

NCR FSMA annual evaluation report

THE FIRST YEAR OF THE US DEPARTMENT OF AGRICULTURE
FUNDING, SEPTEMBER 1, 2018 THROUGH AUGUST 31, 2019

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North Central Region

Center for FSMA Training, Extension
and Technical Assistance

Executive summary

The North Central Region Center for Food Safety Modernization Act (FSMA) Training, Extension, and Technical Assistance (NCR FSMA) began in 2016 with three years of funding from the US Food and Drug Administration (FDA). In September 2018 the NCR FSMA received funding from the US Department of Agriculture (USDA) to continue for another three years. The center is housed at Iowa State University and is a collaboration of on-farm food safety professionals from 12 midwestern states. The purpose of the center is to provide opportunities for education, professional development, and collaboration to these professionals so that they can better support produce growers and handlers to be compliant with FSMA.

The NCR FSMA has used evaluation to continually gather feedback and improve its work. Eight evaluation protocols were conducted in the first year of USDA funding, through August 2019, making 1,986 contacts. These are highlights of the evaluation results:

- The communication survey showed stakeholders are widely satisfied with NCR FSMA communications. They rated NCR FSMA communications with an overall average score of 3.34 (4=very useful). They agreed the center has made a lot of progress since its first year, when their top complaints related to communication (difficulty accessing the shared file system and technical difficulties during group calls). In response to survey results, the NCR FSMA began choosing predetermined topics for monthly listening sessions and revamped the website.
- The annual conference survey showed that participants were widely satisfied with the sessions. They preferred interactive sessions more than updates. The highlight of the conference was meeting one another in person and engaging in interactive discussions. The annual conference contributed to NCR FSMA stakeholders feeling closer to one another.
- Similarly, the theme that ran most strongly through the annual evaluation interviews was that NCR FSMA stakeholders appreciate that the center provides opportunities for them to meet and collaborate with other food safety professionals from the region.
- The PSA grower training knowledge assessment showed that participants increased in knowledge for the second year in a row. On average, across the two years participants' scores increased by 3.9 points from pre-test to post-test (out of 25 points possible). The data showed that participants in trainings targeting special populations scored lower, on average, on the pre-test and the post-test than participants in trainings targeting the general population. They also had lower increases in scores. NCR FSMA partners agreed that the training is technical, and an alternative curriculum may be more appropriate for special populations.
- The PSA grower training follow-up survey showed that 72 percent of grower respondents (199 of 276) made some sort of change on their farm to improve food safety practices since attending the training in in 2017-18. Implementing new or different training for employees on food safety/hygiene protocols was the most common change made since the training. In addition, 26 percent of grower respondents made a change to infrastructure or equipment since the training.
- Five success stories highlighted that working with the NCR FSMA better equipped partners to help growers and processors comply with FSMA.
- Food Safety Outreach Program (FSOP) grantees in the North Central region are reaching 13 special populations, including minority growers, Plain growers, Spanish-speaking growers, growers implementing sustainable agricultural practices, and others. Seven of eight funded

projects focused on delivering trainings and workshops. So far, grantees have hosted 23 trainings and an estimated 457 individuals have participated in the trainings.

- NCR FSMA partners collaboratively created 14 educational add-ons. Add-ons are resources such as handouts, checklists, and a record-keeping envelope. The NCR FSMA distributed 2,376 copies of its add-on resources in 2019. They were rated as the most useful NCR FSMA communications on the communications survey.

During the second year of USDA funding, the NCR FSMA will hold its second annual conference, continue to work with the National Sustainable Agriculture Coalition to receive approval of the first alternative curriculum, continue to fund a trainer sharing program, and continue to host monthly listening sessions.

Introduction

The North Central Region Center for Food Safety Modernization Act (FSMA) Training, Extension, and Technical Assistance (NCR FSMA) began in 2016 with three years of funding from the US Food and Drug Administration (FDA). The center is housed at Iowa State University and is a collaboration of on-farm food safety professionals from 12 midwestern states. The purpose of the center is to provide opportunities for education, professional development, and collaboration to these professionals so that they can better support produce growers and handlers to be compliant with FSMA. In September 2018 the NCR FSMA received funding from the US Department of Agriculture (USDA) to continue for another three years.

The NCR FSMA has used evaluation to continually gather feedback and improve its work. This report shares highlights of the results of several evaluation protocols that were conducted in the first year of USDA funding, through August 2019.

Methods

Seven evaluation protocols were used in year one of USDA funding: a communications survey, a survey at the annual conference, the PSA grower training knowledge assessment, a follow-up survey for the PSA grower training, interviews with state leads and advisory board members, impact stories, and the Food Safety Outreach Program (FSOP) evaluation survey. We also evaluated the NCR FSMA add-ons using several of the above-mentioned methods.

We made 1986 contacts through the evaluation. That does not mean that 1,986 unique individuals were reached, because some individuals may have participated in more than one protocol (Table 1).

Communications survey

We conducted an electronic survey with NCR FSMA stakeholders in January and February 2019. The survey data was gathered using the Qualtrics™ online survey platform. Ellen Johnsen, program coordinator, sent an invitation to participate to everyone on the NCR FSMA list serve and posted the invitation to the center's Facebook page. In addition, state leads were asked through personal phone calls from Joe Hannan, Iowa State University extension horticulturalist and the principal investigator for the USDA-funded center, to distribute the invitation to their teams during the week of February 7.

Respondents were offered an incentive: the opportunity to enter a drawing to win one of four gift cards, each valued at \$25.

We received 24 responses. We are not able to calculate a response rate, because we do not know how many people received the invitation to participate.

Table 1: 1,986 contacts are made through the evaluation in year 1 of USDA funding

Evaluation method	# of respondents
Communications survey	24
Annual conference survey	51
Knowledge assessment	1,519
Follow-up survey	364
Interviews	6
Impact stories	14
FSOP evaluation survey	8
TOTAL	1,986

Annual conference survey

The NCR FSMA hosted its first annual conference in June 2019, with 72 attendees. Conference participants were invited to complete a paper survey to assess the quality of the conference as well as gather additional information about the center's work.

We received 51 responses (71 percent response rate).

Interviews

Arlene Enderton, the NCR FSMA evaluator, has conducted interviews annually since 2016, for a total of four rounds. Interviews have been held with the state leads, advisory board members, and other partners.

The most recent interviews were conducted in October 2019. Enderton invited five state leads and five members of the advisory council to participate in interviews, for a total of ten. A total of six (four state leads and two advisory board members) agreed to participate (60 percent response rate).

Enderton interviewed respondents over the phone using a common interview template and a semi-structured interview style. She took extensive notes during the interviews but did not record them. She coded the data for themes using NVivo 12™ software.

Interviews conducted in previous years are also used to interpret data throughout this report.

PSA grower training knowledge assessment

The knowledge assessment was developed by Dr. Amy Harder, an evaluator for the Southern Center for Training, Education, Extension, Outreach, and Technical Assistance to Enhance Produce Safety.

The knowledge assessment consisted of 25 questions related to the seven modules of the PSA Grower Training. Training participants were asked to complete the quiz in writing before beginning the training and again after the training.

Trainers collected the paper copies from the participants and sent them to the NCR FSMA evaluation team. Data was entered into Qualtrics™, an online data collection and analysis platform, to create the dataset. Pre-test and post-test responses were matched using a unique identification number written on each quiz, along with the date of the training, and the state.

Only responses which included both a pre-test and a post-test from the same person were included in the analysis. We received 1,519 complete responses from 93 trainings in the North Central Region (NCR) from July 1, 2018 to June 30, 2019.

Bridget Perry, Iowa State University graduate research assistant, and Arlene Enderton, NCR FSMA evaluator, analyzed the data using SPSS™. Each question was assigned to the related PSA Grower Training module, and a total score of correct answers was calculated for each module. The scores by module were averaged and rescaled from zero to five. Rescaling allowed the evaluators to compare participants' knowledge of each module with other modules.

In addition, trainers completed a cover sheet for each training and returned the cover sheet along with the pre-tests and post-tests. The cover sheets provided information including the date of the training, the location, names of trainers, the number of participants, and whether the training targeted any special population. Special populations that we tracked included Plain growers (which includes Amish,

Mennonite and Hutterite growers), minorities, local food growers, military veterans, non-English/limited English language, and other. Nine trainings held in NCR targeted Plainclothes growers, two targeted non-English/limited English proficiency speakers (Spanish), and one targeted minority growers. Nine trainings targeted other special populations, which included university students, professionals in food-adjacent industries, research or learning farm staff, or a mix of Plain growers with non-Plain (Also known as “English”) growers. The remaining trainings did not target any special population.

PSA grower training follow-up survey

The follow-up survey was conducted approximately one year after trainings were held. Food safety specialists from 10 states sent the survey to their contact lists to follow up with 2017-18 trainings; Minnesota and Ohio did not send the survey.

