

The North Central Region Center for FSMA Training, Extension,  
and Technical Assistance

# NCR FSMA 2021 Evaluation Report

Center impact and recommendations for improvement

February 2022

# NCR FSMA 2021 Evaluation Report

## Executive Summary

The North Central Region Center for FSMA Training, Extension, and Technical Assistance (NCR FSMA) formed in 2016 with funding from the US Food and Drug Administration (FDA). The purpose of the center is to equip produce safety educators, professionals, and regulators from 12 midwestern states to help small scale farmers and food processors understand and comply with the Food Safety Modernization Act (FSMA).

After three years with funding from the FDA, the NCR FSMA was funded for three more years (NCR FSMA 2.0) by the United States Department of Agriculture (USDA) and was funded again for three years in September 2021 (NCR FSMA 3.0).

The NCR FSMA uses evaluation to measure the extent to which it is meeting its objectives to allow for course correction as well as demonstrate its impact. Evaluation results in 2021 showed that the NCR FSMA the following impacts:

- The NCR FSMA communication network increase its reach in the last year, with newsletter subscribers increasing from 176 in 2020 to 211 in 2021.
- NCR FSMA network members have demonstrated engagement through their participation and listening sessions. While the *percentage* of participants who speak or use the chat during meetings has decreased, the actual *number* has increased from 2019 to 2021. As a result, the NCR FSMA has continually adjusted the format and agenda of listening sessions to better fit the larger audience that attends.
- NCR FSMA network members continue to collaborate on joint projects and events.
- Trust has remained high among NCR FSMA network members throughout NCR FSMA 2.0.
- In 2021, Food Safety Outreach Program awardees from the North Central Region reported reaching 10 unique types of underserved audiences. During interviews, all types of NCR FSMA partners identified underserved audiences that they currently serve and expressed desire to better understand how to connect with these audiences, provide relevant resources, and use data to make the case for investment in these audiences. This provides evidence that NCR FSMA partners are aligned with the NCR FSMA 3.0's objective of reaching underserved audiences.
- FSOP awardees benefited from the NCR FS MA primarily by connecting with others who are serving similar audiences or through the opportunity to share their work with the network. However, one awardee explained that they were unaware of what was available through the NCR FSMA until doing their own research in response to the invitation to participate in an interview, and would have appreciated it if the NCR FSMA had reached out to them as soon as they received their grant.
- The first alternate curriculum was approved by the FDA in 2021. The review process, and the role the NCR FSMA plays in it, is now clear. The NCR FSMA's review of the first alternate curriculum simplified the FDA approval process by checking that the curriculum aligned with the required learning objectives.

- The virtual NCR FSMA annual meeting sessions were found useful 79 percent of the time in 2021, the same as the in-person conference in 2019 (with the caveat that the 2021 evaluation survey had a very low response rate). In contrast, sessions at the first virtual conference in 2020 were found useful less often (66 percent), likely because the conference was originally planned to be held face-to-face and was switched to a virtual format at the last minute. The 2021 results show that with adequate planning, a virtual conference can be just as useful as a face-to-face conference.
- NCR FSMA partners have increased their knowledge and expanded their professional network through NCR FSMA events, listening sessions, and peer-to-peer learning and accessed new educational resources.
- 77 percent (738 of 962) of growers who responded to the NCR FSMA's follow-up survey in the last four years made a change to food safety practice, infrastructure, or equipment since the training.
- 26 percent (250 of 962) of growers made changes to infrastructure or equipment to improve food safety practices after taking the training.
- Participants in the Produce Safety Alliance Grower Trainings offered by NCR FSMA partners learned more from trainings held in 2020-21 than previous years.
- Even when differences between paper surveys and electronic are accounted for, participants in remote delivery PSA Grower Trainings offered by NCR FSMA partners learned more than participants in face-to-face trainings. One question that cannot be answered using NCR FSMA data is whether the better performance of remote delivery trainings was due to the delivery mode or to differences between populations who might choose or have access to remote delivery trainings and populations who might not.

Recommendations for next year of the center include:

- Clarify and communicate whose needs the listening sessions are meant to meet.
- Consider establishing a listserv where NCR FSMA partners can post questions or share resources.
- Continue to provide opportunities for educators to learn from regulators about on-farm food safety practices which regulators have observed need improvement.
- Invite all FSOP awardees to participate in NCR FSMA events and join the mailing list.
- Give leadership in helping states to understand how data that is being collected about farmers, such as in farm inventories, is being/could be used to inform program implementation and development and support small and diverse farms.
- Continue to expand the support available to people who work with food processors and cottage food makers.
- Collect demographic data as a part of the knowledge assessment to help answer the question of whether the superior performance of people who participate in remote delivery trainings is related to the delivery format or due to differences in the populations who access different styles of trainings.

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# Introduction

The North Central Region Center for FSMA Training, Extension, and Technical Assistance (NCR FSMA) formed in 2016 with funding from the US Food and Drug Administration (FDA). The purpose of the center is to equip produce safety educators, professionals, and regulators from 12 midwestern states to help small scale farmers and food processors understand and comply with the Food Safety Modernization Act (FSMA).

After three years with funding from the FDA, the NCR FSMA was funded for three more years (NCR FSMA 2.0) by the United States Department of Agriculture (USDA) and was funded again for three years in September 2021 (NCR FSMA 3.0). During NCR FSMA 2.0, the center was pursuing six objectives:

Objective 1: Expand the successfully established produce safety network within the NCR

Objective 2: Development and implementation of a communication system

Objective 3: Support for Food Safety Outreach Program awards

Objective 4: Support for development of FSMA add-ons and alternate curricula

Objective 5: Develop a cadre of regional FSMA trainers

Objective 6: Provide technical assistance to growers, processors and vendors in the NCR.

Objectives of the NCR FSMA 3.0 include:

Objective 1: Expand the produce safety network within the NCR to include underserved produce industry partners, more and more diverse producers, processors, and educators

Objective 2: Collaborate with and support the NCR produce safety network

Objective 3: Create, modify, and validate produce safety training materials based on a needs assessment, focusing on underserved and diverse production and processing environments and new educators

Objective 4: Professional development and technical assistance of NCR produce safety educators, growers, and processors.

Throughout the life of the NCR FSMA, evaluation has been used to measure its impact and receive continuous feedback to improve its work. This report shares evaluation results related to each objective of the NCR FSMA 2.0 in 2021. Baseline measures for NCR FSMA 3.0 are included in Appendix B.

# Methods

In 2021, seven evaluation methods were conducted, listed in chronological order.

