

The No-till and Cover Crop Implementation – Online Education Program is a series of interactive webinar trainings for agricultural service providers. Providers include staff at NRCS, Soil Conservation Districts, non-profit employees, agricultural extension agents, crop consultants, and agricultural product dealers.

North Jersey RC&D, an agricultural nonprofit, is providing this opportunity through a Professional Development Grant by Northeast Sustainable Agriculture Research and Education (SARE) to deliver a series of workshops in 2020 aimed at educating agricultural service providers regarding no-till and cover crop implementation in the Delaware River Basin (eastern Pennsylvania, New Jersey, southern New York, Delaware and Maryland).

## GOAL

To create a network of educated and knowledgeable agricultural service providers that can support farmers' transition to no-till and implementation of cover crops. Well trained providers can more effectively promote, encourage and facilitate no-till and cover crop transition and implementation. Educated service providers reduce the knowledge barrier that discourages implementation

Actions to accomplish this goal include:

- A series of five (5) interactive webinar trainings during 2020 that reviews and tests on previously studied content.
- Educating on the difference between no-till and conventional farming; the steps to successful no-till implementation, the equipment required to successfully no-till, and common no-till mistakes and solutions.
- Educating on cover crop seed selection, application techniques, termination techniques, and how to adjust nutrient management with cover crops.
- Fostering a regional network of agricultural service providers through frequent discussions in small breakout groups.
- Encouraging critical thinking, problem-solving, and discussions on the most common impediments to no-till and cover crop implementation.

## MATERIAL REVIEWED

- No-till and Cover Crop Implementation Guide, North Jersey RC&D, 2020.
- Educational video content

## WORKSHOP/WEBINAR SEQUENCE

1. Introduction to the Program (1.5 hours)
2. No-till Preparation (1.5 hours)
3. No-till Implementation (1.5 hours)
4. Cover Crop Preparation (1.5 hours)
5. Cover Crop Implementation (1.5 hours)

## Wrap Up Field Day (Optional) – Advanced Soil Health Practices

### EDUCATIONAL PLAN

To encourage subject mastery, the educational program will use a three-step approach to education: teach, review, apply.

**TEACH:** Participants will be asked to read the "No-till and Cover Crop Implementation Guide" and watch educational videos, prior to the webinar, to obtain foundational knowledge. This system enables participants with less experience in the subject to spend more time learning important content.

**REVIEW:** During webinars, instructors will provide a summary of the section's most important points.

**APPLY:** During webinars, participants will take part in critical thinking, problem-solving, and discussion-based exercises, predominately in small breakout sessions, applying information from the readings, to solve common questions and problems related to no-till and cover crop implementation. Examples of critical thinking and problems solving activities include:

- Think, Pair, Share,
- 1-Minute Description of Complex Topic
- Survey and Discussion

### PARTICIPANT VERIFICATION PLAN

Attending Webinars:

- Participants attendance at each of the five (5) webinars will be recorded by an RC&D staff member at the beginning of each webinar.
- During each webinar, participants will complete a one-question quiz at the end of each section (4 to 5 times during each webinar). Quiz results will be recorded.

At the end of the webinar, NJRC&D will assign continuing education credits (CECs) to participants who were present at the beginning of the webinar and answered every quiz question.

Homework and Readings:

- Participants will sign a statement verifying that they completed all reading and video viewing assignments. Readings and video viewing each week will take 1-2 hours. In addition, participants will complete a short quiz pertaining to material in the reading and video viewing assignments.
- Participants will complete homework assignments each week; homework assignments are anticipated to take participants 20-30 minutes.

NJRC&D will assign continuing education credits (CECs) to participants that (1) sign that statement confirming they finished the required readings and viewing assignments and (2) completed all homework assignments.