The survey was conducted electronically using Qualtrics™ for participants who use technology. It was sent out by postal mail to participants who do not use technology, except in Wisconsin where paper copies were sent to all participants and electronic invitations to those who use technology. One or two reminders were sent to those who use technology; no reminder was sent to those who received paper copies. Table 2 shows the dates when invitations were sent for each round of surveys and the survey format used (electronic and/or paper). A total of 69 trainings were evaluated.

We received 364 responses (25.3 percent response rate, Table 2).

Table 2: 10 states participated in the PSA grower training follow-up survey.

2017-18 training follow-up				
State	Send date	Format	# of invitations	# of responses
Illinois	01/30/19	Paper and electronic	60*	9
Indiana	12/13/18	Paper and electronic	59	14
Iowa	01/16/19	Paper and electronic	183	44
Kansas/Missouri	12/19/18	Paper and electronic	359	99
Michigan	12/03/18	Electronic only	495	105
Nebraska	11/26/19	Electronic only	47	14
North Dakota	02/11/19	Electronic only	17	5
South Dakota	02/20/19	Electronic only	20*	0
Wisconsin	01/01/19	Paper and electronic	196	74
2017-18 TOTAL			1,436	364
			RESPONSE RATE	25.3%

**estimated*

Success stories

Arlene Enderton, Ellen Johnsen, and summer interns completed five success stories in the first year of USDA funding. Members of the NCR FSMA generated ideas for success stories and submitted those ideas to Enderton. They conducted interviews over the phone using a semi-structured interview style. Between one and five people were interviewed for each story. After the first draft of the story was written, each interviewee was asked to review the story and confirm its accuracy. Interviewees had the opportunity to make edits if they found anything inaccurate. Once all interviewees had approved the story, the story was copy edited and posted to the NCR FSMA website and given to the appropriate state lead(s) to print in their own reports.

FSOP evaluation survey

The Southern Center for Training, Education, Extension, Outreach, and Technical Assistance to Enhance Food Safety, which serves as the lead center, developed a survey for FSOP awardees. Eight FSOP awardees were asked to complete the evaluation survey. Four completed the survey in April 2019 and four completed it in November 2019.

NCR FSMA add-ons evaluation

During the first three years of the NCR FSMA, one of its tasks was to create educational materials for produce growers to educate them about FSMA and on-farm food safety practices. The NCR FSMA partners formed committees, which collaboratively created 14 new resources, which were called “add-ons.” They were available online on the NCR FSMA website, the national clearinghouse, and in print. We evaluated the use of NCR FSMA add-on resources using a survey, tracking online downloads, and tracking the number of hard copies sent out by the NCR FSMA staff. We evaluated the quality of the add-ons with questions asked during interviews and in the communications survey.

Results

Communications survey

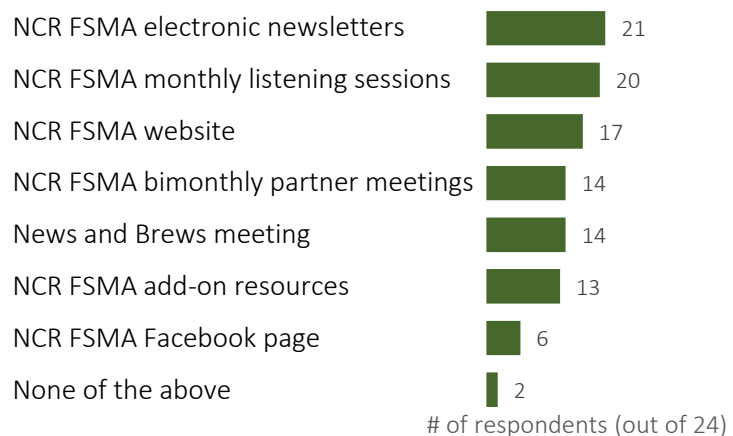
The communications survey showed that partners were widely using NCR FSMA communications and were satisfied with them.

On average, respondents have used four different types of NCR FSMA communications. Nearly all respondents have used NCR FSMA electronic newsletters and have participated in monthly listening sessions (Figure 1). Over half of respondents have used the website, participated in bimonthly partner calls, participated in the New and Brews meeting, and utilized NCR FSMA “add-on” resources.

The NCR FSMA Facebook page was the least-used NCR FSMA communication, with only six respondents indicating they used it. This may be partially due to not everyone having a Facebook account.

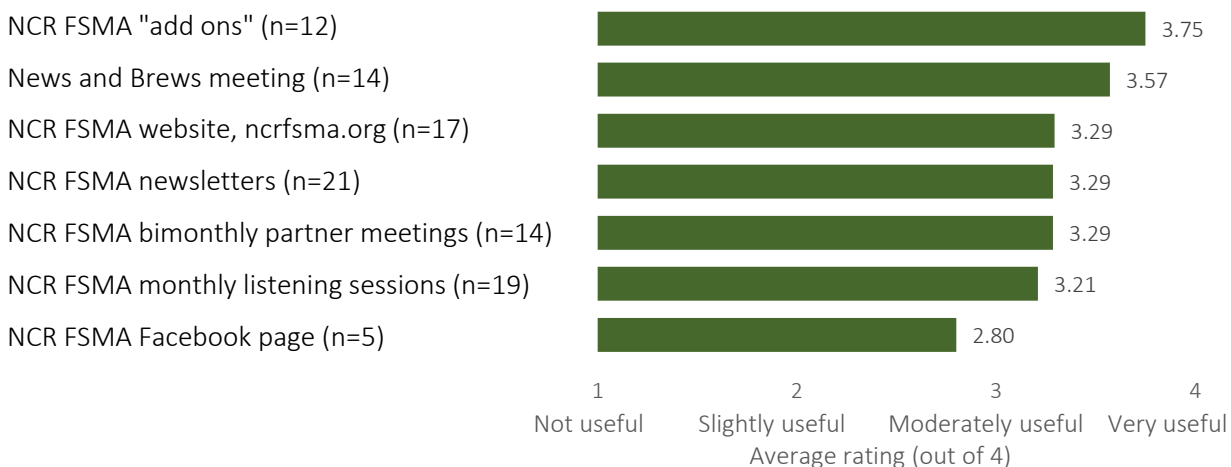
The clear majority (19 of 22, 86 percent) of respondents believe they have access to information about FSMA which they need.

Figure 1: Nearly all respondents use NCR FSMA newsletters and listening sessions.



Respondents also found NCR FSMA communications useful (average overall score 3.34, 4=very useful). They found the NCR FSMA add-on materials most useful, followed by the October 2018 News and Brew meeting (the only face-to-face meeting that held been held at the time of the survey, Fig.2).

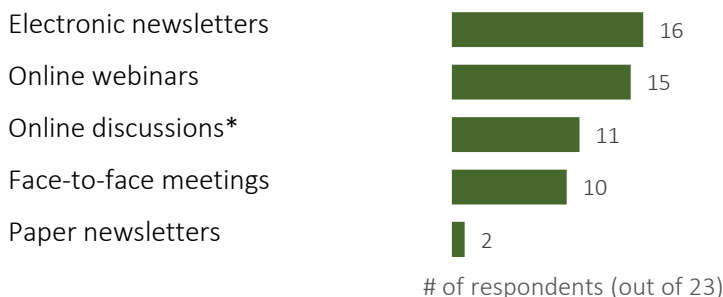
Figure 2: Respondents found NCR FSMA "add-ons" and the News and Brews meeting to be very useful.



Newsletters and online webinars are partners' most preferred forms of communications. The survey asked respondents to identify their preferred format for the electronic newsletter. Just over half of respondents preferred that newsletters continue to be sent as PDF files attached to an email.

Somewhat surprisingly, fewer than half of respondents ranked face-to-face meetings in their top three preferred forms of communications (Fig. 3). Interviews conducted in the first three years of the center consistently showed that state leads want to have annual face-to-face meetings, and that the News and Brews event, the only face-to-face meeting held thus far, was rated as highly useful (Fig. 2). The fact that face-to-face meetings were less preferred than remote

Figure 3: Respondents' most preferred forms of communication include electronic newsletters and online webinars.



*such as Zoom™ or Skype™ meetings

communications may be explained by obstacles to traveling for face-to-face meetings, such as the financial cost, access to airports, and the time commitment involved. One respondent described these obstacles during a success story interview, requesting that the NCR FSMA provide opportunities to participate in face-to-face events remotely.

NCR FSMA partners have differing preferences for NCR FSMA calls based on the prominence of food safety in their job.

Interviewees who participated in state lead interviews in 2018 tended to fall into one of two groups: those for whom FSMA education is a small part of their job, and others for whom FSMA education is one

of their primary responsibilities. These two groups tended to have different desires for communication. Partners for whom FSMA education is a small part of their work prefer succinct communications, whereas those who work full-time on FSMA are more likely to prefer longer, in-depth calls. This helps explain why bimonthly partner meetings and monthly listening sessions received lower ratings than other forms of communication. Those who have time to dedicate to these meetings appreciated them. However, those who are looking for succinct communication found these meetings too time-intensive.

Communications survey showed respondents would prefer a different schedule and would appreciate covering pre-planned topics.