## 1. Follow-up survey with Produce Safety Alliance Grower Training participants, January 2021

Partners from each state sent invitations to participate in the survey to people who took the training in their state. The invitation was sent via email to those who use technology and on paper to those who do not use technology. The electronic survey was conducted using Qualtrics™. At least one reminder was sent to those who received the electronic invitation, and no reminder was sent to those who received paper invitations. The only variations were in Wisconsin in years 2-4 and North Dakota in year 4, where they sent a paper copy of the survey to all participants as well as an electronic invitation to those who use technology.

Table 1 shows the number of people invited to take the survey in each state in each year and the number of responses received. The yearly response rate has ranged from 18 percent (year 1) to 26 percent (years 2 and 3). In total, 4,723 people were invited to take the survey and 1,126 responded. Therefore, the overall response rate is 24 percent, which is good for this type of survey.

**Table 1: 11 state have collected 1,126 responses in four years**

Training yr.	# of people invited to take survey					# of responses					State response rate
	Year 1 2016-17	Year 2 2017-18	Year 3 2018-19	Year 4 2019-20	TOTAL	Year 1 2016-17	Year 2 2017-18	Year 3 2018-19	Year 4 2019-20	TOTAL	
<b>Illinois</b>	47	60*	93	206	406	11	9	18	50	88	22%
<b>Indiana</b>	86	59	148	96	389	23	14	30	14	81	21%
<b>Iowa</b>	0	183	0	132	315	0	44	0	44	88	28%
<b>Kansas and Missouri</b>	28	359	296	185	868	11	99	70	33	213	25%
<b>Michigan</b>	600*	495	500*	301	1896	92	105	78	42	317	17%
<b>Nebraska</b>	0	47	19	17	83	0	14	8	2	24	29%
<b>North Dakota</b>	0	17	0	55	72	0	5	0	27	32	44%
<b>Ohio</b>	20	0	0	0	20	3	0	0	0	3	15%
<b>South Dakota</b>	0	20*	23	0	43	0	0	6	0	6	14%
<b>Wisconsin</b>	0	196	347	88	631	0	77	156	41	274	43%
<b>TOTAL</b>	781	1436	1426	1080	4723	140	367	366	253	1126	24%
<b>Yearly response rate:</b>						18%	26%	26%	23%		

\*Estimated

The response rate to surveys distributed on paper (30 percent) was higher than the response rate to the electronic survey (18 percent). This may mean our sample is skewed to include a higher proportion of Plain clothes growers than general audiences, because paper copies were sent to Plain clothes growers more often than to general audiences. (Year one is not included in paper versus electronic response rates, because whether responses were received electronically or on paper was not tracked.)



North Dakota had the highest response rate (44 percent), followed by Wisconsin (43 percent). These high response rates are likely due to sending the survey on paper to all participants in addition to sending electronic invitations to those who use technology, which both Wisconsin and North Dakota did. Offering participants more than one way to participate appears to have boosted response rates in those states.

In two cases, partners shared data from the follow-up surveys that they had conducted themselves. These two surveys are not included in Table 1.

In the first instance, partners in Iowa surveyed training participants who had taken the course in the previous two years (the 2017-18 training season, and the 2018-19 training season). They sent their survey in November 2019. Their data was added to the year three regional dataset for a few questions that both surveys had in common. Iowa received 60 responses to that survey.

In the second case, Minnesota has conducted their own follow-up survey for three years, following up with participants from trainings starting in the 2017-18 training season (year 2) through 2019-20 (year 4). They shared aggregated results from four questions that were similar enough to the regional survey to be added to the regional results. They received 108 responses.

Data was analyzed using descriptive statistics using SPSS™ (version 26) software.

Table 1 shows the number of responses from each state. More people responded from Michigan (317 responses) than from any other state.

## 2. Annual conference evaluation survey, February 2021

Participants in the annual conference were invited to take a brief survey to rate the sessions as well as answer questions regarding trust among the NCR FSMA network participants. Only one invitation to participate was sent, and reminders were not sent due to human error, so only seven complete responses were received (9 percent response rate).

## 3. Produce Safety Alliance Grower Training Knowledge Assessment, July 2021

The knowledge assessment was developed by Dr. Catherine Shoulders at the University of Arkansas. The knowledge assessment is a quiz with 25 questions related to the seven modules of the PSA Grower Training. The NCR FSMA has been utilizing the knowledge assessment since 2017.

Training participants were asked to complete the quiz before beginning the training and again after the training. Remote delivery participants completed the assessment online and face-to-face participants completed it on paper. The online survey was conducted using a Qualtrics™ survey, which the NCR FSMA evaluation team set up. Pre-test and post-test responses were matched using a unique identification number or word, 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. (In a few cases, a person completed only the pre-test or only the post-test.) The evaluation team received 511 complete responses in year 4. In total, 3,703 complete responses have been received from the region since year 1 (2017-18), from 235 trainings (Table 2).

The NCR FSMA evaluation team analyzed the data using SPSS™.

In addition, training organizers completed a cover sheet for each training. The cover sheets provided information including the date of the training, the location, names of trainers, the number of participants, types of supplemental educational activities conducted during the training, and whether the training was targeted towards any special population. Special populations tracked included Plain clothes growers (which includes Amish and Mennonite growers), minorities, local food growers, military veterans, non-English/limited English language, and other. In year 4, trainings were held for Plain clothes growers, local food growers, and regulatory professionals from the FDA and Michigan Department of Agriculture and Rural Development.

Year 4 saw a proliferation of multi-state trainings, when NCR FSMA partners jointly taught remote trainings. Kansas and Missouri held five joint trainings, with 54 participants responding to the knowledge assessment. Iowa and Nebraska held two joint trainings, with 43 respondents. Finally, Nebraska, North Dakota, and South Dakota held one joint training, with seven respondents.

While the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) held two trainings in year 4, they did not conduct the knowledge assessment, because of a change in staff responsibilities at DATCP.

While data from more trainings was submitted in year 4 for the knowledge assessment (52) than in year 3 (50), the number of respondents was lower in year 4 (511 versus 893, Table 2). This is because the average number of participants in the trainings in year 4 (13) was lower than in year 3 (18).

