

FRD01 – On Farm Research and Demonstration



Enhancement 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.

The farmer will need to conduct one of the following types of research: 1) randomized and replicated experiment, paired comparison, or multiple activity comparison on the farm where data is collected and assessed to determine

which activities might best enhance conservation or resource condition on their farming operation and others in their region, or 2) intense record keeping and analysis where data is collected on implementation, efficacy, and/or outcomes of one or more conservation practices or enhancements over a period of time and used for better decision-making concerning the farmer's activities addressing conservation concerns on working lands.

Land Use Applicability

Crop, Pasture, Range and/or Forest, each approved project will have a land use designated.

Benefits

On-farm research, documentation, and evaluation of alternative conservation techniques can help farmers and NRCS personnel develop more effective approaches to protecting resources and improving resource condition. Dissemination of findings through on farm field days, written summaries, and other means promotes adoption of the most effective current and new conservation practices and enhancements.

Farmers often need willing researchers to help them design research and demonstration projects they initiate. It is also true that researchers often need willing farmers to help them carry out research projects on working farms. Regardless of who takes the lead in initiating the project, 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.

Conditions Where Enhancement Applies

This enhancement applies to all crop, pasture, range or forest land use acres.



Criteria

On-Farm Research and Demonstration projects consists of implementing applied research on working land to gather information and demonstrate the effectiveness of new and innovative conservation activities. The research projects must be conducted by an individual or entity that seeks to determine the value of a conservation practice, component, treatment, or process. The individual or 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. Projects are preapproved by the NRCS State Conservationist in each state.

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 to conduct scientific research, they can initiate their own projects within the topic areas identified by their state and the criteria of this activity.

The farmer may chose to work independently, or to collaborate with other farmers, a non-governmental organization, extension, university, NRCS, and/or other entities to help with trial design and protocol, and the conduct of the study or data collection. The farmer is not required to work with an outside group. However, if working independently, the participant must be able to demonstrate the ability to manage and lead an applied research project.

When field trials or other research on a particular practice, enhancement, or conservation topic are conducted on multiple farms, each farm is eligible for this enhancement. However, enrollment in the CSP is not a requirement for all farms participating in a multi-farm research project under this enhancement.

Participants will need to follow criteria as outlined for each project that include:

- Goals of the research and demonstration
- A schedule showing completion of the project during the contract period
- A chronological list or plan of activities expected to take place during the project
- Planned end products or outcomes from the project
- Acreage needed
- Years research is to be conducted
- Farm inputs, equipment needs, etc.
- Expected assistance with data collection

Adoption Requirements

This enhancement is considered adopted when the pre-approved applied research project has been implemented and monitored according protocols developed specifically for the project and events to publicize the project have been held.



United States Department of Agriculture
Natural Resources Conservation Service

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Documentation Requirements

- Research plan, including objectives, resource concerns addressed, experimental design, and data to be gathered.
- Results or conclusions from the research and demonstration
- Plan for disseminating project outcomes
- The farmer is committed to sharing research plans, data summary, and project outcomes in writing with NRCS and with other farmers and the general public through written summaries, on-farm events, or oral presentations.
- Farmers are encouraged but not required to work with their NRCS and/or extension agents to have at least one field day/open house where the experimental practices can be reviewed and discussed with the public.
- Documentation of the CSP participant's participation in the research project including:
 - A schedule of activities undertaken by the participant
 - Fields or other areas of the farm involved in the research

Conservation Stewardship Program On-Farm Research and Demonstration Projects and Research Entity Requirements

Overview

The Conservation Stewardship Program (CSP) encourages participants to address resource concerns in a comprehensive manner by undertaking additional conservation activities, and improving, maintaining, and managing existing conservation activities. This enhancement is eligible for cropland, pastureland, rangeland, and non-industrial private forestland. CSP enhancements means a type of activity installed and adopted to treat natural resources and improve conservation performance. Many of the CSP enhancements are related to existing NRCS conservation practice standards, but at a management intensity level that exceeds minimum practice standards.

On-Farm Research and Demonstration projects consists of implementing applied research on working land to gather information and demonstrate the effectiveness of new and innovative conservation activities. The research projects must be conducted by an entity that seeks to determine the value of a conservation practice, component, treatment, or process. These projects are designed to encourage applicants to participate in new or ongoing research where participation is needed from working land. Interested researchers gain access to farmers that are willing to follow research protocols on their farm across a broad landscape. Farmers participating in such projects learn about new technology first hand, helping to determine how new technology will be applied.

NRCS invites interested researchers to submit their projects for inclusion as eligible On-Farm Research and Demonstrations. The purpose of this activity is not to provide primary funding for a research project, but to expand the area and acreage from which research data is collected. CSP applicants that choose to participate in On-Farm Research and Demonstrations are awarded conservation performance points that improve their CSP ranking and increase annual payment levels.