Therefore, under the USDA-funded center the NCR FSMA rescheduled listening sessions to be held on the third Thursday of each month at 2 p.m., which was identified through the survey as a good time for the most respondents. They changed the format of the webinar from being an open discussion to a webinar on a predetermined topic followed by discussion. Partner interviews held in November 2019 confirmed that most partners were happy with these changes, although the 2 p.m. time did not work for everyone and one interviewee missed having longer times for open discussion.

One interviewee who appreciated this change said, “I have to say the sharing one-on-one is usually not as useful to me as when we have a speaker who focuses on a certain topic area.” However, one missed the open sessions, because it gave him or her the opportunity to ask questions in a relaxed atmosphere. While the new listening session format often includes a time for questions following a webinar, this participant was hesitant to ask a question that might open a long discussion after having already participated in a long webinar.

One idea for maintaining a format with a predetermined topic while creating an atmosphere open to discussion would be to choose a predetermined discussion topic, but without a webinar or designated presenter. This will allow only those participants who are interested in discussing the topic to join while allowing time for a deep discussion.

Communications survey respondents use the NCR FSMA website, but thought it needed to be improved.

Most respondents (17 of 24) have used the NCR FSMA website, and half (9 of 18) have shared a link to the website with growers or processors. It was also rated by respondents as moderately useful (average of 3.29 on a scale of 1 to 4, 4= very useful, Fig. 2). Yet all comments received about the website indicate it is not that well-liked.

Most interviewees did not even mention the NCR FSMA website, which may indicate that they don't use this resource very often. The two interviewees who did mention it said they found it visually unappealing, too wordy, and hard to navigate. One interviewee thought the website appeared to be branded with Iowa State University colors, because it primarily uses the color red, which this person thought was inappropriate for a collaboration of 12 states.

Only one survey respondent mentioned the website, saying, “The website is difficult to navigate. There is a lot of information, but it is not easy to find.”

As a result, the NCR FSMA rebuilt its website to simplify navigation and improve its visual appeal. The NCR FSMA was not able to remove the Iowa State University branding, despite one interviewee's request. They partnered with ISU Extension and Outreach Information Technology Services to create the new

website, which was free, but requires use of ISU branding. To help mitigate the feel that the website is branded with ISU colors, the NCR FSMA put the logos of all partnering universities on the website landing page.

Annual conference survey

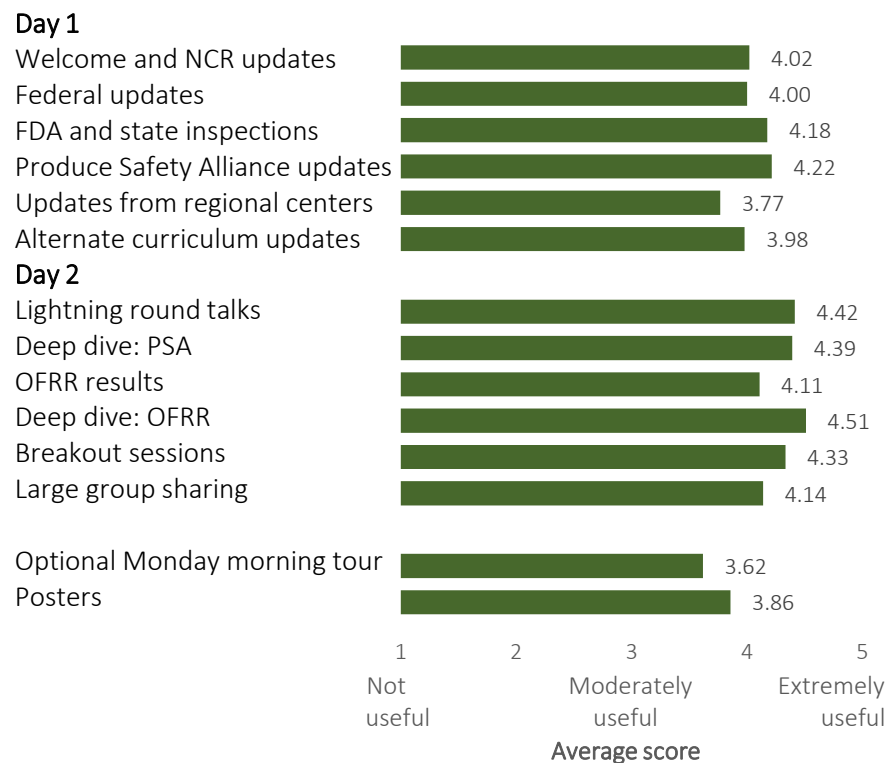
The NCR FSMA held its first annual conference in June 2019. The two-day conference was held in Indiana.

Attendees preferred interactive sessions more than updates.

Day 1 focused primarily on introductions and receiving updates from various partners. Day 2 was more interactive, including lightning round talks, two deep dives, breakout sessions, and group sharing. On average, sessions held on day 2 were rated as more useful (Fig. 4).

Forty-seven of 48 (98 percent) of respondents indicated they met an average of 8.8 people at the annual conference whom they had not met before. The opportunity to meet and deepen relationship with others is one of the biggest benefits of face-to-face gatherings. Interviews during the first three years of the NCR FSMA consistently requested a face-to-face gathering. Interviewees suggested that it is easier to get to know one another in such a setting and that they felt like not having the opportunity during the FDA-funded center was holding collaboration back. A high level of agreement (average score 4.49, where 5= strongly agree) with the statement “I feel closer to other NCR FSMA partners because of attending this annual meeting” is evidence that meeting face to face did facilitate relationship-building among partners (Fig. 6).

Figure 4: On average, day 2 sessions had higher ratings than Day 1.



Annual conference did a good job of accommodating special diets but could improve by selecting topics relevant to and speakers from diverse audiences.

The annual conference survey also evaluated the extent to which the conference was inclusive of diverse audiences. Figure 5 shows the conference did a good job of accommodating special diets and providing a handicap accessibility. However, improvements could be made in the areas of visual assistance, hearing assistance, and gender-neutral bathrooms. Comments written on the survey suggested that not everyone could see the screens well, the audio equipment was inaudible, and gender-neutral bathrooms were not

available. While it may not be possible to provide visual or hearing assistance at future events, simple improvements in these areas could be made by asking presenters to use larger fonts on their presentation slides and ensuring that a reliable sound system is available.

The evaluation also showed that conference organizers can make improvements to include topics of interest to diverse audiences and include diverse presenters and attendees. Suggestions to do this included:

- Invite more farm organizations or NGOs. Have leaders from various communities talk about their own experienced food safety needs.
- Make funding available and extend invitations to the "farmer instructors," those growers who have been trained to teach PSA grower training classes.
- Include photos in presentations or topics or breakout sessions on how programs were developed for diverse and protected people.
- Acknowledge the stolen/native land the group is convening upon. Take part of the registration fee (such

Figure 5: Future events will need to provide gender-neutral restrooms and improved visual and hearing environments.

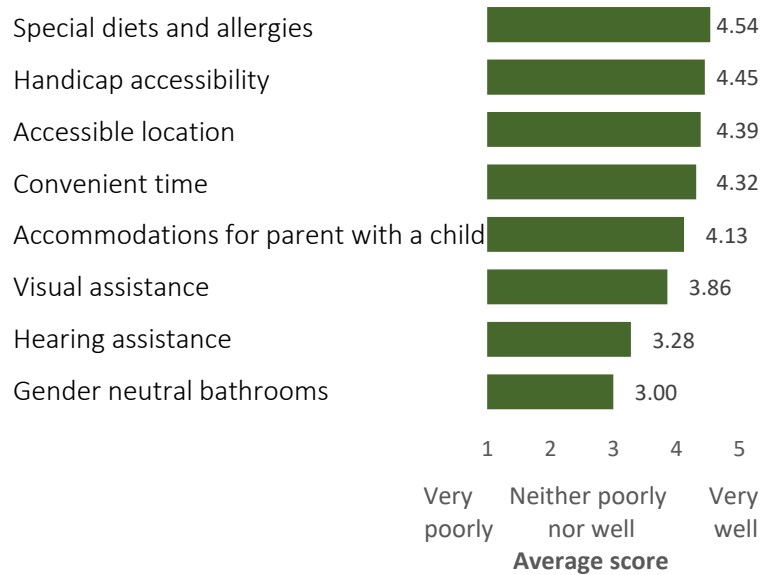
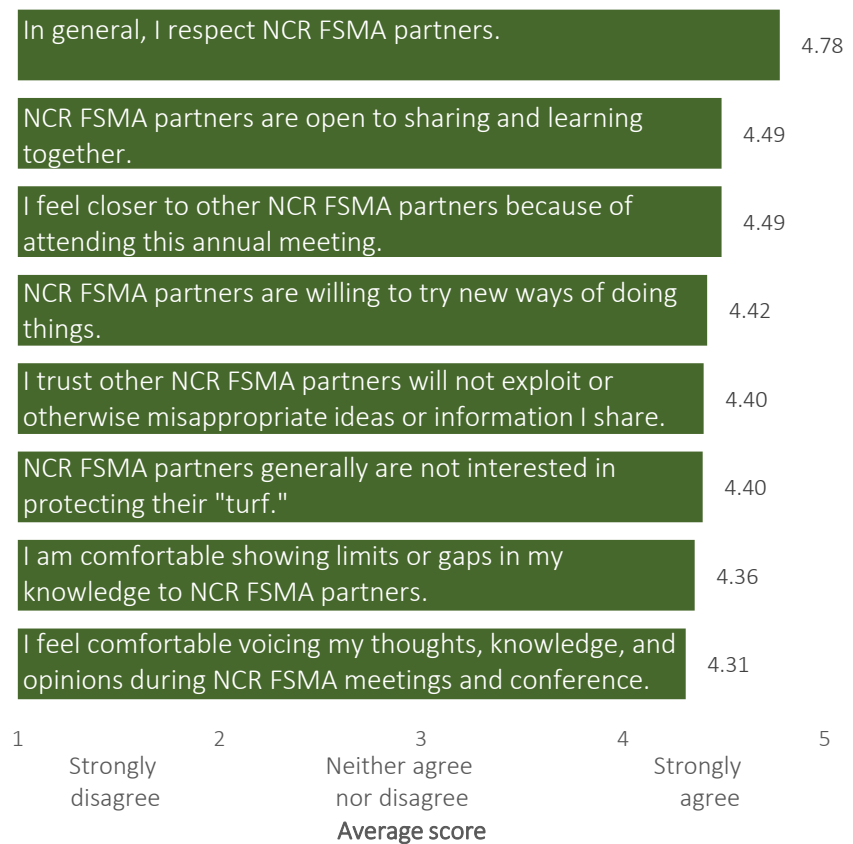


