



Optimizing Human Health and Nutrition: From Soil to Society

Progress and Collaboration Survey Report
November 2022

KANSAS STATE

UNIVERSITY

Office of Educational
Innovation and Evaluation

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Background

In 2021, Washington State University (WSU) and its partners received funding from the United States Department of Agriculture National Institute of Food and Agriculture (USDA-NIFA) for an Agriculture and Food Research Initiative (AFRI) Sustainable Agricultural Systems (SAS) project, *Optimizing Human Health and Nutrition: From Soil to Society* (herein referred to as the AFRI SAS Soil to Society project). According to the project's proposal, the long-term goals of this project are to create more nutritious, affordable, and accessible whole grain-based foods through (1) the investigation of the contribution of novel, biofortified crop varieties and food products to human health through clinical and epidemiological evaluations and (2) the development and deployment of nutritious food products made from improved crop varieties grown within sustainable cropping systems.

This multi-institutional and transdisciplinary project will employ a Soil to Society (S2S) pipeline strategy that addresses gaps in current knowledge and traces the flow of nutrients from agricultural systems and food production to human consumption. The strategy will culminate in the synthesis of more sustainable agricultural management strategies and healthy and affordable food products to meet the needs of diverse individuals and communities.

To address short-, medium-, and long-term goals, the project's key objectives are to:

1. Understand and apply the roles of environment, soil, and cropping system management on soil health, farm economics, and the nutritional content of the grain for each target crop (Soil Management and Cropping Systems).
2. Develop new varieties of barley, wheat, peas, lentils, quinoa, and buckwheat with enhanced health and nutritive value (Plant Breeding and Genetics).
3. Confirm the impact of nutritionally enhanced varieties on key indicators of human health and assess acceptance using consumer panels (Human Health and Nutrition).
4. Develop a diverse and innovative suite of flavorful, affordable, and nutritious food products that will be accessible to consumers from all income levels (Food Science and Product Development).
5. Conduct population studies to explore impacts on dietary quality by increasing target crop consumption in US diets and assess consumer acceptance and valuation of whole grain- and legume-based foods (Community-based Health and Nutrition).
6. Focus educational capacity on secondary student instruction, teacher professional development, and farmer training (Education).
7. Disseminate knowledge gained and products developed to stakeholders across agriculture, food and health sciences, and communities, schools, and underserved populations through a wide-reaching extension effort (Extension).

Purpose

As part of the project evaluation, the AFRI SAS Soil to Society project leadership contracted with the Office of Educational Innovation and Evaluation (OEIE) to conduct evaluation activities that assess the progress, implementation, and impacts of the project. Project leadership collaborated with OEIE to develop and conduct a web-based survey with project team members to learn about their perceptions related to progress made toward project objectives, implementation, collaboration within the project, and perceived benefits from being a part of the project. A copy of the survey is provided in Appendix A.

Methods

On September 2, 2022, OEIE sent survey invitations to 47 AFRI SAS Soil to Society project team members identified by project leadership. The email invitation provided each contact with a personalized link through which they could complete the survey, with a request that they submit their completed survey by September 16, 2022. OEIE periodically sent email reminders to encourage team members to complete the survey. When the survey deadline passed, OEIE extended the deadline to September 23 to allow additional time for responses.

Respondents

OEIE received responses from 27 of 47 team members, with 26 complete and one partial responses, a 57.4% response rate.

- All seven project objectives were represented to some degree by survey respondents, with nine survey participants (33.3%) indicating involvement in two or more objectives.
- Respondents' involvement varied across AFRI SAS Soil to Society project objectives. The most frequent selections were Objective 1 – Soil Management and Cropping Systems and Objective 2 – Plant Breeding and Genetics ($n = 8$; 29.6% for each). Involvement in other objectives ranged from four to six respondents.

Analysis

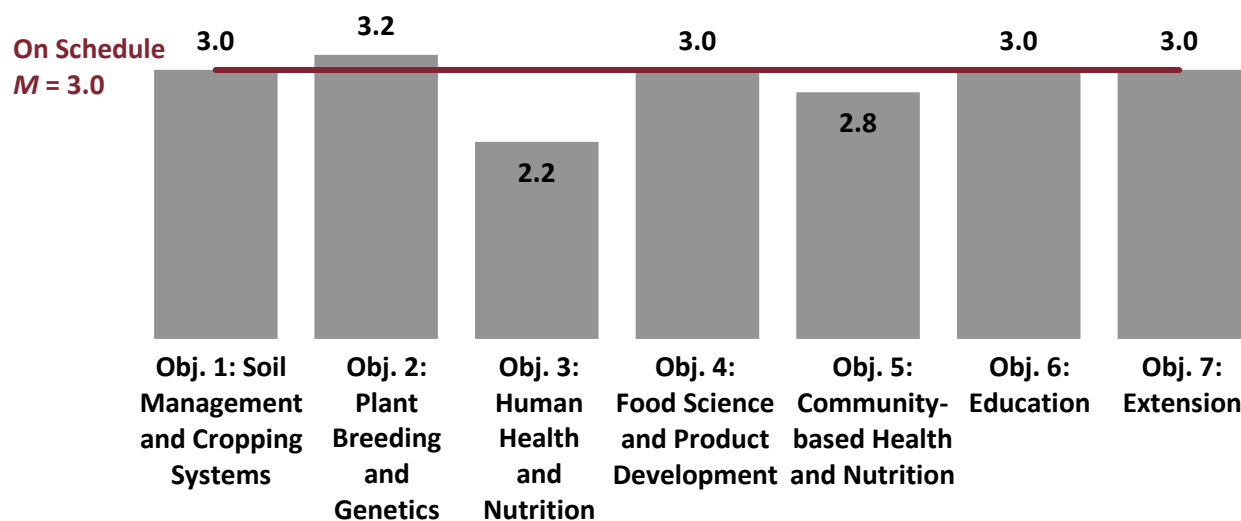
OEIE analyzed the survey data by (1) calculating descriptive statistics on multiple choice and scaled items (i.e., frequencies [n], percentages [%], means [M], and standard deviations [SD]); (2) coding qualitative responses for themes (with individual responses coded to single or multiple themes as applicable); and (3) conducting a social network analysis (SNA) of respondents' primary project collaborations. Highlights of these analyses appear on the following pages. Full results are appended, including descriptive statistics for all survey items (Appendix B), lists of responses to qualitative items (Appendix C), and SNA results (Appendix D).

Highlights

Progress and Satisfaction

Team members first identified the AFRI SAS Soil to Society project objectives with which they were involved. Based on these selections, the survey requested team members provide updates on the components with which they were involved. **Participants rated the level of progress made toward each of the objectives on which they work** on a five-point scale (1 = Significantly behind schedule to 5 = Significantly ahead of schedule). Mean ratings ranged between 2.2 and 3.2, with two of the seven mean ratings falling above the 2.0 level (Somewhat behind schedule) but not quite approaching the 3.0 level (On schedule) while respondents reported progress for the other five objectives as “On schedule.”

Individual team members who indicated work was behind schedule described challenges with staffing (i.e., hiring graduate students) and supply/equipment shortages.