**Table 2: The number of responses to the knowledge assessment has declined steadily since year 2.**

	# of responses					# of trainings				
	Year 1 2017- 2018	Year 2 2018- 2019	Year 3 2019- 2020	Year 4 2020- 2021	Total	Year 1 2017- 2018	Year 2 2018- 2019	Year 3 2019- 2020	Year 4 2020- 2021	Total
<b>SINGLE STATE TRAININGS</b>										
<b>Illinois</b>	-	86	179	-	265	-	5	7	-	12
<b>Indiana</b>	91	161	57	166	475	9	14	5	22	50
<b>Iowa</b>	184	164	131	13*	492	11	14	9	2*	36
<b>Kansas</b>	57	59	64*	*	180	3	6	4*	*	18
<b>Michigan</b>	-	277	178	185	640	-	13	8	16	37
<b>Minnesota</b>	131	276	71	43	521	5	15	5	4	29
<b>Missouri</b>	62	155	109*	*	326	3	10	5*	*	18
<b>Nebraska</b>	54	12	15	*	81	2	2	1	*	5
<b>North Dakota</b>	-	-	-	*	-	-	-	-	*	-
<b>Ohio</b>	-	-	-	-	-	-	-	-	-	-
<b>South Dakota</b>	9	16	-	*	25	1	1	-	*	2
<b>Wisconsin</b>	179	326	82	-	587	6	13	5	-	24
<b>MULTI-STATE TRAININGS*</b>										
<b>Kansas and Missouri</b>	-	-	7	54	61	-	-	1	5	6
<b>Iowa and Nebraska</b>	-	-	-	43	43	-	-	-	2	2
<b>Nebraska, North Dakota, and South Dakota</b>	-	-	-	7	7	-	-	-	1	1
<b>Total</b>	767	1,532	893	511	3,703	40	93	50	52	235

\*See multi-state trainings.

#### 4. Annual partner interviews, Fall 2021

Approximately one third of active advisory board members, state leads, and active state regulators were invited to participate in the interview process in 2021. Fifteen partners were invited to participate, and 10 responded to the invitation and were interviewed. One email invitation was returned because the intended recipient had left employment with the organization. Therefore, the response rate was 71 percent.

Those who were interviewed included five regulators, two state leads, and five FSOP awardees (two of whom were also state leads).

Interviews were conducted over the phone from November 2021 through January 2022. Interviews were semi-structured, using a common interview template. The evaluator took notes of the conversation but did not record the calls. Interviewees were promised confidentiality, meaning identifying information would not be associated with their responses, and were informed that they could skip any question they did not want to answer.

Data was coded for themes using NVivo™ software.

#### 5. Food Safety Outreach Program survey, Fall 2021

Recipients of a Food Safety Outreach Program (FSOP) grant from the North Central Region completed an electronic survey. The survey was developed by Amy Harder, PhD, an evaluator at the University of Florida. The survey was conducted using Qualtrics™. Eight grant recipients reported in 2021. Data was analyzed in Excel using descriptive statistics.

#### 6. Participant observation, continual

The evaluator participated in monthly listening sessions and took extensive notes during the sessions, noting the level of participant engagement. She also received the monthly newsletters and participated in team lead meetings.

#### 7. Success stories, continual

In a continual process, NCR FSMA partners identify success stories and inform the NCR FSMA evaluator or program coordinator that they have a story. The NCR FSMA evaluator or program coordinator contacts the people involved, usually farmers or food safety educators, and interviews them about their experience with the NCR FSMA. The evaluator or program coordinator then writes a story based off interview data and shares the story back with interviewees for their approval. In this way, the stories are verified to be true.

New in 2021, NCR FSMA partners were invited to submit stories which they had written. Stories are posted to the NCR FSMA website at: <https://www.ncrfsma.org/impacts>.

# Results

Objective 1: Expand the successfully established Produce Safety Network within the NCR

## **Indicator 1: Communication network increases reach**

*Newsletter subscribers **increased** from **176 in 2020** to **211 in 2021**.*

The NCR FSMA maintains a list of people who subscribe to its email newsletters. In 2021, 211 people received the newsletter. This was an increase of 45 people (20 percent) from 176 in 2020.

Objective 2: Development and implementation of a communication system

## **Indicator 2.1: Network members demonstrate engagement**

**Five of 11** listening sessions enjoyed **moderate or high participation** from participants.

*The average number of people who attend listening sessions **increased** from **19 in 2019** to **33 in 2020** to **35 in 2021**.*

Through participant observation, the evaluator noted how many people spoke or shared something in the chat box during each listening session. In most sessions (6 of 11), fewer than 35 percent of participants spoke or shared something in the chat box. These sessions were rated as having low participation. Yet, three sessions had high engagement, when over half of attendees participated, and two had moderate participation.

While the number of listening sessions with high or moderate engagement has decreased from 2019 (9 of 10 meetings) to 2020 (8 of 11) to 2021 (5 of 11), the average *number* of people who share during a meeting increased from 8 to 13 to 15. Similarly, on average, the total number of people who participate in listening sessions nearly doubled from 19 in 2019 to 33 in 2020. This level of high attendance was maintained in 2021, with an average of 35 participants in each listening session.

It appears that people find value in the listening sessions, which explains the uptick in participation numbers. The fact that more people are working from home due to the COVID-19 pandemic may have also contributed to the increase in participation. However, higher participation creates the challenge of giving all who want to participate an opportunity to speak, which may explain the lower number of high-participation meetings. While the number of participants who share has increased, it has not kept pace with increasing participation numbers, which may indicate the NCR FSMA can explore ways to increase sharing during these high attendance meetings.

In addition, three interviewees recommended the NCR FSMA revisit and refine the purpose of the monthly listening sessions. Two interviewees indicated it was unclear who the intended audience is for these sessions and indicated they did not consistently find value in every call; both were regulators. A third interviewee, a university employee, indicated they would appreciate more time for interaction and networking during the calls.

Year after year, the best format for the listening sessions comes up during annual interviews, as this is one of the primary venues through which NCR FSMA partners connect with one another. Every year, some

interviewees indicate they prefer a structured learning time with defined topics and speakers, while other participants would like to hear updates and have time for open discussion.

These results may indicate different audiences have different needs, and it may be necessary to clarify whose needs the listening sessions are meant to meet. Alternatively, the NCR FSMA may want to consider providing different venues for different needs. For example, one interviewee suggested creating a listserv which partners may use to interact with one another, such as by asking a question or providing a resource. This could help fill the need for an open space for discussion.

*“Monthly calls haven’t been as prioritized because they haven’t been as focused. It would be nice to have a preview of what is coming up. We weren’t learning anything new from the sessions.”*

*~ State regulator*

### ***Indicator 2.2: Increased collaboration among network members***

*Network members continue to collaborate on joint projects and events.*

Evidence collected during monthly listening sessions indicate that the NCR FSMA has facilitated collaboration:

- In 2021, 10 PSA grower trainings were collaboratively offered using remote delivery, five of which would not likely have occurred without the NCR FSMA.
- During a listening session, an FDA employee offered to help teach an upcoming PSA Grower Training in a state that did not have enough trainers.
- Trainers from 11 states collaborate yearly to conduct a knowledge assessment and follow-up survey to evaluate the PSA Grower Training.