Figure 6: NCR FSMA partners have developed a high level of trust.



- as \$2 per person) and donate it to indigenous or people of color farming organizations.
- Ask all who introduce themselves to share which pronouns they use.
- Provide option to use pronouns on nametags at the time of registration/sign-up.

As a result of attending the conference, attendees most commonly plan to make changes to how they teach the Produce Safety Alliance Grower Training.

Conference attendees were asked to identify changes that they will make in their work based on what they learned at the conference. The most common response was plans to make changes in the way respondents teach the Produce Safety Alliance Grower Training (10 respondents). For example, "I loved the PSA best practice review. I will change how we get participants' attention by buying a cow bell!" Six respondents said that they will make changes related to collaboration, especially calling upon others when they have questions. Four respondents said they will look more closely at the NECAFS clearinghouse resources. Three will pursue on-farm readiness reviews for their audience or make a change in the way that they conduct OFRRs. Two respondents said that they will be more intentional in reviewing the resources others have created before creating their own, to reduce duplication of efforts.

NCR FSMA partners trust one another, and the conference built closer relationships.

The annual conference survey was also used to measure trust among NCR FSMA partners. Some statements in this question did not relate directly to the conference but were included to avoid conducting a separate survey at another time. Figure 6 shows the level to which respondents agreed with various statements measuring trust. The overall average score for all eight statements was 4.46, a high score supporting the idea that the NCR FSMA has developed a cohort of food safety professionals who trust one another.

Interviews

The following themes emerged from the qualitative data analysis of interview data collected in October 2019:

NCR FSMA partners most appreciate that the center allows them to meet and collaborate with other food safety professionals from the region.

The benefit of meeting and working with food safety professionals from around the region has continually been the most prominent theme of annual interviews. All six interviewees mentioned this theme in 2019. As one interviewee said, "Probably the biggest benefit [of the NCR FSMA] is being part of a community."

Although the NCR FSMA started nearly four years ago, some partners are still meeting others for the first time. One interviewee said, "At the annual meeting in Indiana I met regulators from six states, and they had never heard of [my organization] before. They said they would reach out to growers in their states to tell them about us."

The NCR FSMA is a trusted source of information.

Being a part of the community allows partners to learn new information, both insider information and information open to the public. As an example of how they learn insider information, one interviewee said, "I learned [at the annual conference] that Wisconsin is doing water sampling! Crazy! Logistically, how do you do that?... Hearing about these things is useful." This is the type of information partners could not find by searching online or reading reports, but only through conversation with colleagues.

Partners also appreciate the “information flow” that occurs through the center. They trust the newsletter and listening sessions to keep them up to date on information, so that they do not need to look for the information themselves. While this is not insider information, having access to the information from one source is a great service for partners.

Those who have attended face-to-face NCR FSMA events most appreciated the opportunity to meet other people.

The NCR FSMA held its first annual conference in 2019. It has also helped organize two face-to-face events to prepare Produce Safety Alliance Grower Training course trainers for the upcoming training season: News and Brews (NBI, October 2018) and NCR Training Blastoff II (NBII, October 2019).

Five of six interviewees attended at least one face-to-face NCR FSMA event. When asked how they have benefited from face-to-face events, the most common theme (mentioned by four people) was the opportunity to meet others and learn what they are doing. For example, one interviewee said, “Meeting people in person helps sort of break the ice. Getting a sense for who a person is and what they’re doing makes it easier to know who to call about something or to plan something.”

Only one interviewee mentioned benefiting from a specific topic that was discussed during a face-to-face meeting, appreciating one of the deep dive conversations held at the NBII meeting in Minnesota. All others’ comments centered on meeting and deepening relationships with others as opposed to the presentations themselves. This may indicate that creating opportunities for group discussion and interaction during face-to-face meetings is just as important as choosing the session topics.

The NCR FSMA provides funding opportunities.

While the NCR FSMA does not distribute large sums of money, one interviewee appreciated the money that is available for trainer sharing. In addition, two other interviewees mentioned that they had applied for grants in collaboration with other NCR FSMA partners. They would not likely have applied for funding together had they not met through the NCR FSMA. In addition, one partner appreciated the “funds available” section of the NCR FSMA newsletter.

Everyone likes the newsletter.

Interviewees were asked if they had any suggestions for improving the newsletter. For the most part they did not. Everyone indicated that they like the newsletter. They appreciate that the newsletter allows them to find the information they need quickly and on their own time, has information that they can pass on to growers in their states, and that PDF files are easy to download. Interviewees shared two ideas for improving the newsletter: adding a feature about each state to better understand what food safety professionals are doing there, and adding pictures or other visually appealing elements.

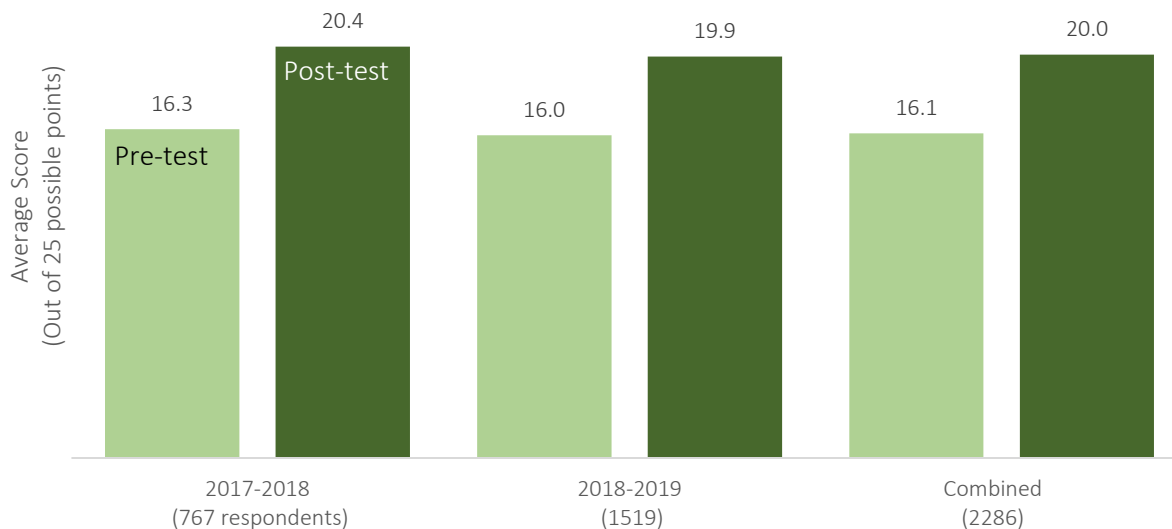
PSA grower training knowledge assessment

Scores increased by an average of 3.9 points out of 25 possible from pre-test to post-test in 2018-19.

Respondents’ knowledge of food safety and FSMA improved in the last two years of the Produce Safety Alliance Grower Training. On average, respondents scores improved by 4.1 points (out of 25) from the pre-test to the post-test in year 1 and by 3.9 points in year 2 (Fig. 7). This averages out to a 3.9-point increase across both years. The difference between pre-test and post-test scores is statistically significant at a level of $\alpha=0.001$ in year one and a level of $\alpha=0.05$ in year two. This means the differences pre-test and post-test scores are not likely due to chance, but to an actual difference between pre-test and post-

test scores in the population. Therefore, we can conclude that participants' knowledge did increase during the training.