W O R K S H O P O N E  
**Introduction to Program (1.5 hours)**

TIMEFRAME	TITLE AND DESCRIPTION	INSTRUCTOR/ ORGANIZER
9:00 - 9:15	<b>Project Background and Contributors</b> The leadership team will provide a brief introduction and explanation of course goals and objectives.	<i>Leadership team</i>
9:15 - 9:45	<b>Participant Introductions</b> Participants will introduce themselves, describe their job, and one useful fact (pertaining to agriculture). Examples could be (1) funding opportunities, (2) advances in seed genetics, (3) advances in other farm technology, (4) research results, (5) regulations, or other.	<i>Group</i>
9:45 - 10:00	<b>Participant Survey</b> Participants will take part in a survey assessing their learning needs, goals and objectives.	
10:00 - 10:20	<b>Impediments to and Misconceptions around No-till</b> Participants and instructors will generate a list of impediments to and misconceptions of no-till. During group discussion, statements will be classified as "False," "Sometimes True," and "True".	<b><i>Bench</i></b> <i>Breakouts (10 min)</i> <i>&amp; Group</i> <i>Discussion (10 min)</i>
10:20 - 10:30	<b>Homework Description</b> Participants will be asked to read the first chapter (No-till) of the manual and record the three most important facts or tips that they believe should be highlighted on a one-page factsheet.  Participants will be provided links to 6 relevant videos and will be required to watch two videos (most pertinent to work and learning needs) <ul style="list-style-type: none"> <li>• Reading: 3 hours</li> <li>• Video: 15 minutes</li> <li>• Homework Assessment: 30 minutes</li> </ul>	

W O R K S H O P T W O

Preparation for No-till (1.5 hours)

TIMEFRAME	TITLE AND DESCRIPTION	INSTRUCTOR/ ORGANIZER
9:00 - 9:05	<b>Introductions and Welcome</b>	<i>Leadership Team</i>
9:05 - 9:10	<b>Present the results of the homework</b> Hilshey will discuss what facts/tips participants thought were most valuable and present a factsheet with tips.	<i>Hilshey</i>
9:10 - 9:35	<b>Effectively communicating with farmers (Brainstorming)</b> It is important to be honest with farmers about both the pros and cons of transition to non-till. The group will quickly (2-min) brainstorm a list of situations where no-till might not be appropriate/possible using a shared google doc. Bench and Rosenbaum will talk about what they consider and mention to farmers interested in no-till as well as situations when no-till might not be right for the farmer touching on participant comments in the google doc.	<b>Rosenbaum and Bench (15 mins)</b> <i>Breakouts (5 min) &amp; Group Discussion (5 min)</i>
9:10- 9:25	<b>Preparing Fields for Transition to No-till</b> Rosenbaum will lead a discussion of the importance of properly preparing for no-till; he will share his process of working with farmers who are interested in no-till and the steps he takes to prepare them to be successful. Participants will be encouraged to share stories about instances when farmers did not prepare, and the subsequent consequences.	<b>Rosenbaum</b>
9:25 - 9:40	<b>Nutrient Management in No-till</b> Rosenbaum will discuss the chemical and structural changes that occur into the soil during no-till and the subsequent impact on nutrient cycling and water management as well as options for applying fertilizers to no-till crops.	<b>Rosenbaum</b>
9:40 - 10:00	<b>Nutrient Management Exercise</b> Participants will be asked to develop one-minute explanations of complex topics in small breakout groups, and then share these with the group and how they relate to no-till. Instructors will weigh in as needed.  <ul style="list-style-type: none"> <li>· C:N ratio and “Carbon Penalty”</li> <li>· Manureapplication in no-till vs. conventional</li> <li>· Soilsampling no-till</li> <li>· Stratificationof P in No-till</li> <li>· Banding and Pop-up – why they are important</li> <li>· Role of Soil Micro-organisms in No-till</li> </ul>	<i>Breakouts (6 min) &amp; Group Discussion (7 min)</i>

10:00	- 10:10	<b>Cover Crops and No-till Small Discussion</b> Participants will discuss in small groups their opinion of the importance of cover crop to no-till. They will try to pick a single "fact" that they think makes the most compelling case for adding cover crops to no-till for the average farmer.	
10:10	10:20	<b>Cover Crops and No-till Larger Group Discussion</b> Groups will share their "compelling fact" and Rosenbaum and Bench will weigh in, and share opinions about not-till systems with and without cover crops.	<i>Rosenbaum</i>
10:20	- 10:30	<b>Homework Assignment</b> <ul style="list-style-type: none"> <li>• Participants will be provided links of 6 relevant videos and to watch two videos (most pertinent to work and learning needs)</li> <li>• Participants will develop a meme, infographic, illustration, Expert Tip, or catchy "rule of thumb" that could be used to teach better or a confusing or complicated topic.</li> </ul>	Hillshey