Participants rated their **level of confidence that the AFRI SAS Soil to Society project will achieve its goals** on a five-point scale (1 = Not at all confident to 5 = Completely confident). The mean rating was 3.6, with 24 of 26 respondents (92.3%) indicating they were “Confident” ($n = 12$), “More than confident” ($n = 7$), or “Completely confident” ($n = 5$). One individual who indicated they were “Less than confident” that the project will achieve its goals mentioned, *“I am not aware that any in-depth discussions have happened to brainstorm creative research designs for projects that will bridge the fields of research needed to connect soil health measurements to human health measurements.”*

Similarly, when asked to rate their **level of satisfaction with the implementation of the project** on a five-point scale (1 = Not at all satisfied to 5 = Completely satisfied), the mean rating was 3.6, with 24 of 26 respondents (92.3%) indicating they were “Satisfied” ($n = 11$), “More than satisfied” ($n = 9$), or “Completely satisfied” ($n = 4$). Given the opportunity to explain a rating below “Satisfied,” one respondent mentioned a lack of clear communication on project logistics as the primary concern.

Respondents rated their agreement with six statements regarding their **satisfaction with various project components** on a five-point scale (1 = Strongly disagree to 5 = Strongly agree). Mean ratings ranged between 3.7 and 4.0, with five of the six mean ratings falling slightly below the “Agree” level (a 4.0). The time/energy they are contributing to the project received the highest mean rating ($M = 4.0$), while the communication/information they are receiving about the project and integration between objectives received the lowest mean rating ($M = 3.7$ for each).

Team members described **work being done to integrate with other objectives**, including collaborating with other teams (e.g., data collections, field trials, analyses, plant breeding) to promote intergroup connections ($n = 10$). Some team members described an emphasis on communication (e.g., frequent communication between teams, establishing structures/channels to enhance collaborative communication) ($n = 5$), while others pointed out that it was still early and that integration will occur as the project progresses ($n = 5$). Three respondents noted that the annual meeting was useful for learning about other teams’ research, and three respondents were recruiting graduate student assistance to promote integration with other objectives.

Looking ahead, respondents offered **suggestions for support or resources that would be helpful to facilitate the integration of their objective's work with the work of other objectives.** While some participants indicated that no additional support is needed at this time ($n = 5$), other participants suggested more communication with other objectives (e.g., at annual meeting to share about research, to share data, to discuss opportunities for future synergy, for feedback) ($n = 4$).

"I am working to increase collaboration between teams and establish internal structures to increase communication. This, and establishing the project website, will integrate work between objectives."

For instance, one participant shared, *"Continue annual face-to-face meetings with the whole project team, have project team members present on their research to the team occasionally, so that we all understand each other's work better."* Three participants noted that improved project logistics (e.g., regular project updates, shared information on collaborative tools and platforms) would help facilitate the integration of work across objectives.

Graduate Students/Postdoctoral Researchers

Graduate students/postdocs ($n = 3$) described how much they think their **participation in the AFRI SAS Soil to Society project will impact five professional outcomes**, on a five-point scale (1 = None at all to 5 = A great deal). The graduate students/postdocs agreed at least "A moderate amount" that this project would help to increase their knowledge of project-related research topics ($M = 4.0$), build their professional network ($M = 3.7$), and increase their skills for working as an integrated member of a research team ($M = 3.7$). The outcome rated the lowest was the expectation that their participation would bring recognition to the work they are doing on the project ($M = 2.7$).

When asked to describe the ways in which their **involvement in the AFRI SAS Soil to Society project would help to advance their career**, one graduate student/postdoc stated, *"I am most interested in this project to be able to view how a large research team works to achieve goals (or fails to) because I'm interested in leadership strategy for translational change."* Another said, *"I will hopefully be able to submit a grant that will emplace a clinical nutrition trial that will complete the story."*

Regarding the **personal or professional benefits, the graduate students/postdocs hope to gain**, one individual responded, *"A personal benefit is that I can continue working with faculty at WSU in a postdoc capacity. I am skeptical about whether I will receive much professional benefit beyond observing the process and having more faculty at WSU aware of my existence. I am interested in participating in research design discussions and learning about the basic science in fields I have no background in ... to broaden my general knowledge of ag systems."*

Collaboration Network

Primary Collaborators

To understand the collaboration occurring as a result of the AFRI SAS Soil to Society project, respondents were asked to list up to five people with whom they collaborate most frequently on the project. Collaborators could be internal team members or external partners. In addition to identifying collaboration partners, respondents were asked to indicate whether their collaborations were established as a result of the AFRI SAS Soil to Society project or existed prior to the project.

- **Twenty-two respondents submitted a total of 67 unique collaborative relationships.**
- The 67 collaborative relationships corresponded to 37 unique project collaborators, including 28 project team members and 9 external partners.

- **The SNA revealed connections across 10 unique institutions associated with the project** and included network members from three project-affiliated institutions (WSU, Johns Hopkins University, Viva Farms) and seven institutions external to the project (Cairnspring Mills, Concrete Farm to School, Kansas State University, King Arthur Baking, Mount Vernon School District, Sedro-Woolley Farm to School, Water Tank Bakery).

Social Network Analysis

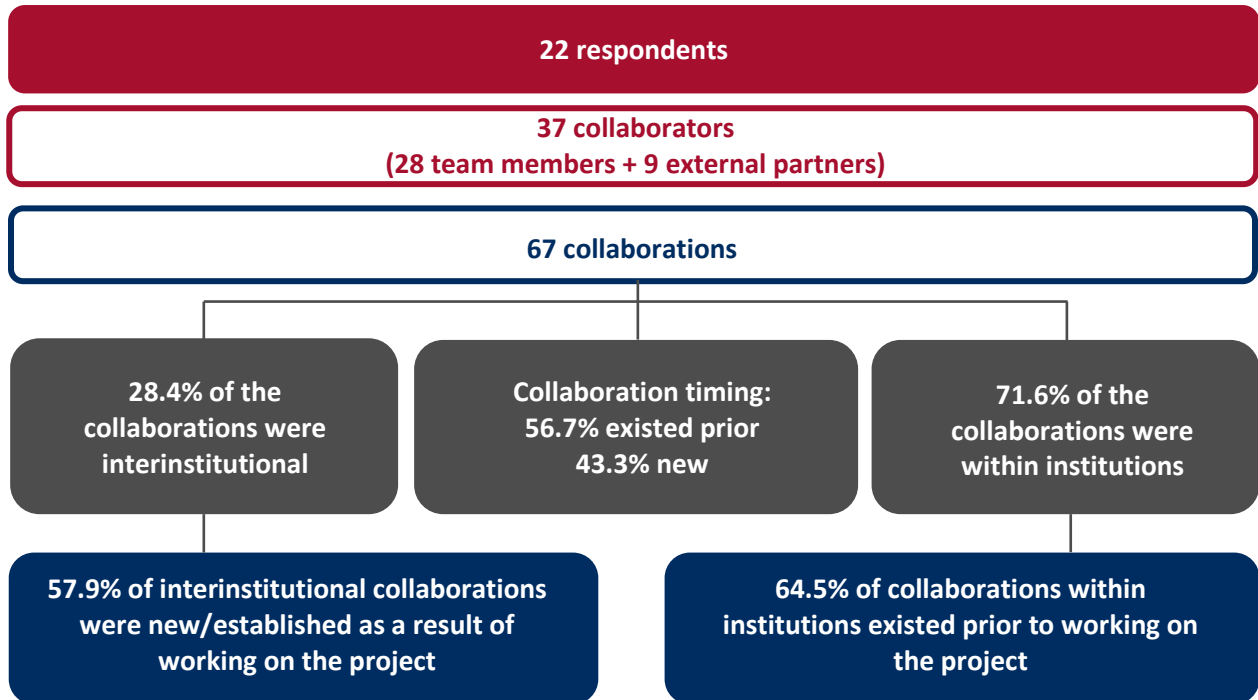
The social network for the AFRI SAS Soil to Society project is, overall, well interconnected, with many links between project members within and between institutions as well as nine individuals who are external to the project team.