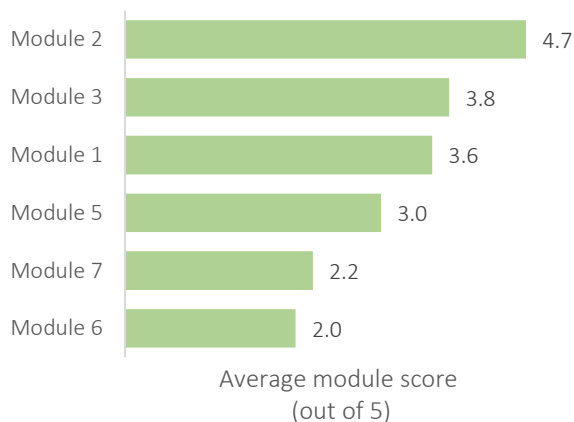
Figure 7: On average, scores increased more in 2017-18 than 2018-19. (n=2286)



Prior to the training, participants were most familiar with concepts related to worker health, hygiene, and training.

The pre-test is especially useful for determining training participants' baseline knowledge before the training, so trainers can know which modules may need more emphasis. In the NCR, in year 2 (2018-19) participants came to the training with the highest baseline understanding of Module 2 (worker health, hygiene, and training), as shown in Figure 8. Therefore, future trainings may not need to emphasize this module as heavily. (However, the knowledge assessment only included two questions related to Module 2, making it harder to assess.) Respondents had the lowest baseline knowledge of Module 6 (post-harvest handling and sanitation) and Module 7 (how to develop a farm food safety plan).

Figure 8: Participant scored highest on Module 2 on the pretest. (n=1519)



Knowledge improved the most on wildlife, domesticated animals, and land use; and post-harvest handling and sanitation.

Figure 9 reports the participants' average post-test scores. Like on the pre-test, respondents scored highest on Module 2 (worker health, hygiene, and training) on the post-test.

Respondents scored lowest on the post-test on Module 7 (how to develop a farm food safety plan) in year 2, as shown in Figure 9. Only 34 percent of respondents answered question 24 (Fig. 10) correctly on the post-test, making it the least-understood question. This question is one of those which tests knowledge of Module 7. It asks which records are required by the FSMA Produce Safety Rule. The Produce Safety Alliance produced a handout entitled “Records required by the FSMA Produce Safety Rule” ([Produce Safety Alliance, 2018](#)) which may help growers understand this module better. If not already doing so, NCR trainers may want to include this handout in the materials they provide to growers.

Figure 9: Participants scored highest on Module 2 on the post-test. (n=1519)

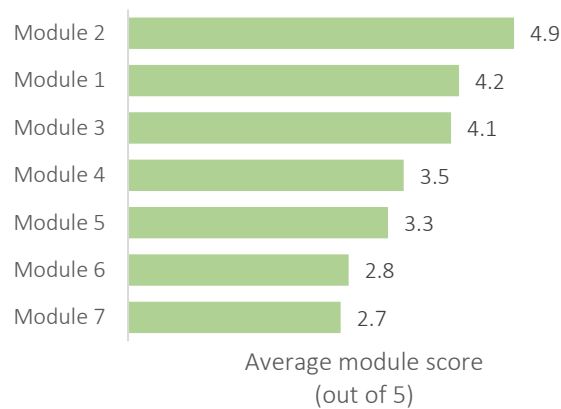


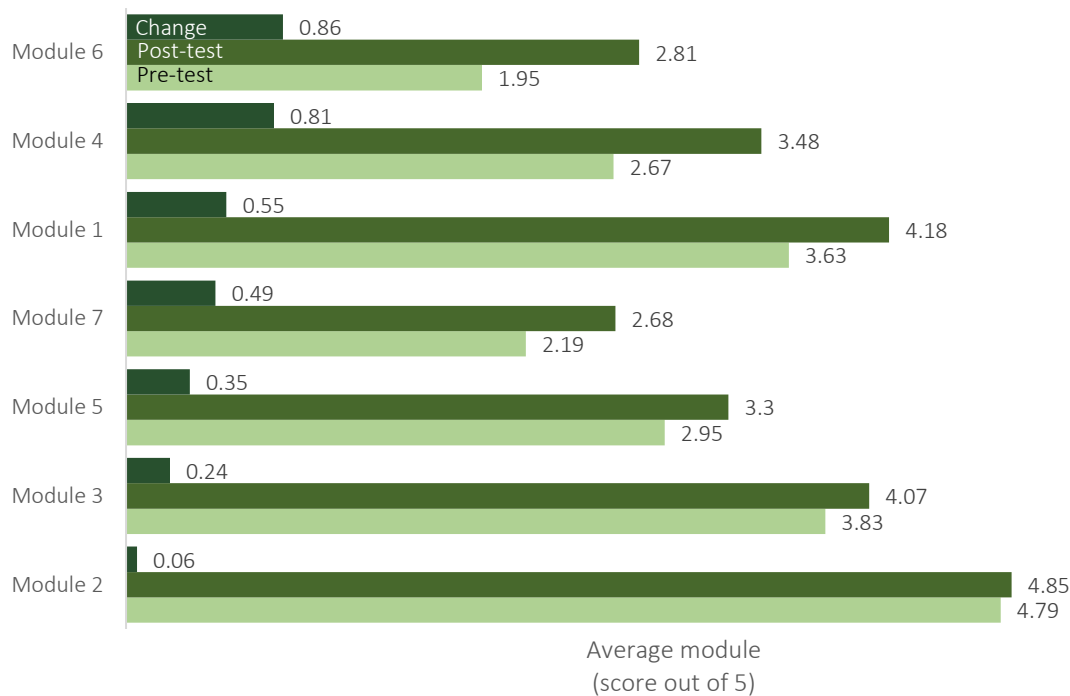
Figure 10: Question 24 was the question most often answered incorrectly on the post-test.

Which of the following records is required by the FSMA Produce Safety Rule?

- a. **Worker training dates**
- b. Water change schedules
- c. Soil amendment applications
- d. Management of sanitary facilities

When the post-test scores were compared to the pre-test, it showed the greatest gain in knowledge on Modules 4 and 6, about wildlife, domesticated animals, and land use; and post-harvest handling and sanitation (Fig. 11). Not surprisingly, they gained less knowledge on Module 2, as this was the module about which they already had a higher understanding before the training.

Figure 11: Scores improved most on Modules 6 and 4 (n=1519)



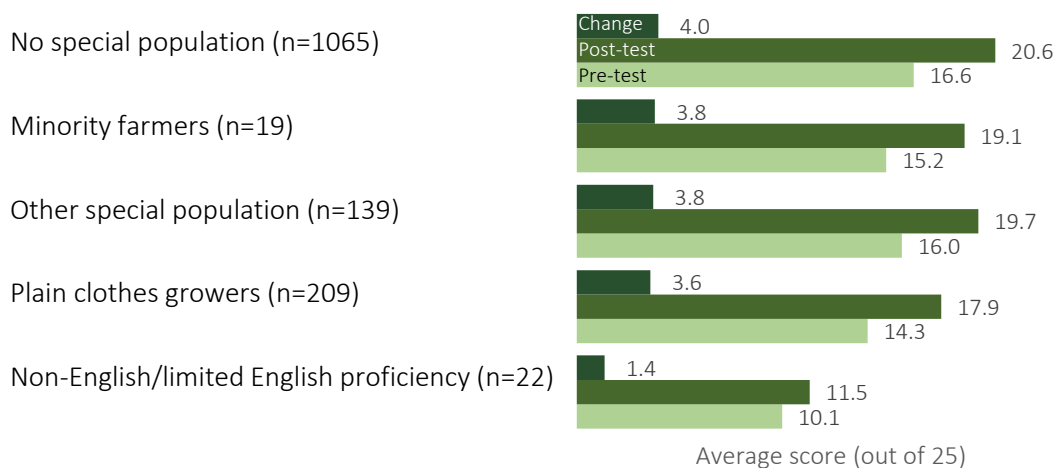
Special populations did not score as well on the knowledge assessment as the general population.

The cover sheets for the trainings held in NCR in year 2 indicated that 21 of the trainings targeted a special population. Nine trainings targeted Plain (Amish and Mennonite) growers (Indiana, Iowa, Wisconsin), two trainings reached non-English English/limited English proficiency (Spanish) growers (Michigan), and one targeted minority growers (Kansas). Nine trainings were held for other special populations (Illinois, Iowa, Missouri South Dakota, and Wisconsin). Eleven of the trainings targeting special populations had the lowest average pre-test scores.

Figure 12 shows how the 21 trainings targeting special populations compare with those that did not target any special population (72 trainings). It shows that participants in trainings targeting special populations, on average, had lower pre-test and post-test scores and lower average score change. This may indicate growers who attended trainings for special populations had a lower knowledge of food safety and FSMA prior to the training than other growers. It also may indicate that having a lower incoming knowledge disadvantaged these growers, making it harder for them to understand the training and glean new knowledge to the same degree as other growers. If this is the case, trainers may want to consider offering a more basic food safety course to special populations prior to taking the PSA Grower Training, to give them a stronger baseline knowledge of food safety.

