Soil Quality Enhancement Activity – SQL08 – Intercropping to improve soil quality and increase biodiversity

**Enhancement Description**
This enhancement involves the use of intercropping principles (i.e., growing two or more crops in close proximity to each other during part or all of their life cycles) to promote interactions that improve soil and water quality via increased biodiversity and contribute to pest management.

**Land Use Applicability**
Cropland

**Benefits**
Incorporating intercropping principles into an agricultural operation increases diversity and interaction between plants, arthropods, mammals, birds and microorganisms resulting in a more stable crop-ecosystem and a more efficient use of space, water, sunlight and nutrients. Furthermore, soil health is benefited by increasing ground coverage with living vegetation which reduces erosion and by increasing the quantity and diversity of root exudates which enhances soil fauna. This collaborative type of crop management mimics nature and is subject to fewer pest outbreaks, improved nutrient cycling and crop nutrient uptake, and increased water infiltration and moisture retention. Soil quality, water quality and wildlife habitat all benefit.

**Conditions Where Enhancement Applies**
This enhancement applies to all crop land use acres (excluding permanent hayland).

**Criteria**
One or more of the following intercropping systems shall be used. Systems can be mixed during the contract period allowing for within year diversity on the same field. Producers should consult with the USDA-Risk Management Agency (RMA) to clarify and understand how the use of any of the criteria options below might impact insurability of any cash crop grown using these methods.

1. Inter-seeding or over-seeding – using seeding methods that allow for cover crops to be seeded into existing crops prior to desiccation, to take advantage of late summer or early fall sunlight and moisture to increase biomass production. (e.g., over seeding of a clover cover crop into cotton during defoliation; planting of clover at lay by time in corn).
2. Relay intercropping – grow two or more crops on the same field with the planting of the second crop before the first crop is harvested. This cropping strategy enables production of a second crop in areas where time for seeding the second crop is considered inadequate for double cropping.
Note: Use of this method is considered double cropping and may fall under the RMA 1st/2nd crop rules.

3. Row intercropping – grow two or more crops simultaneously in the same field with at least one crop planted in rows (e.g., planting corn in the rows and interseeding sorghum between the rows, harvesting all as silage; plant vegetables, cereal grains, perennial covers or annual covers between orchard tree rows).

Note: This method of cropping does not allow for separate agronomic maintenance or management and may result in the cash crop being uninsurable by RMA.

4. Strip intercropping – grow crops in alternate strips wide enough to permit separate crop production machinery, but close enough for crops to interact (e.g., planting alternating strips of corn and soybeans 6 rows each or alternating strips of corn and Sudan grass). Generally, the maximum width of individual strips for effective interaction of crop pests and their natural enemies is about 30 ft. Note: this criterion is not the same as NRCS Conservation Practice Stripsrotation Code 585.

Considerations for system design:
1. Adjustments in plant density to avoid overcrowding.
2. Maturity dates and/or development periods to maximize use of nutrients, water and other resources.
3. Combining deep and shallow rooted crops to optimize use of soil moisture and nutrients
4. Utilizing complementary plant structures and crop heights to:
   a. provide support for others to grow (e.g., corn supporting climbing beans),
   b. provide partial shade and a cooler micro-climate for the other (e.g., lettuce and other greens between rows of taller crops),
   c. low-growing living mulch between rows of taller crops to control erosion, reduce soil displacement onto fruit, or suppress weeds.
5. Intercropping a legume with a nitrogen requiring crop to reduce fertilizer N requirements of the system,
6. Adjustments in nutrient application rates to account for nutrients being supplied (e.g., sequestered N from legume sources), recycled or consumed by the components of the intercropping system used,
7. Companion crops that provide food or habitat for natural enemies of key pests of the production crop(s), and
8. Companion crops that serve as alternate hosts of pests of production crops.

Adoption Requirements
This enhancement is considered adopted when one or more of the three listed intercropping systems in the criteria above have been implemented on the crop land use acre where this enhancement applies.
Documentation Requirements
1. Written documentation for each year describing by field:
   a. Intercropping system(s) used
   b. Crops planted
2. A map showing fields where enhancement was applied
3. Photographs of one or more representative number of fields showing the
   intercropping system(s) used.