- Just over half of the collaborations existed prior to the start of the project (38 of 67; 56.7%), while **43.3% (29 of 67) of the collaborations were “new,”** established as a result of the project. The prior relationships provide a good foundation for new relationships to build upon, which, in turn, should encourage the project to achieve its short-term goal of improved/increased collaborations across disciplines and institutions contributing to foundational research.
- There were **58 collaborations between project team members and 9 with external partners.**
 - Of the nine external partners listed as collaborators, two individuals were from project-affiliated institutions. Four of the collaborations with external partners (44.4%) were “new,” established as a result of the project.
 - Two project team members from Viva Farms listed six individuals from six separate external institutions.
 - This indicates that the project has well-connected project team members capable of facilitating various relationships with external partners. As the project moves forward, engaging additional external partners through increased sharing of project knowledge should establish trust in the project’s efforts and help the project to meet its goal of increasing the accessibility of nutritious, affordable whole grain-based foods.
- **Collaborations involving individuals from WSU are represented most** in the network (56 of 67; 83.6%), followed by collaborations involving individuals from Viva Farms (12 collaborations) and Johns Hopkins University (11 collaborations).
 - Although individuals from Viva Farms ($n = 3$) and Johns Hopkins University ($n = 5$) make up about one-fifth (21.6%) of the total number of collaborators in the network, **94.7% (18 of 19) of the interinstitutional collaborations in the network involve these two institutions.** For instance, one project team member from Viva Farms reported collaborations with five external partners, forming a subnetwork. Engaging project team members with external connections such as this will help to maintain the team’s cohesiveness and enhance the project’s collaborative network to support education and outreach initiatives.
- At this stage in the project, **collaborations are primarily between individuals within their own institution** (intra-institutional) (48 of 67; 71.6%).
 - Of the 48 collaborations occurring within the same institution, about one-third (17 of 48; 35.4%) were “new,” established as a result of working on the project, with the remaining collaborations within institutions existing prior to working on the project (31 of 48; 64.5%).
 - Given that 62.2% of the network is composed of individuals from WSU, it follows that most intra-institutional collaborations occur within this institution (43 of 48; 89.6%). Of the 56 collaborations that involve WSU, nearly half (23 of 56; 46.4%) are new connections.

- **Over one-fourth of the reported collaborations were across institutions** (interinstitutional) (19 of 67; 28.4%).
 - Of the reported collaborations across institutions, over half of the relationships were “new,” having been established as a result of working on the project (11 of 19; 57.9%).

These results suggest that the AFRI SAS Soil to Society project’s **early efforts have been effective in cultivating new collaborative relationships** not only among individuals from the project institutions but also with external partners. This work will help the team to reach broader project goals to increase contributions to foundational research and be better equipped to make informed changes to research and outreach programming when needed. New sustainable relationships and collaborative networks established through this project can be leveraged in the future to optimize productivity and nutritional quality of crops across the Pacific Northwest and overcome the gap between food science and human health and nutrition to improve the health of the population. The figure below provides a snapshot of the SNA (see Appendix D for full SNA results).

AFRI SAS Soil to Society SNA Summary



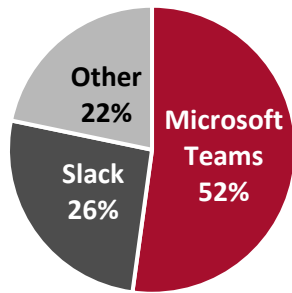
Overall Collaboration

Respondents provided feedback regarding the frequency and preferred methods used to communicate with their collaborators on the AFRI SAS Soil to Society project.

- Most of the team members reported that they **collaborate on a monthly ($n = 10$; 43.5%) or weekly ($n = 8$; 34.8%) basis.**
- The **primary means of communication is email** for collaborating with team members ($n = 22$; 95.7%). Team members also indicated that **videoconferencing** is another useful method used to communicate with others ($n = 14$; 60.9%).

- Similarly, most project team members indicated that the most useful methods of communication for project leadership to share information would be through email ($n = 23$; 92.0%) or videoconferencing ($n = 14$; 56.0%).

Respondents rated their level of familiarity with the instant messaging platforms, Microsoft Teams Chat and Slack, on a five-point scale (1 = Not familiar at all to 5 = Extremely familiar). About three-fourths of the respondents (73.1%) reported being at least moderately familiar with the Microsoft Teams Chat platform, while only 42.3% of respondents were familiar with Slack.



About half of the survey participants prefer to use Microsoft Teams Chat for an instant messaging platform. Participants provided the following reasons for preferring Microsoft Teams over Slack:

- They already use/are familiar with Microsoft Teams ($n = 7$)
- WSU provides Microsoft Teams ($n = 3$)
- Microsoft Teams offers easy file sharing ($n = 2$)
- Microsoft Teams provides instant communication ($n = 1$)

Most of the project team members ($n = 19$ of 24; 79.2%) reported that it would be **beneficial to receive regular email updates** reporting project progress from the project manager. In general, participants preferred to receive progress updates either once a month or every two months ($n = 8$; 42.1% for each).