These results were discussed during an NCR FSMA listening session. All participants agreed that the training is not designed for beginners. They said that the training uses technical terms which may not be familiar to many growers. A simpler version of the training would likely be more appropriate for many growers, especially those belonging to special populations. We know at this time of one alternative curriculum that is being developed.

Figure 12: Special populations did not score as well as non-special populations.



PSA grower training follow-up survey

Response rates to paper surveys were higher than to electronic surveys.

Only in 2017-18 we tracked how surveys were sent (electronically or on paper) as well as the format in which responses were received. Approximately two of three (63 percent) responses to the 2017-18 survey were submitted electronically.

We found that the response rate was higher from those who received paper surveys (33 percent) than from those who received the survey invitation electronically (22 percent).

This was especially noticeable with the responses from Wisconsin. Wisconsin sent a paper copy of the survey to every participant (196 participants) and sent an invitation to the online survey to those for whom they had an email address (87 participants). Therefore, those who provided an email address received the invitation both on paper and electronically, whereas the other states sent participants with an email address only the electronic invitation. We received 74 responses from Wisconsin; 68 were on paper and 6 were electronic. Hence, their response rate to the paper survey was 35 percent, whereas their response rate to the electronic survey was significantly lower (7 percent).

Therefore, for the 2018-19 follow-up survey we are giving states the option of sending as many paper copies as they would like.

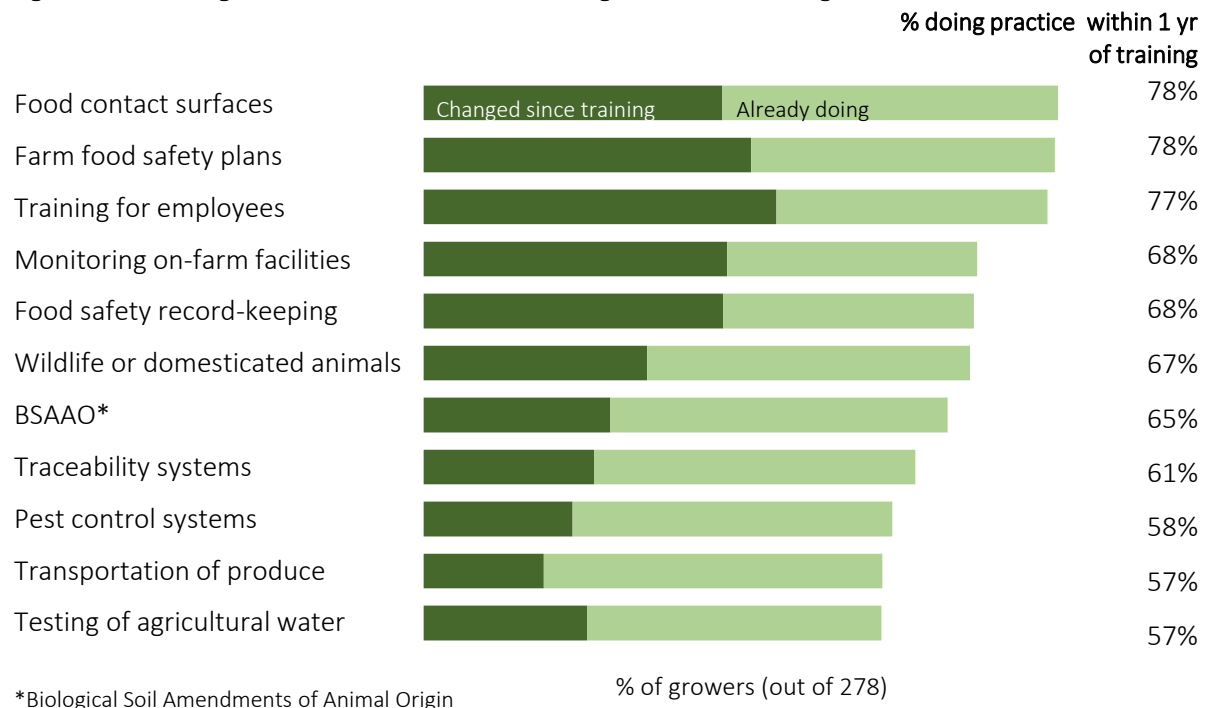
72 percent of grower respondents (199 of 276) made some sort of change on their farm to improve food safety practices since attending the training in in 2017-18.

Figure 13 shows which changes growers made, as well as which practices they already had in place prior to the training (and, therefore, did not need to change). The most common practices put in place by growers within one year of the training were methods for cleaning or sanitizing food contact surfaces and farm food safety plans, with approximately three of four growers indicating they put these practices into place since the training or already had them in place.

Implementing new or different training for employees on food safety/hygiene protocols was the most common change made since the training, with 44 percent (108 of 248) of growers making the change since the training.

Added to that, 42 percent of respondents (85 of 204) already had adequate systems for using biological soil amendments of animal origin (BSAAO) and 41 percent already had good practices for cleaning and sanitizing food contact surfaces, showing that growers were already doing many things well.

Figure 13: 72% of growers made some sort of change since the training.



Respondents agreed the PSA Grower Training prepared them well to make changes to improve on-farm food safety.

Respondents who had made a change listed in Figure 13 (above) rated how well the training prepared them to make the change. (Respondents only answered this question for those areas in which they made a change following the training.) The training received high ratings for all types of changes, with ratings ranging from an average of 4.30 (testing of agricultural water) to 3.98 (wildlife or domesticated animals) (where 5=very well and 1=very poorly). The training did the best job of preparing growers to make changes to testing agricultural water (4.30) and cleaning and sanitizing food contact surfaces (4.27). The training introduces which water tests are required by FSMA, which has been a source of much confusion; these results indicate the training has provided some clarity regarding water testing. However, through open-ended comments, one respondent said the training could do more to make it clear which water

tests are required by FSMA and how to conduct them. The training also teaches a distinction between cleaning and sanitizing, which some growers may not have understood before.

26 percent of grower respondents made a change to infrastructure or equipment since the training.

Seventy of 265 growers made changes to infrastructure or equipment to improve food safety practices since taking their training in 2017-18. This demonstrates that they made not only practice changes, but systems changes to support food safety, which is a higher level of change.

Changes included the following:

24 growers upgraded or added **hand-washing stations**. For example, one added a sanitary hand wash station and catch basin next to their outhouse for you-pick customer use.

12 growers added new equipment or changed their **washing/packing line**. For example, one upgraded the packing line to stainless steel.

11 growers built new or upgraded existing **buildings or packsheds**. For example, one dedicated a warehouse building to packaging and storing produce.

9 growers upgraded or added new **restrooms**. For example, one respondent switched from a homebuilt hand wash station on a portable toilet trailer to a H2A compliant station from the porta-jon supplier.

6 growers changed their **irrigation system**.

6 growers added **fencing or other barriers** to keep wildlife or domesticated animals away from production or packing areas.

4 growers created **physical separation** between cleaned and uncleaned produce or between produce and chemicals.

2 growers made changes to how they **transport produce**; dedicating a vehicle for produce was a common change.

2 growers changed their **source of water** for irrigation or post-harvest. Both connected to city water and one also put up fencing to deter wildlife from entering a pond used for irrigation.

Forty percent (24 of 60) of non-grower respondents indicated that they had implemented some sort of change related to food safety in their work since the training.

The most common change was sharing new or different information with clients (5 respondents). For example, one respondent said, "I am better able to describe or explain how FSMA can impact [my clients'] farms regarding safety, markets and practices."

Three respondents indicated that they used information from the training to create or update written materials (3 respondents). One respondent said, "I worked on fact sheet documents to assist growers in my field to understand how FSMA affects them."

Two respondents indicated they improved hygiene practices when growing or handling vegetables. These respondents are not farmers but grow produce for educational or non-profit purposes. For example, one said, “We now expect more handwashing from Master Gardeners who glean crops.”

One hundred thirty-two respondents described in their own words how NCR FSMA partners have provided them with guidance regarding FSMA.

Responses were coded for themes. These are the most commonly mentioned themes:

Explained the requirements of the FSMA Produce Safety Rule: Twenty-six respondents appreciated learning what the FSMA Produce Safety Rule requires. As one said, “It made our farm aware of where we are failing to comply with FSMA currently, and how to ensure proper compliance going forward.”

Provided additional resources: Twenty-five respondents valued the resources that are available to them through NCR FSMA and its partners, including educational resources as well as people to call when they have a question.

Provided information about food safety practices: Twenty respondents said NCR FSMA partners have introduced participants to new information about food safety practices. This demonstrates that some growers had not already learned this information in other trainings. For example, one respondent said, “The training made us more aware and increased focus on picker sanitation.”

Provided the required training: Fourteen growers said that the greatest value of NCR FSMA and its partners’ work was that they provided a training which growers were required to take.

