

**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 1<sup>st</sup>/2<sup>nd</sup> 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 *Stripcropping 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.



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**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**

Zhang, F. and L. Long. 2003. Using competitive and facilitative interactions in intercropping systems enhances crop productivity and nutrient-use efficiency. *Plant and Soil*. 248, pp 305–312.

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

**Utah State Supplement 2015 for SQL08**

**Notes:**

**None**

Enhancement Name	Enhancement Code	Potential Duplicative Practices (code)	Incompatible Enhancements
Intercropping to improve soil quality and increase biodiversity	SQL08	328 - Conservation Crop Rotation 340 - Cover Crop	ANM21 ANM23 SQL09 SQL11 WQL25



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**Operations & Maintenance, Conservation Measures, and Client Acknowledgement**

<b>Operation and Maintenance</b>	
Operation:	
Maintenance:	
<b>Conservation Measures</b>	
Actions that must be implemented by the landowner/manager during practice implementation:	
<b>Client's Acknowledgement Statement</b>	
The Client acknowledges that:	
a. They have received a copy of the enhancement and understand the contents and requirements.	
b. It shall be the responsibility of the client to obtain all necessary permits and/or rights, and to comply with all ordinances and laws pertaining to the application of this practice.	
<b>Cooperator:</b>	_____ <b>Date:</b> _____
<b>Planner:</b>	_____ <b>Date:</b> _____