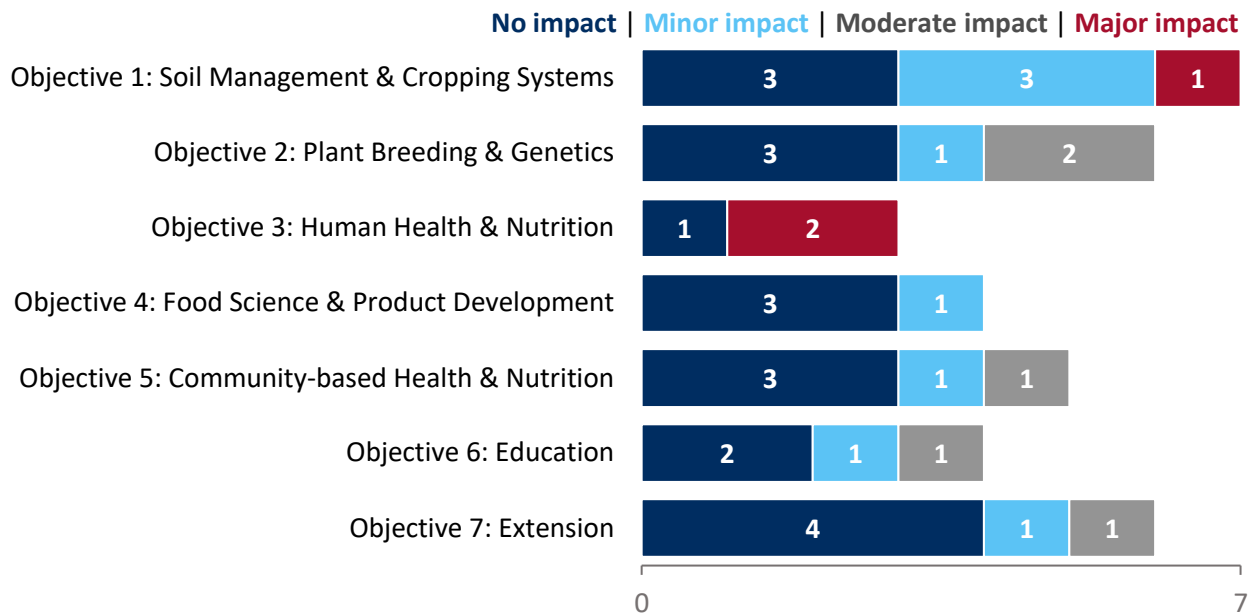
Participants rated their agreement with a series of six statements regarding their **collaboration experiences on the AFRI SAS Soil to Society project**. A majority of the respondents agreed or strongly agreed with each of the statements, with the means for four of the six statements surpassing the “Agree” level rating (a 4.0, on a 5-point scale).

- **Agreement was highest for appreciating the contributions of others working on the project** ($M = 4.4$). Participants also agreed that the benefits outweigh the challenges associated with collaboration on this project ($M = 4.2$), that collaborating on this project is producing a higher quality product than working individually ($M = 4.2$), and that their experiences on this project have increased their interest in interdisciplinary collaboration on future projects ($M = 4.0$).
- The two items rating slightly lower included the level of agreement that others working on the project appreciate the respondent’s contributions ($M = 3.8$) and that the respondent is included in brainstorming/planning with others working on the project ($M = 3.6$).
- The project team indicated an awareness of the importance of project collaboration to achieve project outcomes. Moving forward, the project could use the regular project progress updates to recognize the contributions of team members and communicate various opportunities for team members across each of the objective teams to collaborate on future projects.

COVID-19 Impacts

Participants rated the **extent to which COVID-19 impacted work on their objective(s) this year** on a 5-point scale (1 = No impact to 5 = Total impact). Means ranged from 1.3 to 3.0, with Objective 4 – Food Science and Product Development reporting the lowest impact ($M = 1.3$) and Objective 3 – Human Health and Nutrition reporting the largest impact ($M = 3.0$). None of the participants indicated that their work could not begin due to COVID-19 (i.e., Total impact).

The figure below shows the extent that the COVID-19 pandemic impacted participant’s work in the following area(s) of the AFRI SAS Soil to Society project this past year



Final Thoughts

Team members reflected on the **most significant benefits or impacts** of being part of the AFRI SAS Soil to Society project.

- Participants mentioned expansion of their network of collaborators ($n = 5$); gains of specific knowledge, skills, or abilities (e.g., crop systems, new research protocols, understanding the project as a whole) ($n = 5$); and learning about the research conducted by other project teams ($n = 5$).
- Team members also shared that they have been impacted by the project-level inter/cross-disciplinary collaboration (e.g., bridging gaps) ($n = 4$) and the involvement of the external and private sector stakeholder partners ($n = 3$).

“The interdisciplinary approach is exciting. Bridging all these historic gaps between soil scientists, producers, food scientists, value-added companies, and consumers is leading to great synergy and exponential impact across sectors. Being able to connect the dots and understands both strengths and weaknesses of project partners and processes in real time is huge. I do have an increased knowledge of partner organizations, both the people and process, which enables me to have more vision of our connections, collaborate effectively, and leverage our combined knowledge and resources.”

Considering progress and collaboration, participants identified some **aspects of the project they considered most successful** at this point.

- While some respondents ($n = 4$) shared that, at this point in the project, it is still too early to identify specific “wins,” team members most often described collaborations and the creation of partnerships as a strength of the project ($n = 7$).
- Participants also highlighted the annual meeting (e.g., opportunity to meet the broader team, to showcase research) ($n = 4$) and the transdisciplinary framework that enables researchers to prioritize integration to achieve the project’s overarching goal ($n = 2$) as two additional aspects contributing to the success of the project.

“Each discipline within this project is incredibly rich in breadth and depth. These overarching projects force us to take the best of our knowledge and to apply them across disciplines to yield both tangible products and programs meant to optimize human health through improved nutrition and education. I think the hidden beauty is every scientist in this project would agree that this is a central tenant of each of our disciplines, but this framework makes it a priority that we must keep coming back to; it keeps our work and our research questions focused on what’s most important.”

Suggestions to improve the project’s efforts toward progress and collaboration related primarily to increasing the number of interactions between project teams ($n = 5$). For instance, one team member shared, *“Challenges will be meeting the breadth and depth of the goals. Overall, the project is well-run. Continue to find opportunities to share information about research projects.”*

- Team members also suggested planning now for impacts that will come later in the project (e.g., create a dissemination strategy, maintain a “seed material bank,” have an outlet for finished food products) ($n = 3$).
 - One project team member suggested that *“there should be effort early on to market and promote the grant. And to have an outlet for the finished food products.”*
- In some cases, participants did not offer suggestions to improve the project because they either believed the project progress and collaboration was going well so far ($n = 3$) or did not know enough about the project to provide suggestions ($n = 2$).

Some respondents provided additional feedback sharing that the project has the potential to make significant, real-world contributions ($n = 2$) and that they are grateful for this project ($n = 2$).

- For instance, one team member commented, *“I am grateful for this transdisciplinary project. I believe it has the power to maximize the application of our respective disciplines towards the welfare of society.”*
- Another team member praised the project saying, *“I have been part of other large projects (although not of this magnitude), and I believe that the good working relationship among the collaborators is key to the success for the research. This collaboration has been extremely pleasant and rewarding for me since the first Zoom meeting when we started planning for the proposal.”*

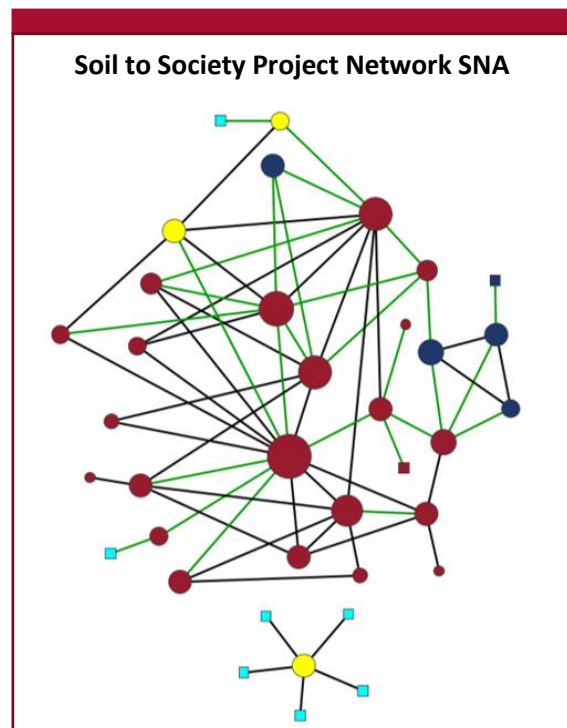
One individual provided **feedback on the scope of the project** saying, *“[It] would be helpful to have a bigger picture/bird’s eye view of all the moving pieces. As I participate only in one part, I don’t yet have a good sense of the whole or how different pieces are progressing together.”*

Observations and Recommendations

OEIE offers the following observations and recommendations to assist AFRI SAS Soil to Society project leadership in moving forward with evaluation results. Additional details, including specific ideas provided by team members, may be found in Appendix C. OEIE recommends project leadership look for opportunities to use information gained from this evaluation activity to enhance project planning and implementation.