Provided on-farm education or conducted an on-farm readiness review: Eight growers indicated that their state extension or department of agriculture had given on-farm education, either by visiting the grower’s individual farm or offering on-farm field days or trainings.

“I am a small operation so most of the rules do not apply to me, but it did alert me to areas that I can easily add or improve on that fit my circumstances.”

Grower from Iowa

“Cal Jamison has been very helpful as a contact when we need to ask questions.”

Grower from Kansas

“The print materials and in class teachings helped us develop ideas for our farm plans and safety procedures.”

Grower from Nebraska

“Though we have been doing GAP for many years, they educated us on changes we may see when FSMA becomes law.”

Grower from Missouri

While most respondents found the PSA Grower Training and additional food safety resources helpful, nine respondents indicated they found them to be unhelpful or not applicable to their situation. A few of these individuals expressed negative feelings or impressions toward FSMA. They described the law as “onerous,” “misdirected,” and “a bureaucracy.”

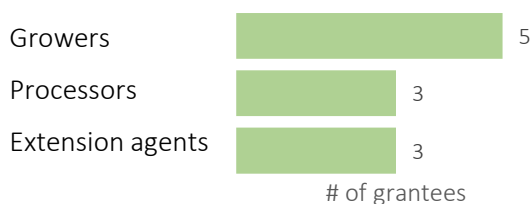
Similarly, when asked for suggestions, four respondents expressed confusion or anger regarding FSMA and/or the PSA Grower Training. For example, one said, “I was very confused by the training. It was not helpful especially when it comes to where and what water testing is needed.” Another was upset that FSMA has not been harmonized with GAP.

Comments like these demonstrate the difficulty food safety educators may face when educating growers who may be defensive or overwhelmed by the new law.

FSOP evaluation survey

Eight food safety outreach program (FSOP) grants were awarded in the North Central region in 2018. Five of the projects focus on educating growers, three on processors, and three on extension agents (Figure 14).

Figure 14: Most FSOP funded projects work with farmers.



“I look forward to this monthly meeting. I can learn from my experts and my friends (peers).”

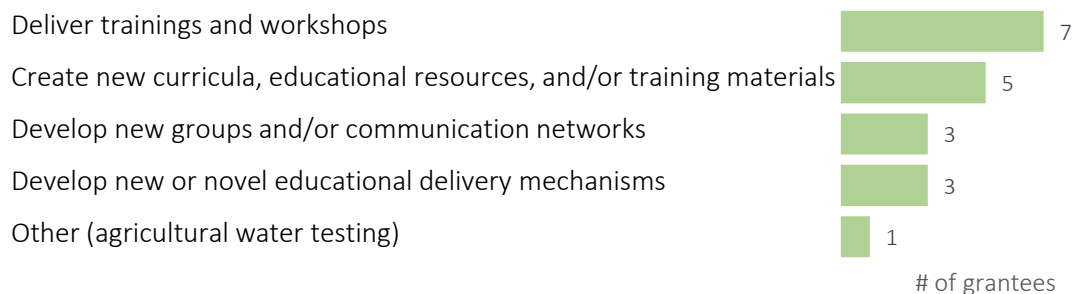
participant in a food safety education program for military veterans

Six of eight grantees’ projects targeted special populations, with a total of 13 special populations reached. Special populations include military veterans, qualified facilities, sustainable agriculture audiences including organic farmers, Amish, Mennonite, low-resource farmers, minority farmers, Latino farmers, Hmong farmers, Somali farmers, and very small and diversified farmers.

Seven of eight funded projects focused on delivering trainings and workshops, shown in Figure 15. So far, grantees have hosted 23 trainings and an estimated 457 individuals have participated in the trainings.

Five of the projects also worked on creating new curricula, educational resources, or training materials. Three of them are complete and two are in progress.

Figure 15: FSOP-funded projects most commonly focused on delivering training and workshops.



Add-on evaluation

The NCR FSMA distributed 2,376 copies of its resources in 2019.

NCR FSMA add-on materials were evaluated using several methods: the communication survey, interviews, and tracking their dissemination.

NCR FSMA staff tracked the number of paper copies of the add-on resources they have sent to partners for distribution. In addition, partners were asked to estimate the number of copies they have printed themselves for distribution. Ellen Johnsen also tracked the number of copies downloaded from the NCR FSMA website. Figure 17 shows that a total of 2,376 copies of its resources were distributed. The record-keeping envelope was the most-distributed resource by far, with more than 1,100 copies distributed (Fig. 16).

Communications survey results showed that respondents found NCR FSMA add-on resources to be the most useful type of NCR FSMA communication (Fig. 2, p. 4). Many have shared NCR FSMA add-ons with growers and processors. Even most of those who haven't shared add-ons with others know the add-ons exist and where to find them.

Yet, some partners are not familiar with the content of the add-ons. Two survey respondents indicated that they had not had time to review NCR FSMA add-ons. During state lead interviews in 2018, two interviewees said they had not had time to read all the add-ons. A success story interviewee said something similar, adding that he/she would appreciate if the creators of each add-on shared the key points of the resource during an online meeting. One survey respondent suggested something similar: rather than listing the add-ons in every newsletter, use the newsletters to summarize the highlights of each add-on by featuring one or two add-on resources in each issue.

In response, the NCR FSMA took time during a listening session to review the add-ons and have added highlights of the resources to the newsletter.

Although we did not specifically ask interviewees about NCR FSMA add-on materials during the 2019 interviews, two interviewees mentioned add-ons. One said that he/she shares add-ons with growers and believes they are good resources. Another said that the resources were too wordy, contained errors, and were not visually appealing. This may indicate that some of the add-on materials might be used more widely if they are further edited and/or reformatted.

Figure 16: The record keeping envelope has been the most widely used NCR FSMA add-on resource.



Discussion

NCR FSMA changed communications in response to survey results.

Results of our communications survey, along with supporting evidence from 2018 interviews, indicate that NCR FSMA partners were generally satisfied with communications. Their main concern was that partners who do not work full time on food safety needed communications to be succinct and non-duplicative. As a result, the NCR FSMA changed the format of listening sessions to be more like a webinar on a predetermined topic followed by open discussion. The majority of 2019 interviewees appreciated this new format, although one missed having longer times of open discussion.

Prior to conducting the communications survey, the NCR FSMA team was planning to switch the platform for the newsletter to something like MailChimp. They were surprised to see that the survey showed a nearly even split between those who preferred a PDF file attached to an email and those who preferred a marketing platform like MailChimp. Therefore, after the results of the survey were released, the NCR FSMA PI, Joe Hannan, asked the advisory board to make the decision regarding newsletter format. The advisory board members agreed to continue sending a PDF file attached to an email.

NCR FSMA partners' desire for face-to-face meetings was met.

Past interviews consistently showed that partners wanted to have face-to-face meetings, because they believed meetings would facilitate stronger relationships and more effective collaboration. In October 2018, NCR FSMA partners organized News and Brews, a two-day meeting to prepare for the upcoming PSA Grower Training season. A success story interview showed the participants especially appreciated the opportunity to get to know one another through in-person interaction. In June 2018, the NCR FSMA held its first annual conference. The annual conference evaluation showed that participants most appreciated the sessions on the second day, because they were more interactive. A conference evaluation survey question also confirmed that the meeting helped participants to know one another better. Interviews in 2019 confirmed that for most people, the experience of interacting with other food safety professionals from around the region was the highlight of the conference.

Trainers agree the PSA Grower Training is difficult to adapt for special populations.

Most of the states involved with the NCR FSMA provided data for the PSA Grower Training knowledge assessment during the 2018-19 training season, the second season during which the NCR FSMA has collected these data. Results showed the trainings continue to be effective in helping participants increase their knowledge of FSMA and food safety. However, the results also showed that participants in trainings targeting special populations had lower incoming knowledge and that they learned less during the trainings, on average. NCR FSMA partners discussed these results during a listening session.

However, they described making great efforts to make the training accessible to special populations. For example, trainings were conducted in Spanish in Michigan with native speakers as trainers and materials translated by a native speaker. Plainclothes growers participated in trainings without the use of overhead projected slides by using printed materials. Hence, trainers were disappointed to see that scores from these trainings were lower than at trainings not targeting special populations.