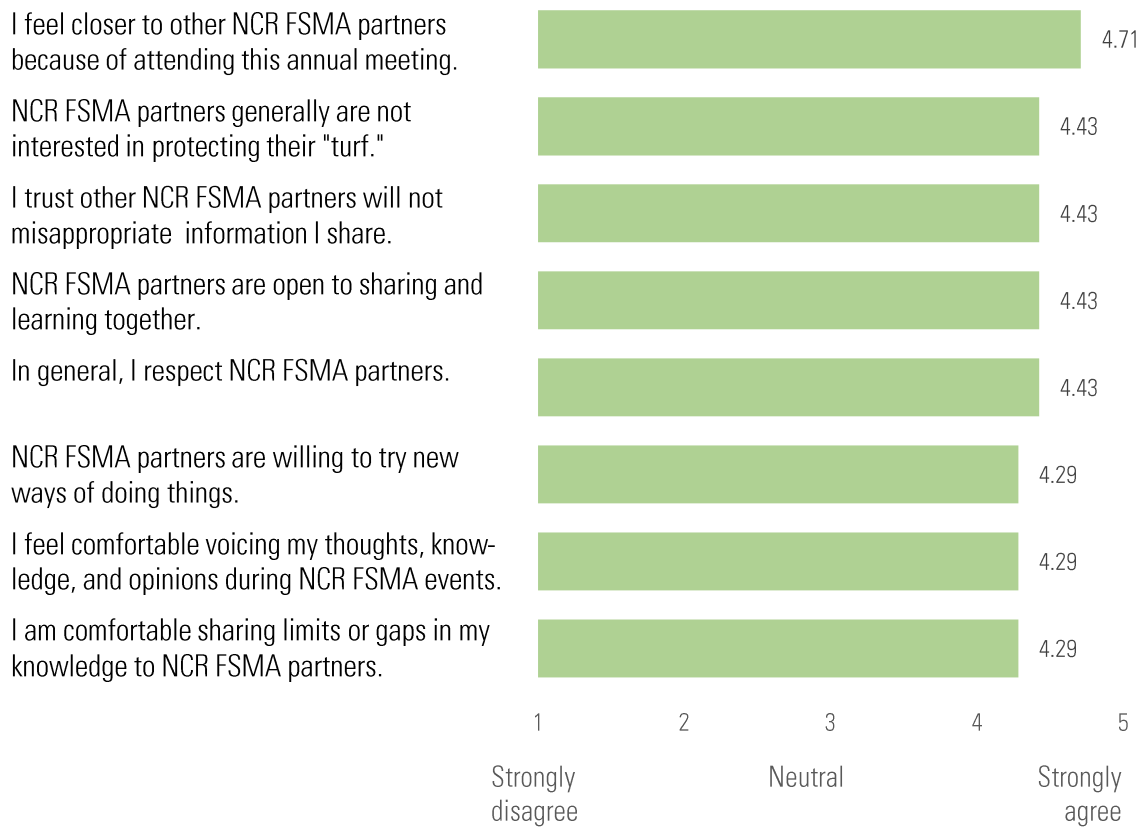
### ***Indicator 2.3: Trust increases among network members***

*Trust has remained high during NCR FSMA 2.0*

Developing and maintaining trust among NCR FSMA partners creates an environment where partners can learn together, ask questions, and reveal what they don't know. Such environments increase the likelihood that partners will share resources, reducing duplication of efforts and ultimately resulting in greater access to resources for small scale produce growers and processors.

The annual conference evaluation includes questions to measure trust among NCR FSMA partners. Figure 1 shows the average agreement score of respondents in 2021 to eight statements measuring trust. While only seven people responded to the survey in 2021, 100 percent agreed or strongly agreed with every statement. Similarly, 88 percent of statements were agreed with in 2020 and 94 percent in 2019. These consistent, high scores indicate there is high trust among NCR FSMA partners.

**Figure 1: Trust measured during the annual conference was high.** (7 respondents)



*"The thing that has been most helpful and engaging is building relationships with others doing this work in our region."*

~State regulator

Objective 3: Support for Food Safety Outreach Program awards

**Indicator 3: Approved materials reach underserved audiences**

FSOP awardees reported reaching **10 unique types of underserved audiences** in 2021.

Four FSOP awardees in 2021 reported reaching underserved audiences including:

- Military veterans,
- Niche sustainable farmers,
- Beginning farmers,
- Non-native English speakers,
- Racial or ethnic minority groups,
- Female farmers,
- Plain clothes growers,
- Refugees, including Burmese and Bhutanese,

- Urban farmers, and
- Operators of small farms.

Some awardees served groups in common, especially operators of small or niche farms.

Through interviews, FSOP awardees indicated that the NCR FSMA supported their grant-funded work primarily by connecting them with others, with three of five mentioning this topic. For example, one worked collaboratively with a person from another state to offer trainings to an underserved audience and would not have known the other person had it not been for the NCR FSMA. Similarly, two mentioned the opportunity to share their work with the NCR FSMA network.

*"I would say NCR FSMA not just provides letters of support but real connections and support."*

*~ FSOP awardee*

However, one FSOP awardee's only interaction with the NCR FSMA has been to provide evaluation data, and first became aware of what was available through the NCR FSMA when they did their own research into the center and response to the invitation to participate in the evaluation interview. This person shared a desire to be connected to the NCR FSMA network and resources, expressing surprise that upon receiving the grant the NCR FSMA had not reached out to make them aware of what was available to them.

Relating back to underserved audiences reached by FSOP awardees, all interviewees (not only FSOP recipients) identified underserved audiences that they currently serve or who they would like to serve. They identified several audiences, with the most common audience being Plain clothes growers, Hmong growers, Spanish speaking growers, BIPOC growers, and operators of small farms. They expressed desire to better understand how to connect with these audiences, provide relevant resources, and use data to make the case for investment in these audiences. This provides evidence that NCR FSMA network members are aligned with the goals of the NCR FSMA 3.0 to better serve niche and underserved audiences.

#### Objective 4: Support for development of FSMA add-ons and alternate curricula

##### **Indicator 4.1: Review process is clear and easy to navigate**

*The alternative curricula review process is clear now that the first alternate curriculum has been approved.*

While the review process for alternate curricula was unclear in 2020, progress was made in 2021. The first alternate curriculum, created by the National Sustainable Agriculture Coalition, was approved in 2021. Going forward, it has become clear that the NCR FSMA's role is to ensure the curriculum aligns with the Produce Safety Rule and meets the required learning objectives, while the FDA's role is to review the curriculum for more technical aspects.

##### **Indicator 4.2: Review improves alternative curricula accuracy and quality**

*The NCR FSMA's review of the alternate curriculum **streamlined the FDA approval process** by checking that the curriculum aligned with the required learning objectives.*



The NCR FSMA provided comments on how well each slide of NSAC's curriculum aligned with the required learning objectives and with the Produce Safety Rule. NSAC made edits based on these comments. As a result, the approval process with the FDA was streamlined, because the NCR FSMA helped the FDA to better understand NSAC's goals for the curriculum and ensure that the curriculum aligned with the Produce Safety Rule and required learning objectives.