- Team members in five of the project’s objectives agreed that progress being made toward the objective on which they work is operating generally on schedule. Two research objectives, Human Health and Nutrition and Community-based Health and Nutrition, indicated that work was slightly behind schedule due to factors related to lack of staffing (hiring graduate students) and supply/equipment shortages. As the project works to overcome these barriers and move forward with implementation, respondents suggested activities to prepare for the future, such as creating project-wide strategies to disseminate research findings, promote education and outreach efforts, maintain a seed material bank with materials harvested each growing season, and have an outlet for the finished food products. OEIE recommends project leadership prioritize this feedback and engage team members in developing a plan to incorporate the project team’s suggestions to improve the project’s implementation efforts.
- Participants are satisfied with project implementation and confident that the project will meet its goals. Team members are pleased with the connections made between objective teams and the development of internal structures to enhance collaboration. Looking ahead, participants suggested more communication to integrate their work with the work of other objectives by incorporating regular project updates and reserving time during project meetings for team member presentations. OEIE encourages project leadership to facilitate knowledge sharing with project stakeholders so they can, in turn, communicate effectively with the public to promote the Soil to Society pipeline research goals and strategies.
- The initial project network already displays interconnectedness between institutions and project team members. Among team members, new relationships are forming within and across institutions and objective teams. This suggests the project is beginning to effectively facilitate interinstitutional collaboration and integration within the project. The network also shows that project members are forming new collaborations as a result of the project (see Appendix D for full SNA results).

At this point in the project, the majority of collaborative partnerships with external institutions are with individuals from Viva Farms. OEIE encourages project leadership to continue to facilitate and build off the existing network of collaborations and foster engagement between project members and external partners to ensure success and sustainability of project initiatives.



- Graduate students and postdocs believe this project will help to increase their knowledge of project-related research and build their transdisciplinary research skills. This project provides both students and project team members the opportunity to build their professional network. OEIE recommends that project leadership establish infrastructure to encourage graduate students, postdocs, and other team members to share the results of their work and build toward these workforce development outcomes. The project website and social media outlets can be used to highlight the progress of the research, promote education and outreach efforts, and recruit additional quality personnel that will complement the work of the project.
- After one year of project activities, team members are focused primarily on collaborations within their own institutions and objective teams. Few or minor setbacks have occurred as a result of COVID-19, and team members are confident that the project will achieve its goals. As the research objectives begin to integrate their work into education and extension/outreach efforts, communication structures will greatly impact the project's success. OEIE suggests that project leadership review the team's preferences regarding communication and establish an internal communication strategy using the most effective methods of communication, intentionally schedule meaningful networking opportunities, and recognize team members' and external partners' contributions to the project.
- A high response rate is key to ensuring that surveys provide representative findings with minimal bias. This survey achieved a 57.4% response rate, with representation from participants identifying with each of the seven project objectives. While the response rate represents more than half of the people to whom the survey was distributed, it may not be fully representative of everyone's experience within the project. OEIE recommends that project leadership incorporate respondents' suggestions for enhancing internal communication (e.g., reminder emails, discussion during meetings, prompting through instant messaging applications) to ensure that the information reported is representative of most team members' experiences. By doing so, the leadership can have data that gives an accurate picture of the opinions and perspectives of all the team members, supporting a foundation for effective decision-making and conversation.

Optimizing Human Health and Nutrition: From Soil to Society Progress & Collaboration Survey Report Appendix A - Survey

Introduction & Consent

AFRI SAS Soil to Society Project Progress & Collaboration Survey (Year 1)

The purpose of this survey is to gain your experiences with and feedback on progress made by and collaboration within the AFRI SAS Optimizing Human Health and Nutrition: From Soil to Society (AFRI SAS Soil to Society) project.

Your participation is voluntary, and your responses to survey questions will be kept confidential to the extent that your responses will not be tied to your name in the reporting of results. Responses from all participants, including text comments, will be combined with those of other survey respondents and reported to the AFRI SAS Soil to Society team for their use with project planning and reporting. Information shared will not be used or distributed for any other purpose.

We ask that you please complete this survey by **September 16, 2022**. The survey should take approximately 15 minutes to complete. Your feedback is important, as your responses will contribute to successful project implementation and reporting to the AFRI SAS Soil to Society team.

For technical assistance related to the survey or questions about the evaluation, please contact the evaluation team ([Kristin Wright](#)).

Questions about the project and the evaluation can also be directed to [Kevin Murphy](#), AFRI SAS Soil to Society Project Director. You may also contact the [Research Compliance Office](#) at Kansas State University with questions about the evaluation.

Thank you,

Kristin Wright

AFRI SAS Soil to Society External Evaluation Team
Office of Educational Innovation and Evaluation (OEIE)
Kansas State University

1. CONSENT

Please indicate your consent to participate in this survey. By selecting "I agree to participate," you are providing your consent to participate in this survey. If you would like a copy of the consent form, please print this page for your own records.

- I agree to participate.
- I prefer to not participate.

Section 1: Progress and Satisfaction

Progress and Satisfaction

2. Please indicate which AFRI SAS Soil to Society objective(s) you are a part of (select all that apply).

- Objective 1: Soil Management & Cropping Systems
- Objective 2: Plant Breeding & Genetics
- Objective 3: Human Health & Nutrition
- Objective 4: Food Science & Product Development
- Objective 5: Community-based Health & Nutrition
- Objective 6: Education
- Objective 7: Extension
- Other (Please specify)

3. For each objective you are a part of, please rate the current status of progress made toward the goal of this objective this year.

	Not applicable (Work is scheduled to start at a later time)	Significantly behind schedule	Somewhat behind schedule	On schedule	Somewhat ahead of schedule	Significantly ahead of schedule
» Objective 1: Soil Management & Cropping Systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 2: Plant Breeding & Genetics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 3: Human Health & Nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 4: Food Science & Product Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 5: Community-based Health & Nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 6: Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 7: Extension	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Other (Please specify) <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. For each objective that you indicated is behind schedule or somewhat behind schedule, please briefly describe which parts of the objective(s) are behind and any mitigation plans that have been developed to address reaching the project goals.