References

NRCS Cover Crop Termination Guidelines

Background:

To ensure that USDA policies are coordinated and up to date with evolving cover crop practices, the administrators of the Natural Resources Conservation Service (NRCS), Risk Management Agency (RMA) and Farm Service Agency (FSA) organized an interagency workgroup to develop consistent, simple and flexible policy across the three agencies. National and local experts, along with multiple stakeholders, were involved in the process. Research literature, plant growth, soil hydrology models, and input from national/local experts in cover crop management provided the basis for developing cover crop termination guidelines to achieve their conservation benefits while minimizing risk of reducing yield to the following crop due to soil water use. These guidelines will be applicable to all USDA programs.

These guidelines only apply to non-irrigated cropland, including systems that contain a fallow period. The cover crops in irrigated cropping systems should be terminated based on the crop system and the conservation purpose, but before the planted crop emerges.

NRCS Cover Crop Termination Guidelines for Management Zones

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*Cover Crop Termination Zones*

*See guidelines for details on the RMA summer fallow practice.*

- **Zone 1** - Terminate cover crop 35 days or earlier before planting, except for the RMA summer fallow practice*
- **Zone 2** - Terminate cover crop 15 days or earlier before planting, except for the RMA summer fallow practice*
- **Zone 3** - Terminate cover crop at or before planting, except for the RMA summer fallow practice*
- **Zone 4** - Terminate cover crop at or within 5 days after planting, but before crop emergence

No-till planting of corn into cover crop of barley. Washington County, Virginia.

Photo: Jeff Vanuga

Cover crops in an orchard reduce soil erosion.

Photo: Gary Kramer

Photo: Justin Fritsher, NRCS
Additional Cover Crop Termination Considerations:

1. If the season is drier than normal nearing cover crop termination time, consider an earlier termination to conserve soil moisture.

2. If the spring season is wetter than normal at cover crop termination time, consider a later termination to use excess soil moisture and improve seedbed condition.

3. If the cover crop is part of a no-till system, termination can be delayed up to 7 days from the above termination period guideline, but terminated prior to crop emergence for all zones and systems.

4. In zones 1 and 2, fall seeded cover crops will have limited growth in the spring prior to “early” spring seeded crops (e.g., spring wheat, sugar beets, corn), and therefore the cover crop may be terminated at or just prior to planting.

5. Cover crop termination zones 1 and 2, in the largely mountainous regions in the Western U.S. (from Montana south to New Mexico and west to California), were refined by NRCS and other local university experts to identify proper cover crop management due to wide variability in climate and cropping systems in those areas.

6. Early vs. Later Spring Seeded Crops – Crops planted as early as possible after the spring thaw are considered early spring crops (e.g., spring wheat, spring barley, sugar beets, corn).

7. New Technology – Where new technology has at least three years of satisfactory performance (achieves historical yield) based on farm records and the written approval of two “agricultural experts” as defined by RMA or recommended by Extension or Ag Industry, the cover crop may be terminated closer to planting or planted during a different time period.

8. Cover Crop Grazing or Forage Harvest – Cover crops may be grazed or harvested as hay or silage, unless prohibited by RMA crop insurance policy provisions. Cover crops cannot be harvested for grain or seed.

9. Herbaceous Wind Barriers – There are specific cropping situations when seasonal cover is needed to protect young seedlings from wind erosion abrasion. The typical seasonal covers may include such crops as wheat, rye, or oats that are planted in rows, e.g., 20 feet apart (single or double row of small grain). These seasonal covers fall under the NRCS Conservation Practice Code 603 – Herbaceous Wind Barriers. These barriers are not considered cover crops.

10. Short Season Cover Crops – There are specific cropping situations where the producer will plant the intended crop, plus a short term seasonal cover crop (NRCS Conservation Practice Code 340 – Cover Crop) prior to or at the same time as planting the main or insured crop. In this case the seasonal cover emerges first and provides short term wind erosion protection until the main crop becomes established and provides its own protection from wind erosion. These seasonal cover crops are terminated by cultivation, frost/winterkill, or herbicides once the main crop is established. The seasonal covers used for the purpose of early crop establishment must be appropriate species for the area and the planned purpose.