#### Objective 5: Develop a cadre of regional FSMA trainers

##### **Indicator 5.1: Annual meeting provides relevant information**

**79 percent** of respondents rated annual conference sessions as extremely or very useful.

For the second year in a row, the 2021 annual conference was held virtually because of the COVID-19 pandemic. The conference was split between three afternoons, each held one week apart. In 2021, conference sessions to be very or extremely useful 79 percent of the time. This is up from 2020 (66 percent), and the same as 2019 (79 percent). However, only 7 respondents filled out the survey in 2021, making it difficult to draw firm conclusions about the usefulness of the 2021 conference compared with previous conferences.

The lower rate of satisfaction in 2020 was likely due to the fact the conference was switched from a face-to-face conference to a virtual conference on short notice due to the pandemic and included full days of programming. The 2021 conference was planned to be a virtual event from the start and spread the content out over three afternoons. Comments left on the 2021 evaluation survey indicated participants appreciated that the conference was spread over multiple days, because it is difficult to participate in all day online events. The fact that the level of satisfaction in 2021 is equal to that of 2019 supports the idea that a virtual conference can be just as useful as a face-to-face conference if planned well.

The 2021 annual conference survey asked respondents which conference format, virtual or in person, was most preferred for 2022 if face-to-face gatherings could safely resume. Three people indicated they prefer face-to-face, one preferred a hybrid model, and one preferred all virtual. Through comments they expressed that networking is much easier at a face-to-face conference than virtual, but the cost of traveling is prohibitive for many.

*"As fun and beneficial as it is to mingle and network at a dinner table and build relationships in-person with folks after sessions, I find that this virtual format worked really well and cost significantly less - allowing people maximum flexibility and attendance because more folks can attend a free conference. [...] However, if we were to have the ability to gather on location and get on an urban farm, for example, or one of our under-served groups' locations, that to me would be worth the time and expense to be there in person."*

*~ NCR FSMA partner*

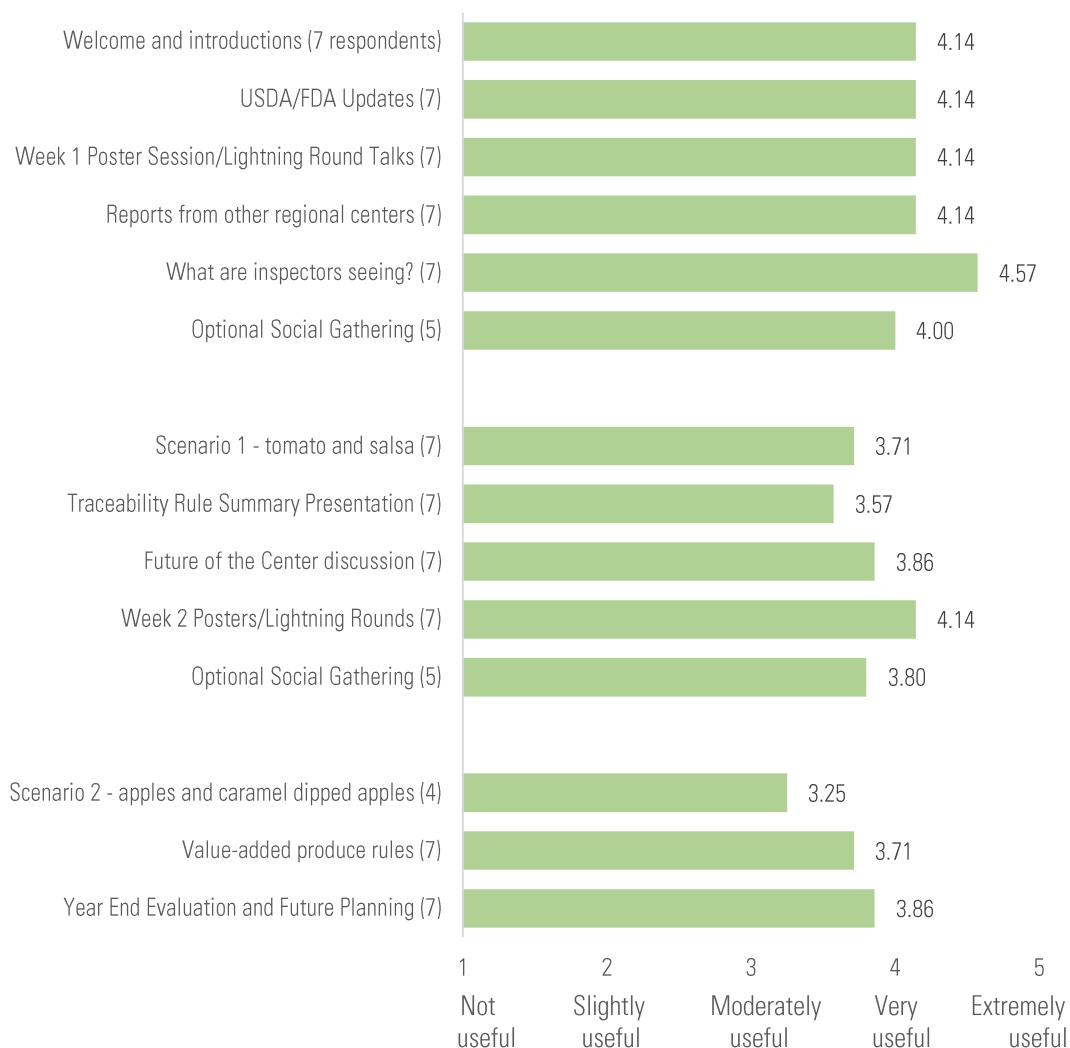
Interview participants also expressed varied opinions about meeting face-to-face versus virtual. While this one specifically requested in-person meetings, others seemed satisfied with virtual options.

Figure 2 shows how attendees rated each annual conference session. Day one had higher ratings than days two and three, on average. One session stood out because of its exceptionally high average rating: What are inspectors seeing? One interviewee gave insight into this topic, explaining that educators are eager to learn how they can better prepare farmers for inspection.

*“We need to know what [regulators] are doing because we aren’t on their calls. If issues are coming up, why don’t they share it with us? We would benefit from maybe sharing some of the overview of what they are talking about. FSMA rules are about regulation and we need to know what they are doing. Maybe every six months we can hear about the issues they are identifying.”*

*~Food safety educator*

**Figure 2: Day 1 of the conference received the highest ratings, especially the session about what inspectors were seeing on farms.**



### **Indicator 5.2: Food safety professionals increase capacity**

*NCR FSMA partners have **increased their knowledge** and **expanded their professional network** through NCR FSMA events, listening sessions, and peer-to-peer learning and **accessed new educational resources**.*

As in past years, interviewees identified expanding their professional network as one of the biggest benefits of being a part of the NCR FSMA. Five interviewees mentioned this. Through interacting with their peers, they have increased their knowledge and learned about new educational resources that are available to them.