5. How confident are you that the project can achieve its goals?

- Not at all confident
- Less than confident
- Confident
- More than confident
- Completely confident

6. Briefly describe why you are less than or not at all confident that the project can achieve its goals and any additional supports you feel are needed for the project to achieve its goals.

7. Overall, how satisfied are you with the implementation of the AFRI SAS Soil to Society project?

- Not at all satisfied
 Less than satisfied
 Satisfied
 More than satisfied
 Completely satisfied

8. Please briefly explain why you are not satisfied with the implementation of this project.

9. Think about your experiences with the AFRI SAS Soil to Society project. Rate your level of agreement with each statement below.

I am satisfied with the amount of...

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Communication/information I receive about the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Resources I have to support my work on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time/energy I am contributing to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time/energy others are contributing to the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Integration between objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Progress being made toward the overall goals of the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Please describe any initial work being done to integrate work from your objective(s) with other objectives' work this year.

11. What support or resources would help facilitate the integration of work from your objective(s) with other objectives' work?

Graduate Students/Postdocs

Graduate Students/Postdoctoral Researchers

12. Are you working as a graduate student or postdoctoral researcher on this project?

Yes No

13. How much do you think your participation in AFRI SAS Soil to Society will have an impact on...

	None at all	A little	A moderate amount	A lot	A great deal
Advancing your professional/career goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building your professional network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing your knowledge of project-related research topics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increasing your skills for working as an integrated member of a research team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bringing recognition to the work you are doing on the project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Please describe the ways that you believe your involvement in the AFRI SAS Soil to Society project will help to advance your career.

15. What personal or professional benefits or outcomes do you hope to gain through working on the AFRI SAS Soil to Society project?

Consider: What knowledge do you hope to gain or improve? What skills do you hope to develop? What opportunities are you looking forward to?



Section 2: Collaboration

Collaboration

We want to understand the collaboration that is occurring on the AFRI SAS Soil to Society project (e.g., collaborations on research, manuscripts, presentations, proposals, workshops or specialized training, curriculum development, invited speaking engagements, product development, etc.). Your responses to these questions will help us understand existing patterns of collaboration and ways to enhance collaboration during future years of the project.

16. Who are your primary collaborators on the AFRI SAS Soil to Society project?

Please list up to 5 people with whom you collaborate most frequently on this project. These collaborators may be internal team members or external partners.

For each of these primary collaborators, please list their name and institution/organization, and indicate whether this collaboration was established due to AFRI SAS Soil to Society or if it existed prior the project.

	Name of Collaborator		Institution or Organization	Is this a <u>new</u> collaboration due to working on this project or did this collaboration <u>exist prior</u> to this project.	
	First Name	Last Name	Please list the collaborator's institution or organization	New	Existed prior
#1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/>	<input type="radio"/>
#2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/>	<input type="radio"/>
#3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/>	<input type="radio"/>
#4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/>	<input type="radio"/>
#5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="radio"/>	<input type="radio"/>

For this next set of questions, consider all collaborations with which you are involved for the AFRI SAS Soil to Society project.

17. On average, how frequently do you collaborate with others for this project?

- Daily
- Weekly
- Monthly
- Quarterly
- Annually

18. What methods do you typically use to collaborate with others for this project? (Select all that apply)

- Emails
- In-person meetings
- Instant messaging (e.g., Slack)
- Microsoft Teams
- Telephone calls/teleconference
- Videoconferences (e.g., Zoom, WebEx)
- Other (please specify)

19. Please rate your level of familiarity with the instant messaging platform Slack.

- Not familiar at all
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

20. Please rate your level of familiarity with the instant messaging platform Microsoft Teams Chat.

- Not familiar at all
- Slightly familiar

- Moderately familiar
- Very familiar
- Extremely familiar

21. Which instant messaging platform do you prefer to use?

- Slack
- Microsoft Teams
- Other (please specify)

22. Why do you prefer to use $\{q://QID48/ChoiceGroup/SelectedChoices\}$ for instant messaging?

23. What methods of communication are most useful for project leadership to share information with you? (Select all that apply)

- Emails
- Full team meetings
- In-person meetings
- Instant messaging (e.g., Slack)
- Microsoft Teams
- Newsletters
- Project website
- Telephone calls/teleconferences
- Videoconferences (e.g., Zoom, WebEx)
- Other (please specify)

24. What methods of communication would be most useful for the Project Manager to use to contact you regarding questions and quick project updates? (Select all that apply)

- Emails

- Telephone calls
- Text messaging
- Instant messaging (e.g., Slack, Microsoft Teams chat)
- Other (please specify)

25. Would regular emails providing updates on project progress be beneficial?

- Yes
- No

26. What frequency of project progress updates would be most useful?

- Every two weeks
- Once a month
- Every six weeks
- Every two months
- Other (please specify)

27. Please rate your level of agreement with these statements about your collaboration experiences on the AFRI SAS Soil to Society project.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
I appreciate the contributions of others working on the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Others working on the project appreciate my contributions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am included in brainstorming/planning with others working on the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The benefits outweigh the challenges associated with collaboration on this project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
Collaborating with others on this project is producing a higher quality product than working individually.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My experiences on this project have increased my interest in interdisciplinary collaboration on future projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section 3: COVID-19 Impacts

COVID-19 Impacts

28. To what extent has the COVID-19 pandemic impacted your work in the following area(s) of the AFRI SAS Soil to Society project in the past year?

	Not applicable (Work is scheduled to start at a later time)	No impact (no changes or delays)	Minor impact (slight changes or delays)	Moderate impact (intermediate changes or delays)	Major impact (significant changes or delays)	Total impact (work cannot begin)
» Objective 1: Soil Management & Cropping Systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 2: Plant Breeding & Genetics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 3: Human Health & Nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 4: Food Science & Product Development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 5: Community-based Health & Nutrition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 6: Education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
» Objective 7: Extension	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not applicable (Work is scheduled to start at a later time)	No impact (no changes or delays)	Minor impact (slight changes or delays)	Moderate impact (intermediate changes or delays)	Major impact (significant changes or delays)	Total impact (work cannot begin)
» Other (Please specify) <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Block 6

Final Thoughts

Final Thoughts

29. What have been the most significant benefits or impacts for you in being a part of the AFRI SAS Soil to Society project? (What have you gained so far?)

Consider: Possible improvements to your awareness, knowledge/understanding, skills/abilities, attitudes/mindset, behaviors/practices, and/or connections/networks.

30. Considering progress and collaboration, what aspects of this project are most successful?(What are the project's strengths? What have been some early "wins"?)

31. Please share any suggestions you may have to improve the project's efforts toward progress and collaboration.

Consider: How should the project focus its efforts to maximize impact? What aspects of the project are most in need of improvement? What are the project's greatest challenges at this point?

32. Please share any additional comments or feedback you may have related to the AFRI SAS Soil to Society project's progress or collaboration efforts.

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Optimizing Human Health and Nutrition: From Soil to Society

Progress and Collaboration Survey Report

Appendix B - Compiled Results

Table 1: Please indicate your consent to participate in this survey. By selecting "I agree to participate," you are providing your consent to participate in this survey. If you would like a copy of the consent form, please print this page for your own records.

