasible in your area. Contact the r NRCS State Agronomist for prior approval.

Documenting the Enhancement

1. **A map or aerial photo showing fields where the Enhancement is applied.**

2. **Photographs of a representative number of fields showing deep rooted crops.**

3. **Deep Rooted/Large Taproot Crop Planted (for each year of the Enhancement):**

_____ Date Planted _____

4. **Cash Crop Planted: _____ Date Planted _____**

5. **Planting Method:**

____ NoTill/Direct Seed ___ Mulch Tillage ___ Conventional Tillage

Reference

USDA-NRCS, *Soil Quality-Agronomy Technical Note #17: Soil Compaction*, Soil Quality Institute, Auburn, AL, June 2003.

Oregon State University Extension Service, *Oregon Cover Crop Fact Sheets*. http://extension.oregonstate.edu/catalog/details.php?sortnum=0124&name=Cover+Crops.