Notes taken during listening sessions showed that in nearly every session, participants requested additional information about resources that others had shared, such as where to purchase binders to offer PSA Grower Trainings to Plain clothes audiences, how to access the Iowa Valley RC&D's handbook for building a pack shed, and where to find K-State's farm supervisor training.

*"Through the NCR FSMA, I learned about the clearinghouse. When developing materials, I use that. Also, some of the NCR publications, like visitors' guidance and dropped produce we use all the time and share with our growers on a regular basis. I have used a lot of [NCR FSMA's] stuff for sure."*

*~Regulator*

Objective 6: Provide technical assistance to growers, processors and vendors in the NCR.

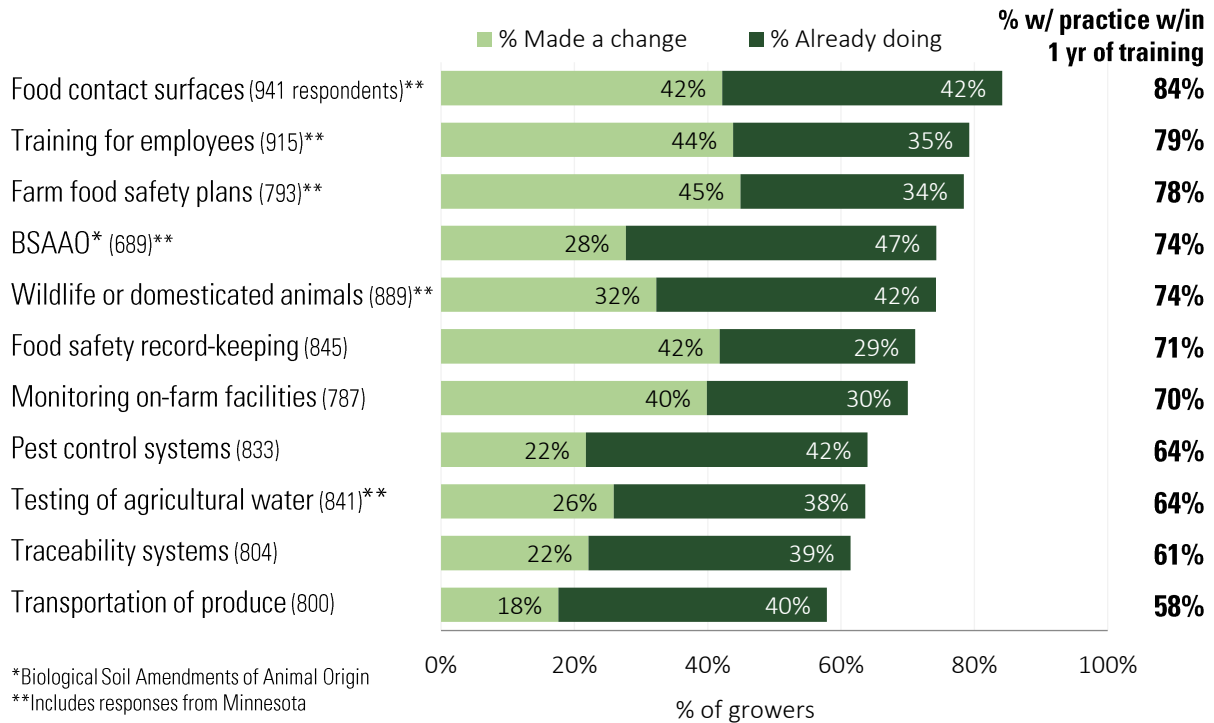
### **Indicator 6.1: Farmers implement new food safety practices**

**77 percent** (738 of 962) of growers who responded to the follow-up survey in the last four years **made a change to food safety practice, infrastructure, or equipment** since the training.

Figure 3 shows which changes farmers/growers made, as well as which practices they already had in place prior to the training (and therefore did not need to change). By the time the NCR FSMA conducted the follow-up survey (approximately one year after each training), 84 percent of farms had adequate practices for cleaning and sanitizing food contact surfaces and 79 percent were providing training for employees about food safety.

Respondents' next most common changes were to food safety plans (45 percent) and training for employees (44 percent) since the training.

**Figure 3: Growers most commonly had implemented practices for cleaning and sanitizing food contact surfaces within one year of training.**



### **Indicator 6.2: Farmers change infrastructure**

**26 percent** (250 of 962) of growers made changes to **infrastructure or equipment** to improve food safety practices after taking the training.

Making changes to infrastructure and equipment shows growers are making systems-level changes to improve food safety, which is a higher level of change than practice changes. Two hundred fifty farms reported making changes to equipment or infrastructure since the training to improve food safety systems.

Infrastructure changes made by respondents included:

- adding or upgrading handwashing stations or facilities (96 respondents),
- adding new or improving equipment, such as packing line equipment (59),
- constructing new, adding on to existing, or upgrading buildings (38),
- adding new or upgrading existing restrooms or portable toilets (34),
- improving water systems, including switching to drip irrigation or changing water sources (29),
- constructing fences, netting, or other barriers to deter wildlife or domesticated animals from production areas (12),
- upgrading food contact surfaces so they are easily cleanable (12),
- upgrading storage or picking containers so they are easily cleanable (9),

- dedicating vehicles for the transportation of produce (9),
- creating clean zones within buildings (9),
- displaying new signage (4), and
- changing growing areas, including building a hoop house with food safety principles in mind and moving growing stations to areas more suitable for food safety (2).

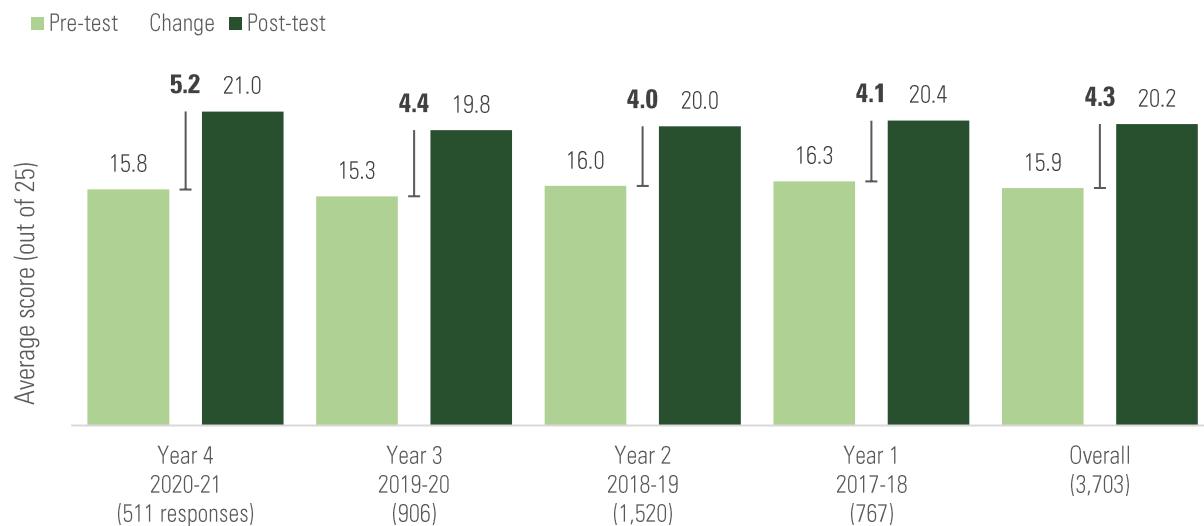
### **Indicator 6.3: PSA Grower Training participants increase knowledge**