Response Option	Frequency	Percent
I agree to participate	27	100%
I prefer not to participate	-	-
Total	27	100%

Progress and Satisfaction:

Table 2: Please indicate which AFRI SAS Soil to Society objective(s) you are a part of (select all that apply). (n = 27)

Response Option	Frequency	Percent
Objective 1: Soil Management and Cropping Systems	8	29.6%
Objective 2: Plant Breeding and Genetics	8	29.6%
Objective 3: Human Health and Nutrition	6	22.2%
Objective 4: Food Science and Product Development	4	14.8%
Objective 5: Community-based Health and Nutrition	5	18.5%
Objective 6: Education	6	22.2%
Objective 7: Extension	6	22.2%
Other (please specify)	-	-

Note. Respondents could select multiple responses; thus, the sum of the frequency percentages will be greater than 100%.

Table 3: For each objective you are a part of, please rate the current status of progress made toward the goal of this objective this year.

Statement	Not applicable (Work is scheduled to start at a later time)	Significantly behind schedule	Somewhat behind schedule	On schedule	Somewhat ahead of schedule	Significantly ahead of schedule	Total (n)	Mean (SD)
Objective 1: Soil Management and Cropping Systems	-	-	-	7 (100.0%)	-	-	7	3.0 (0.0)
Objective 2: Plant Breeding and Genetics	1 (14.3%)	-	-	5 (71.4%)	1 (14.3%)	-	7	3.2 (0.4)
Objective 3: Human Health and Nutrition	-	1 (20.0%)	2 (40.0%)	2 (40.0%)	-	-	5	2.2 (0.8)
Objective 4: Food Science and Product Development	2 (50.0%)	-	-	2 (50.0%)	-	-	4	3.0 (0.0)
Objective 5: Community-based Health and Nutrition	1 (20.0%)	-	1 (20.0%)	3 (60.0%)	-	-	5	2.8 (0.5)
Objective 6: Education	-	-	-	6 (100.0%)	-	-	6	3.0 (0.0)
Objective 7: Extension	2 (33.3%)	-	-	4 (66.7%)	-	-	6	3.0 (0.0)
Other (please specify)	-	-	-	-	-	-	-	-

Note. Individuals were only asked to rate those objectives in which they had previously indicated participating. Means are on a scale from 1 = Significantly behind schedule to 5 = Significantly ahead of schedule. Means do not incorporate non-applicable answers.

Table 4: For each objective that you indicated is significantly behind schedule or somewhat behind schedule, please briefly describe which parts of the objective(s) are behind and any mitigation plans that have been developed to address reaching the project goals. (*n* = 2)

Theme	Frequency
Staffing (i.e., graduate student) shortages	1
Supply/equipment shortages	1

Note. Individuals were only asked about objectives in which they indicated they participate. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies may be greater than *n*.

Table 5: How confident are you that the project can achieve its goals? (*n* = 26)

Response Option	Frequency	Percent
Not at all confident	-	-
Less than confident	2	7.7%
Confident	12	46.2%
More than confident	7	26.9%
Completely confident	5	19.2%
Total	26	100%

Note. Means are on a 5-point scale (1 =Not at all Confident to 5 = Completely Confident). *M* = 3.58, *SD* = 0.9

Table 6: Briefly describe why you are less than or not at all confident that the project can achieve its goals and any additional supports you feel are needed for the project to achieve its goals. (*n* = 1)

Theme	Frequency
<i>[No themes were identified for this survey item.]</i>	

Note. Only participants who selected “Not at all confident” or “Less than confident” in Table 5 received this item. One individual stated, “I am not aware that any in-depth discussions have happened to brainstorm creative research designs for projects that will bridge the fields of research needed to connect soil health measurements to human health measurements.”

Table 7: Overall, how satisfied are you with the implementation of the AFRI SAS Soil to Society project? (*n* = 26)

Response Option	Frequency	Percent
Not at all satisfied	-	-
Less than satisfied	2	7.7%
Satisfied	11	42.3%
More than satisfied	9	34.6%
Completely satisfied	4	15.4%
Total	26	100%

Note. Means are on a 5-point scale (1 =Not at all Satisfied to 5 = Completely Satisfied). *M* = 3.58, *SD* = 0.9

Table 8: Please briefly explain why you are not satisfied with the implementation of this project. (n = 1)

Theme	Frequency
<i>[No themes were identified for this survey item.]</i>	
Note. Only individuals who selected “Less than satisfied” or “Not at all satisfied” in Table 3 received this item. One individual stated, “I have not been told whether there is a plan for regular meetings and effective discussion formats so participating researchers can spend the necessary time developing the research that will address project goals.”	

Table 9: Think about your experiences with the AFRI SAS Soil to Society project. Rate your level of agreement with each statement below. I am satisfied with...

Statement	Strongly disagreed	Disagree	Neither disagree nor agree	Agree	Strongly Agree	Total (n)	Mean (SD)
Communication/information I receive about the project	2 (7.4%)	2 (7.4%)	2 (7.4%)	17 (63.0%)	4 (14.8%)	27	3.7 (1.1)
Resources I have to support my work on the project	1 (3.8%)	1 (3.8%)	6 (23.1%)	13 (50.0%)	5 (19.2%)	26	3.8 (1.0)
Time/energy I am contributing to the project	-	-	6 (23.1%)	15 (57.7%)	5 (19.2%)	26	4.0 (0.7)
Time/energy others are contributing to the project	-	2 (7.7%)	3 (11.5%)	16 (61.5%)	5 (19.2%)	26	3.9 (0.8)
Integration between objectives	1 (3.8%)	1 (3.8%)	8 (30.8%)	12 (46.2%)	4 (15.4%)	26	3.7 (0.9)
Progress being made toward the overall goals of the project	1 (3.8%)	-	3 (11.5%)	19 (73.1%)	3 (11.5%)	26	3.9 (0.8)

Table 10: Please describe any initial work being done to integrate work from your objective(s) with other objectives' work this year. (*n* = 20)

Theme	Frequency
Collaborating with other teams on data collections, field trials, analyses, plant breeding, etc., to promote inter-group connections	10
Communication (e.g., frequent communication between teams, establishing structures/channels to enhance collaborative communication)	5
Too early in the project for integration (e.g., integration will occur later in project)	5
Annual meeting was useful for learning about other teams' research	3
Recruiting graduate student assistance	3
Respondent not currently involved in project (e.g., have not begun project work)	2
Establishing partnerships with external stakeholders (e.g., schools)	1
Feel siloed, not sure how to integrate yet	1
Via education components (e.g., summer student research internships, curriculum)	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Table 11: What support or resources would help facilitate the integration of work from your objective(s) with other objectives' work? (*n* = 17)

Theme	Frequency
No additional support needed at this time (integration is happening)	5
More communication with other objectives (e.g., at annual meeting to share about research, to share data, to discuss opportunities for future synergy, for feedback)	4
Improved project logistics (e.g., regular project updates, increased use of collaborative spaces such as Teams, shared information on collaborative tools and platforms)	3
Hiring of project manager will facilitate integration of project work	2
Not sure yet	2
Early-stage integration with schools (e.g., student food preferences, school garden use of grain crops)	1
Faster allocation of resources from WSU	1
Lack of human resources in department is a challenge	1
Selecting a person to serve as point of contact with other teams to ensure objectives stay aligned	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Graduate Students/Postdoctoral Researchers:

Table 12: Are you working as a graduate student or postdoctoral researcher on this project? (n = 27)

Response Option	Frequency	Percent
Yes	3	11.1%
No	24	88.9%
Total	27	100%

Table 13: How much do you think your participation in AFRI SAS Soil to Society will have an impact on....