W O R K S H O P   T H R E E  
**Implementation of No-till (1.5 hours)**

TIMEFRAME	TITLE AND DESCRIPTION	INSTRUCTOR/ ORGANIZER
9:00 - 9:05	<b>Introductions and Welcome</b>	<i>Leadership Team</i>
9:05 - 9:10	<b>Present the results of the homework</b> Hilshey present infographics/memes/illustrations developed by participants.	
9:10 - 9:30	<b>One minute descriptions of complex topics</b> Participants will be asked to develop one-minute summary of the following topics in small breakout groups and then share these with the entire group. Nance will critique explanations and add additional details as necessary. <ul style="list-style-type: none"> <li>• Difference between Planter and Drill</li> <li>• No-till equipment and its' role in no-till for the following items: <ul style="list-style-type: none"> <li>○ Seed tubes, guards and firmers</li> <li>○ Row Cleaners</li> <li>○ Coulters</li> <li>○ Opening Disks</li> <li>○ Closing Wheels</li> </ul> </li> </ul>	<b>John Nance</b> <i>Participants will be asked to develop a one-minute talk about one of the following topics;</i>
9:30 - 9:55	<b>Equipment Activity</b> Nance will discuss the logistics of procuring equipment for no-till, including the average equipment costs, the pros and cons of converting conventional equipment to no-till, recommended regionally specific upgrades, and what features are most important to invest in when making a purchase. Nance will lead the discussion and encourage group participation, where possible.	<b>John Nance</b>
9:55 - 10:15	<b>Troubleshooting No-till</b> Participants will watch three 1-min videos of poor corn/soybean stands and will be asked to brainstorm potential problems. Videos will showcase (1) uneven germination, (2) poor germination, (3) slug damage.	<i>Breakouts (10 min) &amp; Group Discussion (10 min)</i>
10:15 - 10:25	<b>When is no-till not right?</b> Is no-till right on every farm? Group will discuss examples of farmers that perhaps should not consider no-till. The discussion will also discuss other conservation tillage alternatives; the potential reason could include soil, management capacity, rotations, etc.	<i>Bench</i>
10:25 - 10:30	<b>Homework Description</b> Participants will be asked to read the second chapter of the manual and record the three most important facts or tips that should be on a one-page factsheet.	<i>Hilshey</i>

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Participants will be provided links of 6 relevant videos and to watch two videos (most pertinent to work and learning needs)

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W O R K S H O P F O U R

Preparation for Cover Crops (1.5 hour)

TIMEFRAME	TITLE AND DESCRIPTION	INSTRUCTOR / ORGANIZER
9:00 - 9:05	<b>Introductions and Welcome</b>	<i>Leadership Team</i>
9:05 - 9:10	<b>Present the results of the homework</b> Hilshey will discuss what facts/tips participants thought were most valuable and present a factsheet with tips.	Hilshey
9:10 - 9:20	<b>Seed Purchasing Basics</b> The lecture will focus on what it's like to purchase seeds in different scales (small, medium, and large). The class will generate a list of where and how to buy seed, depending on needs.	<i>Bench</i>
9:20 - 9:30	<b>Keeping Cover Crop Seed Cost Down</b> Participants will share ways to keep cover crop costs down, ranging from government subsidies to seed choices to planting rates and methods. Information will be summarized in a factsheet.	<i>Bench</i>
9:30 - 9:55	<b>One-minute descriptions of complex topics</b> Participants will be asked to develop a one-minute explanation of complex topics in small groups, and then share these with the group. Instructors will add details and critique explanations where necessary. <ul style="list-style-type: none"> <li>• Inoculation of legume</li> <li>• Cereal Rye Vs. Ryegrass</li> <li>• Hard Seed</li> <li>• Seed Classes</li> <li>• Pure Live Seed</li> <li>• Herbicide Carryover</li> </ul>	<i>Wilson and Bench Breakouts (10 min) &amp; Group Discussion (15 min)</i>
9:55 - 10:15	<b>Cover crop composition impacts on management</b> Participants will be presented with five cover crop scenarios and will be asked to consider, in small groups, the impact of the mixture's composition on seed establishment, termination, and future rotations, pesticide carryover, and nutrient management. <ul style="list-style-type: none"> <li>• <i>Ryegrass, red clover, vetch, crimson clover</i></li> <li>• <i>Ryegrass and Tillage Radish</i></li> <li>• <i>Winter Wheat</i></li> <li>• <i>Cereal Rye (Grazed in Spring)</i></li> </ul>	<i>Wilson &amp; Bench Breakouts (10 min) &amp; Group Discussion (10 min)</i>
10:15 - 10:25	<b>Teach a Farmer: Why should farmers include cover crops with no-till management</b> Participants will develop a 1-2 minute "speech" regarding the following: <ul style="list-style-type: none"> <li>• Benefits of incorporating cover crops into no-till management (agronomic)</li> </ul>	<i>Wilson &amp; Bench</i>