Participants **learned more** from trainings held **in 2020-21 than previous years**.

The average pre-test score of respondents (15.8 points of 25) was higher during the 2020-21 (year 4) training season than previous years (Figure 4). An independent sample t-test showed that pre-test scores in year 4 were no different from previous years ( $p=0.273$ ), concluding that participants came to the training with a similar baseline knowledge in year 4 as in previous years.

The average post-test score in year 4 (21.0) was also higher than in previous years. The difference in scores between year 4 and previous years was statistically significant ( $p=0.001$ ), meaning the participants left the training in year 4 with higher knowledge than participants in previous years. Finally, scores improved on the test by 5.2 points, on average, in year 4, which is higher than previous years ( $p=0.001$ ). The difference in average score change between year 4 (5.2 points) and previous years aggregated (4.1 points) is statistically significant ( $p=0.001$ ), so one can conclude that participants learned more in year 4 than in previous years.

**Figure 4: Participants learned more from trainings held in 2020-21 than previous years.**



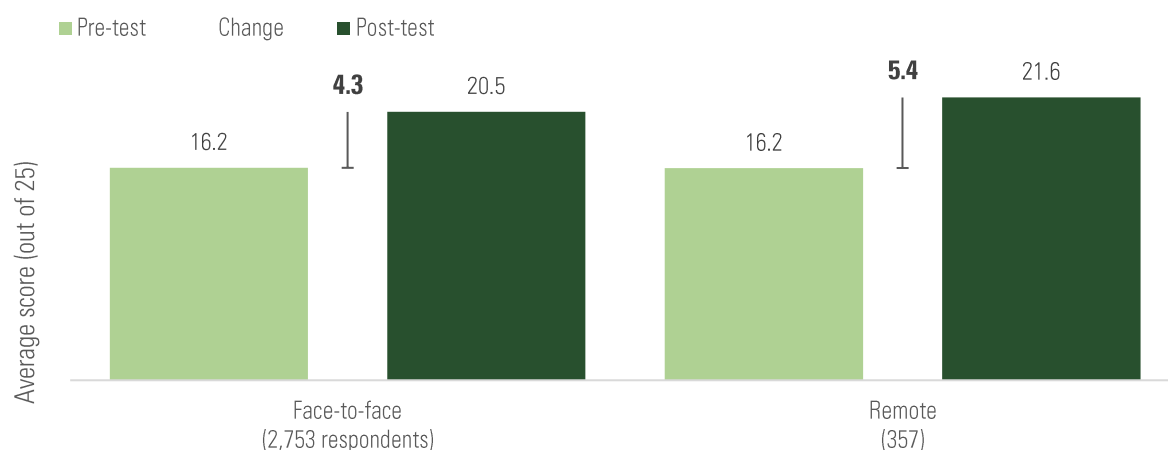
Participants in **remote delivery trainings learned more** than participants in face-to-face trainings.

To determine if learning at remote delivery trainings was any different than face-to-face trainings, the NCR evaluation team compared knowledge change scores between the two types of trainings using data from all years. Trainings for Plain clothes growers and growers who do not speak English were removed from the analysis, because they did not participate in remote delivery trainings. Removing these two populations

allows the analysis to compare similar populations, thus removing any confounding effects these special populations could have on the results.

Figure 5 shows that on average remote delivery participants had the same knowledge assessment scores on the pre-test as participants in face-to-face trainings (16.2 points). Therefore, remote delivery participants came to the training with the same level of baseline knowledge as face-to-face participants. The average post-test score was higher for remote delivery participants (21.6) than face-to-face (20.5), and the difference is statistically significant ( $p=0.001$ ). Finally, on average scores increased by 5.4 points at remote trainings, significantly higher than at face-to-face trainings (4.3,  $p=0.001$ ). Hence, one can conclude that participants in remote delivery trainings learned more on average than participants in face-to-face trainings, and they left with a higher knowledge of on-farm produce safety and FSMA.

**Figure 5: Participants in remote delivery training learned more than participants in face-to-face trainings.**



When taking the knowledge assessment on paper, some respondents chose multiple answers to a question, as opposed to one answer, and therefore received zero points for that question. In contrast, participants in remote delivery trainings took the assessment electronically and were forced to choose one answer. Had participants in face-to-face trainings been forced to select one answer they may have gotten the question right. To test whether forcing participants in face-to-face trainings to choose one answer would have increased their average scores and account for the differences between face-to-face and remote delivery trainings, the evaluators created several scenarios and concluded that participants in remote delivery trainings scored higher on the post-test and increased their scores by more points on average than participants in face-to-face trainings.

One question that cannot be answered using the knowledge assessment data is whether the better performance of remote delivery trainings was due to the delivery mode or to differences between populations who might choose or have access to remote delivery trainings and populations who might not.

#### ***Indicator 6.4: Growers utilize the NCR Center's network of expertise***

This indicator refers to the NCR FSMA's original plan to create a portal where growers could submit questions related to FSMA. This portal has not been created, because a similar resource is available through the [Food Safety Resource Clearinghouse](#) website.

#### ***Indicator 6.5: Regional centers contribute to food safety changes***

*The NCR FSMA collected **four stories** related to how it has contributed to **food safety changes**.*

The NCR FSMA gathers success stories through process of collecting information directly from farmers and food educators, writing it up as a story, and then asking them to verify that the information is true. In 2021, eight stories were collected and four of them documented on-farm impacts:

- The first story describes a temporary pack shed designed by Iowa valley RC&D and describes how the pack shed has contributed to positive food safety infrastructure at one small farm.
- The second story explains how a Hmong farmer in southwest Missouri was able to scale his operation while implementing good agricultural practices with the help of Lincoln University.
- The third story describes how an Amish farmer has especially benefited from the University of Missouri Extension resources for many years. Recently, MU Extension helped him access free water testing and, in response, improve water quality practices on his farm.
- The final story documents how a Kansas farm family stopped washing lettuce as a result of participating in the PSA grower training offered by K-State Extension. They learned that washing lettuce introduced an avenue for potential contamination.