One trainer offered an explanation that the PSA grower training curriculum is very technical. It is difficult to understand, especially for those for whom English is a second language. An alternative curriculum to meet the FSMA education requirement for these populations might yield better results. At this time the

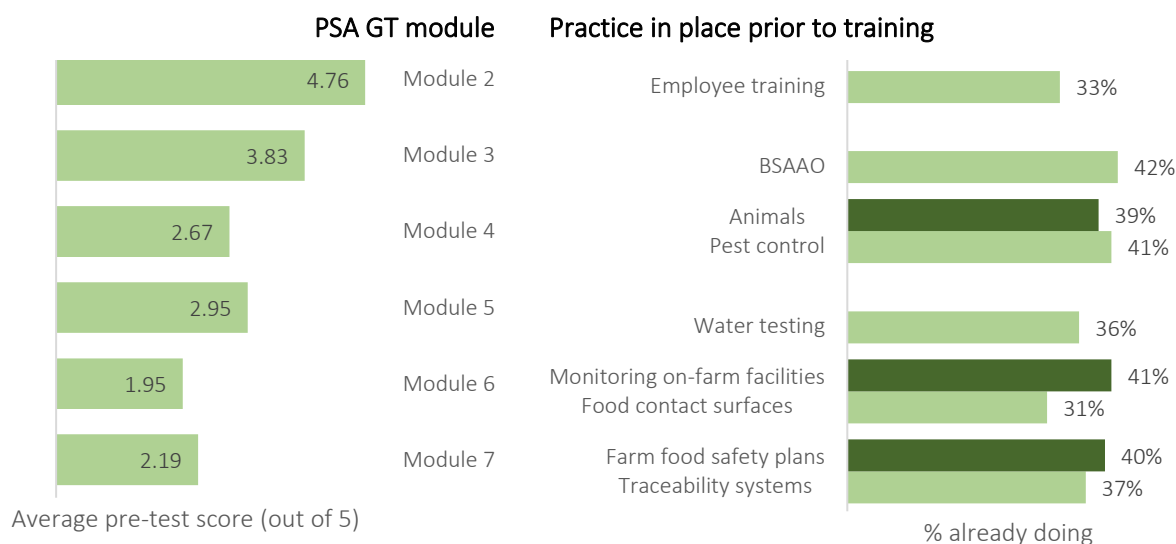
NCR FSMA, which is charged with creating a process to vet alternative curricula, is aware of one organization planning to create an alternative curriculum: the National Sustainable Agriculture Coalition. This curriculum may be less technical.

Comparison of knowledge assessment and follow-up survey results.

To determine whether there is any correlation between knowledge gained during the PSA grower training course and changes made on the farm to improve food safety, we can compare results from the knowledge assessment with the follow-up survey. This could help demonstrate whether knowledge change during the training is related to behavior change after the training.

First, comparison of pretest scores on the knowledge assessment with the practices that growers were already doing prior to the training can shed light on whether food safety knowledge correlated with safety practices in place prior to the training. Figure 17 shows there is no clear relationship between the knowledge growers had about each module prior to the training and which safety practices they had in place. For example, participants had the greatest knowledge of module two prior to the training, but employee training regarding food safety and hygiene had been implemented on only 33 percent of farms prior to the training, making this one of the least-implemented practices prior to the training.

Figure 17: No clear relationship exists between practices growers already had in place prior to the training and their knowledge of PSA GT modules related to those practices.

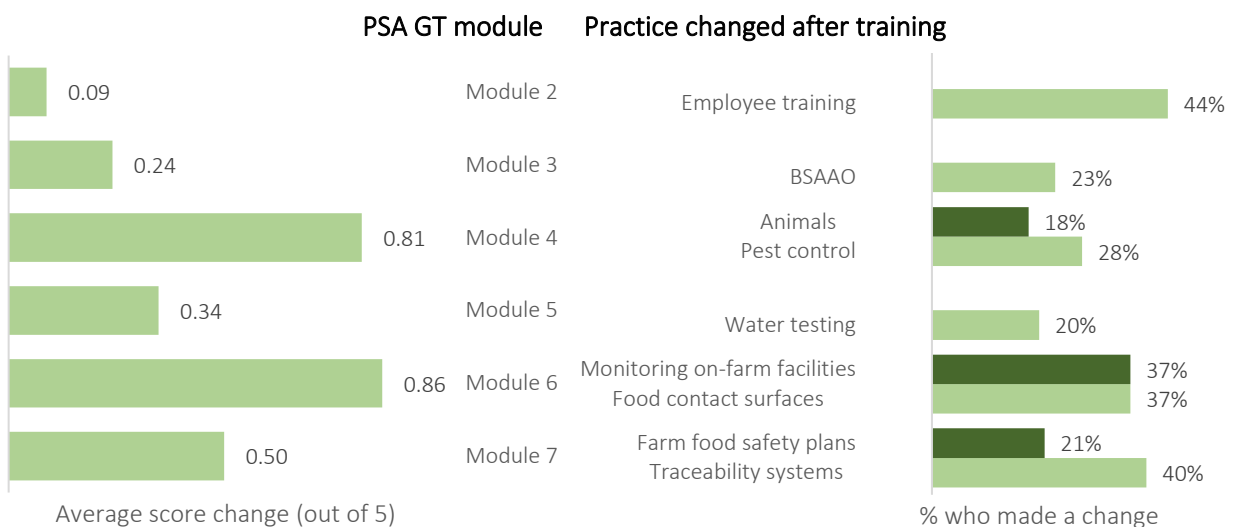


Similarly, changes in knowledge assessment scores showing the modules on which growers learned the most might be related to practices that growers then put in place following the training. Figure 18 compares average score change in each Produce Safety Alliance Grower Training module and the percent of growers who made a change after the training in practices related to those modules. Again, no clear pattern emerges. However, Figure 18 does show that participants increased knowledge most on module 6 and a relatively high percentage of respondents (37 percent) changed practices related to module 6 (monitoring on-farm facilities and cleaning and sanitizing food contact surfaces).

Together these two comparisons between knowledge assessment scores and follow-up survey results support the idea that many factors contribute to behavior change on the farm. Clearly knowledge of food safety practices is not the only influence over implementation. A needs assessment conducted by the Local Food Safety Collaborative showed that farmers indicated that lack of financial resources and time and inadequate facility infrastructure were the greatest barriers to implementing new on-farm food safety practices¹. Hence, just because a grower understands food safety practices does not necessarily mean s/he is able to implement them.

The Local Food Safety Collaborative needs assessment also showed that growers who had written an on-farm food safety plan tended to perceive barriers to implementation as less severe. Hence, the process of writing a food safety plan may help farmers feel a greater sense of agency to improve food safety practices. However, an additional analysis of the NCR FSMA’s follow-up survey data (not shown) showed that while having added a food safety plan following the training correlated with adding other food-safety practices, this correlation was not unique among the variables or new practices added. This means growers were likely to have added more than one new practice since the training or none at all.

Figure 18: Participants learned the most about module 6 and implemented practices related to that module at a relatively high rate.



¹ Bihn, E. A., Springer, L., Pineda-Bermúdez, L. (2019) Local Food Safety Collaborative Needs Assessment Survey Report. <http://190pbv35v6394438e82sds2q-wpengine.netdna-ssl.com/wp-content/uploads/sites/5/2019/10/LFSC-Needs-Assessment-Survey-Report-9-27-19.pdf>

Conclusions and recommendations

Recommendations already implemented by the NCR FSMA:

The NCR FSMA evaluator created a report for every evaluation protocol used during the first year of the USDA-funded center with recommendations. The NCR FSMA has implemented several of the recommendations already, including:

- Changed the date of monthly listening sessions to the third Thursday of each month at 2 p.m. This time was identified in the communication survey as a time which worked for the greatest number of partners.
- Discussed with the advisory board which format to use for the monthly electronic NCR FSMA newsletter. The advisory board recommended continuing to send an email with a PDF file attached.
- Helped partners become more familiar with the content of the NCR FSMA add-on materials by highlighting the content verbally during listening sessions and in the newsletters.
- Replaced the old NCR FSMA website with a new website which is more visually appealing and easier to navigate.
- Reduced barriers to participating in face-to-face meetings by offering scholarships, choosing locations that are easy to access, and offering the option to join remotely. They offered an option to join remotely at the first News and Brew meeting (October 2018), but some participants found it hard to hear and fully participate. The most recent face-to-face meeting was held in October 2019 in Minnesota to prepare trainers for the upcoming PSA grower training season (NCR Training Blast Off Deux, NB II). Organizers made a special effort to improve the meeting experience for people attending remotely by using technology that gave everyone who attended in person a microphone and using a camera that focused on whoever was speaking, so those who joined remotely could see and hear speakers. This received very positive feedback.
- Added structure to the listening sessions by choosing a topic in which to take a “deep dive.” In 2019, the NCR FSMA usually used a webinar format, during which a few people shared their knowledge or experience, followed by an open time for discussion.

Conclusions

Since the beginning, the NCR FSMA evaluation has shown that the center is responsive to stakeholder feedback. As a result, it has built up a network of food safety professionals who trust one another and value the center. Stakeholders have consistently valued learning from one another, sharing resources, and working collaboratively. The center is reaching a point of maintenance, because partners are sharing fewer suggestions for improvement because they are satisfied with the workings of the center.

That is not to say, however, that the NCR FSMA is not trying new things. In the first year of USDA funding, the NCR FSMA hosted face to face events for the first time. As in the past, they learned from those new experiences and made improvement in subsequent events. In the coming year the NCR FSMA will hold its second annual conference, go through the review process with the National Sustainable Agriculture Coalition to develop their alternative curriculum, provide mentorship matches, and fund its trainer sharing program.