Project Criteria:

Eligible Entities

Research Entity Requirements

Entities must be able to demonstrate their means and expertise to conduct on-farm research, analyze findings, and develop conclusions that are relevant to NRCS. Eligible research institutions include land grant universities and others, who have ongoing research or the potential for research in the focus areas. Individual farmers are encouraged to participate in identified on-farm projects. However, if they have the necessary capability to conduct scientific research they can initiate their own proposal for consideration.

Research Project Requirements

Projects must address one of the resource concerns identified by NRCS as a national technology focus area and be conducted by a creditable research entity. States will identify specific projects within the national focus areas that they want to offer to CSP applicants in their states. Research projects should follow scientific methods that include project goals, hypotheses, data collection methods, results, summary, etc.



Project Documentation

Creditable research entities must submit a copy of their research project documentation for a State to use in selecting those projects that will be offered to applicants. The document should include:

- a. Title of Research Project
- b. Research Director/Manager work affiliation and contact information (phone, email, etc.)
- c. Name and brief description of the research entity submitting the proposal, along with similar information for other collaborating researchers, if applicable
- d. General description and/or summary of research to be conducted, specifying the national focus that is being addressed:
 - Air
 - Animal
 - Energy
 - Plant
 - Soil Erosion
 - Soil Quality
 - Water Quality
 - Water Quantity
- e. The geographic location (e.g. state, county) or farm enterprise (peach growers, cattle producers) targeted by the research
- f. Researcher expectation of participants, explaining what the participants will need to provide as part of the project. This should include acreage, number of years research is to be conducted, farm inputs, equipment needs, and/or assistance with data collection.
- g. Total number of on-farm research sites needed
- h. Copy of research projects final report for NRCS use

Evaluation Criteria

States should select research projects that will be offered to applicants based on the following or similar evaluation criteria:

- a. Research purpose and goals as related to the resource focus area
- b. Potential for success and adoption on a broad scale
- c. Number of participants the research can appropriately involve
- d. Demonstration of new and innovative approach to conservation
- e. Design and implementation of research based on sound methodology and/or demonstrated technology
- f. Capability of the entity to conduct scientific research
- g. Potential to transfer the approach or technology nationally or to other geographic or socio-economic areas
- h. Development or improvement of NRCS technical or related materials that will help foster expanded adoption of the innovative technology or approach

This information can be presented to interested participants as a fact sheet that outlines their involvement. Enhancement Job Sheet must be provided for additional information. States will notify the Field of the selected projects and associated entities that will be offered and available to applicants.

Indiana CSP Enhancement Supplemental Information

FRD01 – On Farm Research and Demonstrations (Cover Crop Trials):

Acceptable Indiana On-Farm Research and Demonstrations include:

- Indiana Nitrogen Rate Trials
- Indiana Cover Crop Nitrogen Scavenging Trial

Indiana Cover Crop Nitrogen Scavenging Trial

- This enhancement is available statewide.
- Although, it is only available to 15 CSP applicants based on CSP ranking.
NOTE: for producers who are interested but not selected, the CSP offer may have the FPP02 – *On Farm Pilot Projects* enhancement activity substituted.

CSP participants are required to work with Purdue researchers to collect and share data as outlined below. To set up the trial, participants need to contact Eileen Kladvko (kladvko@purdue.edu, 765-494-6372) as soon as they know they are accepted into CSP.

Purdue University is not committed to any additional obligations to the CSP participant for this enhancement activity beyond what is outlined in this document.

All information provided to Purdue University to complete this activity will be protected under USDA's Personal Identifiable Information protocols.

Criteria

- **Producers must use No-Till or Strip-Till only.**
- Nitrogen rate trials for corn following soybean should include five different nitrogen rates; approximately 60, 100, 140, 180, and 220 pounds of N per acre (this rate includes N applied in spring pre-plant fertilizer and in starter as well as side-dress N).
 - For corn following corn N rate trials, increase each of the five suggested N rates by 30 lbs.
- **It is important that the same N rate be applied to the strips with cover and no cover. (No manure for this field).**
- Each treatment plot (strip) with Nitrogen + cover crops and plots with Nitrogen only should be at least 350 feet long and replicated at least twice (Fig. 1).
 - Growers will calibrate their nitrogen applicators prior to the season to ensure that the targeted rates of N will be accurately applied.
 - The width of each plot (strip) should be equal to two or more combine header widths to enable harvesting a full header width down the center of each plot yet avoid having to glean partial header widths between plots. Harvesting the center of each treatment plot instead of the entire plot avoids possible border effects with adjacent N rates.
 - The same plots will be replicated for 3 sequential years (including corn-soybean rotations to evaluate the potential build-up effects of Nitrogen).

