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.

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IDAHO ADDENDUM 2013
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Additional guidance for deep rooted crops:

Effective deep rooted crops will have approximately 80 percent of the feeder roots in a deep uniform, well-drained soil profile. The following is a list of deep rooted crops that break up compacted soils and improve soil quality.

Crop	Depth in feet
Alfalfa	4-6
Beets (sugar)	3-5
Canola	2-4
Safflower	3-5
Forage radish	1-2

Any other crops used for this enhancement must be approved in advance by the NRCS Idaho State Agronomist.

For additional information on deep rooted crops, refer to:

NRCS National Engineering Handbook, Section 15, Chapter 11 – *Sprinkler Irrigation*.
http://ucmanagedrought.ucdavis.edu/CropRootingDepth.cfm

This activity may NOT be used with the following enhancements: ANM12, ANM21, ANM31, WQL27

Potential Duplicate Practices:
328 – Conservation Crop Rotation, 340 – Cover Crop