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- Economic impacts of cover crops (realistic)
  - Impacts of cover crops on spring planting
  - Why is it important to get cover crops in as early as possible
  - What is the difference between single and multi-species.

Participants will share their "speech" in small groups. Instructors will weigh in where necessary.

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10:25	-	10:30	<b>Homework Assignment</b>	Hilshey
5			Develop a meme, infographic, illustration, Expert Tip, or catchy "rule of thumb" that could be used to better teach or a confusing or complex topic. Participants will be provided links of 6 relevant videos and to watch two videos (most pertinent to work and learning needs)	

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W O R K S H O P F I V E

Implementation of Cover Crops (1.5 hour)

TIMEFRAME	TITLE AND DESCRIPTION	CREDITS
9:00 - 9:05	<b>Introductions and Welcome</b>	<i>Leadership Team</i>
9:05 - 9:10	<b>Present the results of the homework</b> Hilshey present infographics/memes/illustrations developed by participants.	<i>Bridgett Hilshey, NJRCD</i>
9:10 - 9:25	<b>Understanding Cover Crops in Rotations</b> Groff will discuss how cover crops need to be adapted for different rotations. Participants will develop a rotation that includes cover crops for the following crop operations <ul style="list-style-type: none"> <li>• Corn → Soybeans</li> <li>• Corn → Wheat → Soybeans</li> <li>• Corn → Alfalfa (3 years) → Corn</li> <li>• Sweet Corn → Pumpkins → Potatoes</li> </ul> Participants will list when to plant cover crops and what should (and should not) be in the cover crop.	Groff
9:25 - 9:45	<b>Two-Minute Summary of Key Points Specific to Different Application Practices</b> Participants will work in groups to summarize what to tell a farmer interested in each of the different application practices, including warnings and cautions for each. <ul style="list-style-type: none"> <li>• Interseeding</li> <li>• Aerial Seeding</li> <li>• Drilling</li> <li>• Skip Rows</li> <li>• Combine</li> <li>• High Crop</li> <li>• Slurry Seeding</li> <li>• Broadcasting</li> </ul>	<i>Groff Breakouts (10 min) &amp; Group Discussion (10 min)</i>
9:45 - 10:05	<b>What Can Go Wrong during Termination</b> Participants will be presented with four scenarios and will be asked to guess what might be wrong with each. <ol style="list-style-type: none"> <li>1. Organic farmer excited to try roller-crimper for the first time on a U-Pick Pumpkin field with diverse cover crop mixture</li> <li>2. Farmer double-cropping soybeans want to get an early start (April 1<sup>st</sup>) terminating ryegrass cover crop and plant soybean ASAP</li> <li>3. Farmer is renting his field to a neighbor to graze cover crops</li> <li>4. The small vegetable farm is planting radishes and oats to reduce compaction in small vegetable operation.</li> </ol>	<i>Groff Breakouts (10 min) &amp; Group Discussion (10 min)</i>

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10:05	-	10:25	<b>Nutrient Management with Cover Crops</b> Hilshey will provide a short lecture on the impact of cover crops on nutrient management, and participants will be presented with a number of different scenarios and asked how they would adjust nutrient management through a survey. After participant gives their answers, crop consultants will weigh in. <ul style="list-style-type: none"><li>• Ryegrass and clover terminate rated at 4 inches</li><li>• Ryegrass and Cover planted green (10 inches)</li><li>• Harvested Cover crop as Haylage</li><li>• Roller Crimping Manure Vetch and Cereal Rye</li></ul>	<i>Groff and Hilshey</i>
10:25	-	10:30	<b>Wrap-up and Course Survey</b>	Hilshey

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