United States Department of Agriculture
Natural Resources Conservation Service

2016 – 1
2017 – 1 Renewal

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.

USDA-NRCS, 2014. NRCS Cover Crop Termination Guidelines. Version 3

Utah State Supplement 2015 for SQL05

Notes: Remember that the best tool for breaking up compaction is earth worms. Leaving them a good supply of residue for a food source keeps them numerous and vigorous. In alfalfa fields this means leaving something standing to decay over winter to feed the worms.

1. For acceptable cover crops Use the "CoverCropChartwithplantID.pdf" in eFOTG >Section IV >340 Cover Crop
2. Preferred species: Safflower, Diakon Radish, alfalfa, sweet clover, rye, triticale

   More Information:
   http://plantcovercrops.com/category/cover-crop-benefits/breaking-up-compaction/cover-crop-roots/
   http://agfax.com/2014/05/28/cover-crops-better-reducing-soil-compaction-additional-tillage/

Enhancement Name	Enhancement Code	Potential Duplicative Practices (code)	Incompatible Enhancements
Use deep rooted crops to break up soil compaction	SQL05	328 - Conservation Crop Rotation 340 - Cover Crop	ANM12 ANM21 ANM31 WQL27

Operations & Maintenance, Conservation Measures, and Client Acknowledgement

Operation and Maintenance
Operation: Maintenance:

Conservation Measures
Actions that must be implemented by the landowner/manager during practic

Client's Acknowledgement Statement
The Client acknowledges that: a. They have received a copy of the enhancement and understand the conter b. It shall be the responsibility of the client to obtain all necessary permits a with all ordinances and laws pertaining to the application of this practice. **Cooperator:** _____ **Planner:** _____ **Biologist:** _____