Indiana CSP Enhancement Supplemental Information

- Plots will be started in 2011 and located where corn will follow a fall cover crop (i.e. – cover crops should be established in the fall of 2010 where corn will be planted in 2011).
- The number of rows suitable for each treatment plot should also be compatible with all equipment widths to be used in the field (planter, fertilizer applicators, combines, etc). Table 1 shows examples of compatible plot sizes for different implement sizes.

Table 1.

<u>Implement</u>	<u>Example 1</u>	<u>Example 2</u>	<u>Example 3</u>
Planter:	12 row	16	12
Applicator:	12 row	8	12
Combine:	6 row	8	8
Compatible plot size:	12 row	16	24

- Cover crop options:
 - Establishment (dates, rates) must meet NRCS FOTG 340 (Cover Crop)
 - Species will be non-legume only (for example - oats/radish, annual ryegrass, cereal rye, wheat, etc.).
- Availability of a combine with GPS-equipped yield monitor greatly simplifies the harvest logistics. For most accurate yield estimates, yield monitors should be calibrated to the conditions of the test field. If a yield monitor is not available, a weigh wagon can be used to measure the grain weight harvested from each plot, but the length of each plot must also be known and recorded. Harvest and record data from each treatment plot separately.
- **Yield Loss Factors:** Potential collaborators may ask about potential yield losses expected from the lower N rate treatments in the trial. This is a fair question and, unfortunately, we do not have the financial resources to compensate collaborators for such losses. Based on our field trials to date, growers could expect to lose yield primarily with the two lowest N rate treatments (60 & 100 lbs N for corn after soybean or 90 & 130 lbs N rates for corn after corn) at amounts ranging from 8 to 20%.

Indiana CSP Enhancement Supplemental Information

Figure 1. Example of randomized plot layout for a nitrogen trial with 5 N rates with and without prior cover crops, each replicated 2 times for a total of 20 treatment “plots”. Each colored rectangle is equal to a treatment “plot” and would equal a compatible plot size listed in Table 1. The sequence of the treatment plots within each replicate can be changed, but each replicate should contain one and only one plot of each N with or without a prior cover crop rate treatment. As one might imagine, such a randomized treatment layout is most easily accomplished with sidedress N applications where you have the rows of corn to guide you from one replicate of a treatment to the next. Availability of accurate GPS lightbar navigation systems would allow you to put out preplant N rate treatment strips that should then match up with the planted rows of corn. (Please talk to Eileen Kladviko if there are questions)

Cover Crops + 60 lb N/acre	Cover Crops + 100 lb N/acre	Cover Crops + 140 lb N/acre	Cover Crops + 180 lb N/acre	Cover Crops + 220 lb N/acre	100 lb N/acre	180 lb N/acre	220 lb N/acre	60 lb N/acre	140 lb N/acre	Cover Crops + 60 lb N/acre	Cover Crops + 180 lb N/acre	Cover Crops + 220 lb N/acre	Cover Crops + 100 lb N/acre	Cover Crops + 140 lb N/acre	60 lb N/acre	180 lb N/acre	220 lb N/acre	100 lb N/acre	140 lb N/acre
Replicate 1					Replicate 2					Replicate 3					Replicate 4				

Note: If the cover crop seeding is completed by airplane, an extra plot should be added between the cover crop block and non-cover crop block.

Indiana CSP Enhancement Supplemental Information

Use this form to record the pertinent information about the cover crop nitrogen scavenging trial and return to Eileen Kladvko, Purdue Univ., Agronomy Dept, 915 W State St, West Lafayette, IN 47907-2054

Name		County				Soil series			
Tillage ¹					Drainage ²				
Recent soil sample results ³	O.M.	pH	P	K	Ca	Mg	CEC		
Units	Circle units used for P, K, Ca, and Mg – pounds per acre or ppm								
Soil Sample Date:		Previous Crop:			Current Crop:				
Cover Crop:		Plant Date:			Termination Date				
Seeding Method:									
Current Crop Hybrid:				Seed rate:					
Plant date:				Harvest date:					
Broadcast/date ⁴ :				Starter/placement ⁵ :					
Sidedress type/date ⁶ :									
Rain/weather stn. ⁷ (Inches per month)		April	May	June	July	Aug	Sept	Oct.	Nov.
¹ Tillage method preceding this crop, such as no-till, strip-till, disc, moldboard plow, etc.									
² If the field is tile drained how is it functioning. Judgment call by the farmer - poor, fair, good or excellent.									
³ A copy of a recent soil sample for the field if it is available or record on sheet. Soil O.M. is a strong interest.									
⁴ Rate, analysis and date of broadcast fertilizer application if any.									
⁵ Rate/gallons, starter fertilizer and placement (2x2, surface band, etc.) if any.									
⁶ Type (UAN, urea, AA, etc.) and date of application.									
⁷ April -Nov. Or more weather dependent on harvest or a nearby weather station if known.									
Other comments:									