## Conclusion

The NCR FSMA 2.0 has met all its objectives. During the three years of NCR FSMA 2.0, the center has adjusted to supporting food safety educators during the COVID-19 pandemic. Organizers quickly pivoted to offer the 2020 annual conference virtually, after planning for it to be face-to-face. As a result, satisfaction with that conference was not as high as previous conferences, but the center was able to adjust and offer a virtual conference in 2021 that was found to be just as useful as face-to-face conferences.

In addition, during the three years of NCR FSMA 2.0, participation in monthly listening sessions increased dramatically. As a result, the NCR FSMA has adjusted to keep these sessions relevant and interactive, knowing that continual adjustments may need to be made. Also, during this time frame, the NCR FSMA began supporting calls for regulators and people working on state farm inventories in the NCR, which participants have found very valuable.

One highlight of 2021 was learning that participants in remote delivery PSA Grower Trainings learned more than participants in face-to-face trainings. While it is not known if this was due to a difference in the delivery method of the course or a difference in which type of people accessed remote delivery trainings compared with those who attend face-to-face trainings, it supports the conclusion that remote delivery trainings are at least as effective as face-to-face trainings, if not more.

Recommendations from the 2021 NCR FSMA evaluation include:

- Clarify and communicate whose needs the listening sessions are meant to meet.
- Consider establishing a listserv where NCR FSMA partners can post questions or share resources.
- Continue to provide opportunities for educators to learn from regulators about on-farm food safety practices which regulators have observed need improvement.
- Invite all FSOP awardees to participate in NCR FSMA events and join the mailing list.
- Give leadership in helping states to understand how data that is being collected about farmers, such as in farm inventories, is being/could be used to inform program implementation and development and support small and diverse farms.
- Continue to expand the support available to people who work with food processors and cottage food makers.
- Collect demographic data as a part of the knowledge assessment to help answer the question of whether the superior performance of people who participate in remote delivery trainings is related to the delivery format or due to differences in the populations who access different styles of trainings.



## Appendix A: NCR FSMA 2.0 Indicators table

**Table 3: The six objectives of the NCR FSMA and how their attainment is measured.**

	<b>Indicator</b>	<b>Measure</b>	<b>2019</b>	<b>2020</b>
<b>Objective 1: Expand the Successfully Established Produce Safety Network within the NCR</b>	Communication network increases reach	# subscribers receiving newsletters	193	176
<b>Objective 2: Development and Implementation of a Communication System</b>	Network members demonstrate engagement	Participant observation	5 high participation mtg. (≥50% of participants speak) 6 moderate (35-40%) 1 low (≤34%)	1 high participation mtg. (≥50% of participants speak) 8 moderate (35-49%) 2 low (≤34%)
	Increased collaboration among network members	# interviewees who collaborate for first time	3 of 6 (50%)	4 of 9 (44%)
		# interviewees who collaborate in a new way	1 of 6 (17%)	1 of 9 (11%)
	Trust increases among network members	% mtg. attendees who agree with statements about trust	94%	88%
<b>Objective 3: Support for Food Safety Outreach Program Awards</b>	Approved materials reach underserved audiences	# audiences reached by NCR FSOP projects	13	4
<b>Objective 4: Support for Development of FSMA Add-ons and Alternate Curricula</b>	Review process is clear and easy to navigate	Interview data about curricula review process	Not conducted in year 1	Review process has been conducted by the FDA and has not been clear
	Review improves add-ons and alt. curricula accuracy/quality	Interview data about curricula review process	Not conducted in year 1	Restructured the curriculum and improved lesson plans

	<b>Indicator</b>	<b>Measure</b>	<b>2019</b>	<b>2020</b>
<b>Objective 5: Develop a Cadre of Regional FSMA Trainers</b>	Annual meeting provides relevant information	# attendees who rate sessions useful	79%	66%
	Food safety professionals increase capacity	Impact stories	Story about News and Brews	COVID story, BSAAO story
<b>Objective 6: Provide Technical Assistance to Growers, Processors, and Vendors in the NCR.</b>	Farmers implement new food safety practices	# respondents changed practices	293 (73%) (data from 2018 + 2019)	259 (76%)
	Farmers change infrastructure	# respondents who added/ upgraded infrastructure	110 (28%) (data from 2018 + 2019)	69 (25%)
	PSA Grower Training participants increase knowledge	Average score change on knowledge assessment	4.1	4.5
	Growers utilize the NCR Center's network of expertise	# questions or info. requests/year	Not created in year 1	Not created in year 2
		# page visits to the FAQ page	Not created in year 1	Not created in year 2
	Regional centers contribute to food safety changes	Impact stories	Mennonite story	DATCP story

## Appendix B: NCR FSMA 3.0 Indicators table

Objective	Indicator	Measure	Baseline measure, 2021
<b>Objective 1: Expand the produce safety network within the NCR to include underserved produce industry partners and more diverse producers, processors, and educators.</b>	NCR FSMA engages for the first time people who work with diverse audiences.	# of underserved audiences represented by stakeholder feedback boards.	0
		# of people participating in stakeholder feedback boards.	0
<b>Objective 2: Collaborate with and support the NCR produce safety network partners.</b>	Stakeholders indicate they are satisfied with NCR FSMA communications.	Qualitative evidence from interviews and meeting notes.	Stakeholders have consistently expressed satisfaction with newsletters. Satisfaction with listening sessions was mixed in 2021, although attendance was the highest ever.
	Increase in the number of lead trainers within target populations of growers and processors.	# of lead trainers in the NCR within target populations of growers and processors.	0 Hmong 2 Spanish (Scott Monroe, Bismarck Martinez) 0 Plain clothes
<b>Objective 3: Create, modify, and validate safety training programs based on a needs assessment, focusing on underserved and diverse production and processing environments and new educators.</b>	Increased number of culturally appropriate food safety education materials.	# of food safety education materials newly created or modified by NCR FSMA partners to fit the needs of underserved audiences.	0
<b>Objective 4: Professional development of and technical assistance for NCR produce safety educators, growers, and processors.</b>	NCR FSMA hosts advanced trainings, such as the Advanced Produce Safety Rule training, the Advanced Sanitizer Training curriculum, as well as Water and Biological Soil Amendments of Animal Origin trainings.	# of advanced trainings hosted by the NCR FSMA.	1 (BSAAO, Sept. 11-12, 2019, Altoona, IA)

	Growers and processors are co-trained with food safety educators.	# of growers co-trained with food safety educators.	0
		# of processors co-trained with food safety educators.	0