

## FRD01 - On Farm Research and Demonstration



### Activity Description

On farm research and demonstration consists of the implementation of applied research projects on working farms to gather information and demonstrate the efficacy of the activity. The projects must fit within identified state priority topic areas.

### Benefits

Researchers often need willing farmers to help them carry out research projects on working farms.

Participating in such projects can help farmers learn about new technologies while helping researchers determine the results of new technologies. The results of the research can help NRCS identify new and innovative techniques to address on farm conservation problems.

### Criteria

The research projects must be conducted by an entity that is seeking to determine the value of a conservation practice, component, treatment or process. The entity must have the means and expertise to conduct the research, analyze the findings and develop conclusions from the findings that are relevant to NRCS. This is not intended to require farmers to initiate on farm research and demonstrations but rather to encourage them to participate in new or ongoing research projects sponsored by other responsible parties such as universities or other research oriented entities. However, if farmers have the necessary capability they can initiate their own projects within the topic areas identified by their state and the criteria of this activity.

Projects proposals must include:

1. Goals of the research and demonstration
2. A schedule showing completion of the project during the contract period
3. A chronological list or plan of activities expected to take place during the project
4. Planned end products or outcomes from the project

### Documentation Requirements

1. Results or conclusions from the research and demonstration
2. Documentation of the CSP participant's participation in the research project including:
  - a. A schedule of activities undertaken by the participant
  - b. Fields or other areas of the farm involved in the research

## **FRD01 – On Farm Research and Demonstration**

### **Using Perennial Cover Crops in Commercial Vegetable Production Systems**

**General Description of Research Project:** Cover crops can be used effectively to reduce soil erosion and compaction, suppress weeds, increase soil organic matter, and protect water quality. Currently, cereal rye is the most common cover crop species used in vegetable crop rotations in Central Wisconsin. Benefits include rapid establishment, good germination and growth under cool conditions, winter persistence and spring re-growth, weed suppression, and relatively low establishment cost. Rye is a good nitrate scavenger, using up excess nitrate present in the soil at the end of a cropping season and from decomposing crop residue. However, studies on sandy soils show that this nitrogen is lost the following spring and unavailable to the subsequent crop. Small-plot studies at Hancock, Wisconsin by Copas, Bussan, and Drilias (2009, Proceedings of Wisconsin's Annual Potato Meeting) demonstrated the potential for perennial legume species to be incorporated into current vegetable rotations in Central Wisconsin. Results showed that legumes could be underseeded in snap beans at the first trifoliolate leaf growth stage without yield reductions or increased residue in harvested pods. Sweet corn grown the following year where red clover, sweet clover, or alsike clover (established during snap bean production the previous year) was maintained in the understory and no nitrogen fertilization applied produced yields of seven ton per acre. In these studies, the perennial legume cover crops supplied between 50 and 100% of required nitrogen for the sweet corn crop. It is believed the nitrogen source was primarily from decomposing cover crop residue and nitrogen released from the growing legume cover crop species. Additionally, significant amounts of legumes remained after the sweet corn harvest that could be utilized as nitrogen credits for a following potato crop. This perennial cover crop system holds immediate potential as a production system and needs further evaluation under commercial scale on-farm trials.

**Geographic Location Targeted:** Commercial potato and vegetable growers of the Wisconsin Central Sands region.

#### **Requirements of Participants:**

Research duration – three years

Crop rotation – snap beans, \*sweet corn, potato

*\*in lieu of sweet corn, the rotation above may include corn grain or corn silage*

*Other rotations may be eligible with prior approval from the Research Entity*

Field Layout – At least three 12 to 24 row strips across the field inter seeded with red clover at the last cultivation of the snap bean crop and maintained until planting of the potato crop. Balance of the field to be seeded to a rye cover crop between vegetable crops.

12 to 24 rows of snap beans inter seeded with red clover
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Data to be collected – crop yields from conventional and red clover cover crop strips.

**Procedures:**

First year: sow red clover cover crop between snap bean rows at last cultivation (not to occur before 1<sup>st</sup> trifoliolate leaf stage), record snap bean yields and harvesting data, allow cover crop to grow naturally. Sow rye cover crop on balance of field.

Second year: use a burn-down herbicide (glyphosate) on cover crop and disk/chisel prior to planting sweet corn, treat corn with herbicides other than Callisto, Laudis, or Impact if possible, record sweet corn yields and harvesting data, allow clover cover crop to grow naturally and sow rye cover crop on balance of field.

Third year: till under cover crop and plant potatoes, record potato yields from red clover areas and rye areas.

Fertilizer – apply 30 to 60 lbs less nitrogen per acre on the clover strips during the sweet corn and potato production years.

**Field Days:** On-farm field days will be held during the first and second production years to demonstrate the effectiveness of the cropping system.

**Documentation and Reporting:** Data will be statistically analyzed and reported at area and national grower/processor meetings. A written summary of the project will be published as well with additional procedural fact sheets possible.

**Additional Criteria:** Prior to obligation of the Conservation Stewardship Program contract, written documentation must be provided by the participant to NRCS to confirm that the property/operation has been evaluated and accepted for participation in the trial study by the Research Entity.

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