11. Early Crop Planting – When earlier than normal planting occurs due to favorable weather or soil conditions, cover crop termination will naturally occur closer to planting. For example, in zone 2, if planting occurs 2 weeks earlier than normal, the cover crop termination period may be 2 weeks closer to planting.

12. Multiple Climates Within a County – Some counties may have multiple climate areas. In these situations, producers may request a different cover crop termination zone management or timeframe due to unique geographical and topographical features that reflect a different climate. Producers should contact either Extension or the local NRCS for management guidance. If the guidance includes practices other than indicated by the zones in this document, the producer must inform FSA and their crop insurance agent, as appropriate, and provide copies of the recommended management practice(s).
Additional Cover Crop Termination Considerations (Continued):

13. **RMA Summerfallow Practice** – If a crop, or a cover crop, is planted on summerfallow acreage in a fallow year, the following planted crop will not meet the RMA Summerfallow Practice definition until the acres lie fallow for a full crop year. For the 2015 crop year, if a cover crop was planted during the fallow year, the acreage may be insured under the “continuous cropping practice” (if available in your county), or by written agreement (if continuous cropping is not available in your county). For the 2016 and succeeding crop years, if a cover crop is planted during the fallow year, the acreage may be insured under the “continuous cropping practice” (if available in your county), or by written agreement (if continuous cropping is not available in your county) provided the cover crop is terminated at least 90 days prior to planting for summer and fall seeded crops. For early spring seeded crops, terminate the cover crop in the fall or as early as possible in the spring. Please contact your crop insurance agent for more information.

Definitions:

1. **Over-Seeding/Interseeding** – Both terms can be defined as planting one or more cover crop species into an existing or established crop. Common uses that involve over-seeding or interseeding include:
   (1) over-seeding a grass and/or legume cover crop into an existing stand of small grain at an appropriate time for the cover and germination, or (2) seeding a cover crop into an existing crop (e.g., corn or soybeans) at a time that will not impact the yield or harvest of the insured crop.

2. **Interplanted** – This involves multiple crop species grown together, with no distinct row pattern and does not permit separate agronomic maintenance or management. For RMA purposes, this means if a cover crop and cash crop are planted in a way that does not permit separate agronomic maintenance or management, then RMA will not insure the cash crop. This would also apply to cover crops if interplanted into the main crop and the cover crop interfered with the agronomic management and harvest of the main crop.

3. **Relay Cropping** – The practice of interseeding a second crop into the first crop well before the first crop is harvested. The relay cropping strategy is used to enable production of a second crop in areas where time for seeding the second crop following harvest of the first is considered inadequate for double cropping. This is not considered a cover cropping practice, but a method of double cropping and may fall under the RMA 1st / 2nd crop rules.

4. **Double-Cropping** – RMA and NRCS term: Producing at least 2 crops for harvest from the same acreage in the same crop year. This does not include cover crops.

5. **Cover Crop** – Crops including grasses, legumes and forbs for seasonal cover and other conservation purposes. Cover crops are primarily used for erosion control, soil health improvement, and water quality improvement. A cover crop managed and terminated according to these guidelines is not considered a “crop” for crop insurance purposes. The cover crop may be terminated by natural causes such as frost, or intentionally terminated through chemical application, crimping, rolling, tillage, or cutting.

6. **Termination** – Termination means growth has ended.

7. **Good Farming Practice** – RMA term - The production methods utilized to produce the insured crop and allow it to make normal progress toward maturity and produce at least the yield used to determine the production guarantee or amount of insurance, including any adjustments for late planted acreage, which are:
   (1) for conventional or sustainable farming practices, those generally recognized by agricultural experts for the area; or (2) for organic farming practices, those generally recognized by organic agricultural experts for the area or contained in the organic plan.

8. **Continuous Cropping** – RMA Term – Any non-irrigated production practice that does not qualify as a summer fallow practice.
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