Statement	None at all	A little	A moderate amount	A lot	A great deal	Total (n)	Mean (SD)
Advancing your professional/career goals	-	2 (66.7%)	-	-	1 (33.3%)	3	3.0 (1.7)
Building your professional network	-	-	2 (66.7%)	-	1 (33.3%)	3	3.7 (1.2)
Increasing your knowledge of project-related research topics	-	-	1 (33.3%)	1 (33.3%)	1 (33.3%)	3	4.0 (1.0)
Increasing your skills for working as an integrated member of a research team	-	-	2 (66.7%)	-	1 (33.3%)	3	3.7 (1.2)
Bringing recognition to the work you are doing on the project	1 (33.3%)	1 (33.3%)	-	-	1 (33.3%)	3	2.7 (2.1)

Table 14: Please describe the ways that you believe your involvement in the AFRI SAS Soil to Society project will help to advance your career. (n = 2)

Theme	Frequency
<i>[No themes were identified for this survey item.]</i>	

Note. One individual stated, "I am most interested in this project to be able to view how a large research team works to achieve goals (or fails to) because I'm interested in leadership strategy for translational change." Another said, "I will hopefully be able to submit a grant that will emplace a clinical nutrition trial that will complete the story."

Table 15: What personal or professional benefits or outcomes do you hope to gain through working on the AFRI SAS Soil to Society project? Consider: What knowledge do you hope to gain or improve? What skills do you hope to develop? What opportunities are you looking forward to? (n = 1)

Theme	Frequency
<i>[No themes were identified for this survey item.]</i>	
<p>Note. One individual stated, “A personal benefit is that I can continue working with faculty at WSU in a postdoc capacity. I am skeptical about whether I will receive much professional benefit beyond observing the process and having more faculty at WSU aware of my existence. I am interested in participating in research design discussions and learning about the basic science in fields I have no background in...to broaden my general knowledge of ag systems.”</p>	

Collaboration:

Table 16: Who are your primary collaborators on the AFRI SAS Soil to Society project? Please list up to 5 people with whom you collaborate most frequently on this project. These collaborators may be internal team members of external partners. For each of these primary collaborators, please list their name and institution/organization, and indicate whether this collaboration was established due to the AFRI SAS Soil to Society or if it existed prior to the project.

[Refer to Appendix D: Social Network Analysis for further information on this question.]

Table 17: On average, how frequently do you collaborate with others for this project? (n = 23)

Response Option	Frequency	Percent
Daily	1	4.3%
Weekly	8	34.8%
Monthly	10	43.5%
Quarterly	3	13.0%
Annually	1	4.3%
Total	23	100%

Table 18: What methods do you typically use to collaborate with others for this project? (Select all that apply). (n =23)

Response Option	Frequency	Percent
Emails	22	95.7%
Videoconferences (e.g., Zoom, WebEx)	14	60.9%
In-person meetings	10	43.5%
Microsoft Teams	7	30.4%
Telephone calls/teleconference	5	21.7%
Instant messaging (e.g., Slack)	3	13.0%
Other (please specify)	1	4.3%

Note. Respondents could select multiple responses; thus, the sum of the frequency percentages will be greater than 100% and the frequency summation will be greater than *n*. The “Other” response was “Text”

Table 19: Please rate your level of familiarity with the instant messaging platform Slack. (n = 26)

Response Option	Frequency	Percent
Not familiar at all	9	34.6%
Slightly familiar	6	23.1%
Moderately familiar	7	26.9%
Very familiar	3	11.5%
Extremely familiar	1	3.8%
Total	26	100%

Note. Means are on a 5-point scale (1 =Not familiar at all to 5 = Extremely familiar). $M = 2.27$, $SD = 1.2$

Table 20: Please rate your level of familiarity with the instant messaging platform Microsoft Teams Chat. (n = 26)

Response Option	Frequency	Percent
Not familiar at all	3	11.5%
Slightly familiar	4	15.4%
Moderately familiar	6	23.1%
Very familiar	10	38.5%
Extremely familiar	3	11.5%
Total	26	100%

Note. Means are on a 5-point scale (1 = Not familiar at all to 5 = Extremely familiar). $M = 3.23$, $SD = 1.2$

Table 21: Which instant messaging platform do you prefer to use? (n =23)

Response Option	Frequency	Percent
Microsoft Teams	12	52.2%
Slack	6	26.1%
Other (please specify)	5	21.7%
Total	23	100%

Note. "Other" responses were: "Happy to use whatever;" "I can't stand instant messaging;" "I prefer email to instant messaging. I find it hard to juggle multiple modes of communication and still get core work such as writing done;" "WhatsApp or Text;" "Zoom"

Table 22: Why do you prefer to use Slack/Teams/Other for instant messaging?

Theme	Frequency
Teams (n = 10)	
Already use/are familiar with Teams	7
Provided by WSU	3
Offers easy file sharing	2
Provides instant communication	1
Slack (n = 5)	
Already use/are familiar with Slack	2
Easier to use on a phone	1
Hard to use Teams without a Microsoft account	1

Theme	Frequency
Provides instant communication	1
Other (n = 4)	
Prefer meetings, phone calls, or emails due to being burned out on instant messaging	1
SMS or WhatsApp are easier to use	1
Videoconferencing, as Zoom has been used since the pandemic	1
Will use whatever platform the team prefers	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies may be greater than *n*.

Table 23: What methods of communication are most useful for project leadership to share information with you? (Select all that apply) (n = 25)

Response Option	Frequency	Percent
Emails	23	92.0%
Videoconferences (e.g., Zoom, WebEx)	14	56.0%
Full team meetings	9	36.0%
Microsoft Teams	9	36.0%
In-person meetings	8	32.0%
Telephone calls/teleconferences	4	16.0%
Newsletters	3	12.0%
Project website	3	12.0%
Instant messaging (e.g., Slack)	1	4.0%
Other (please specify)	1	4.0%

Note. Respondents could select multiple responses; thus, the sum of the frequency percentages will be greater than 100%. The “Other” responses were: “I’m project leadership so I feel weird answering this question.”

Table 24: What methods of communication are most useful for the Project Manager to use to contact you regarding questions and quick project updates? (Select all that apply) (n = 25)

Response Option	Frequency	Percent
Emails	23	92.0%
Telephone calls	8	32.0%
Instant messaging (e.g., Slack)	7	28.0%
Text messaging	6	24.0%
Other (please specify)	2	8.0%

Note. Respondents could select multiple responses; thus, the sum of the frequency percentages will be greater than 100%. The “Other” responses were: “N/A;” “Video conferencing”

Table 25: Would regular emails providing updates on project progress be beneficial? (n = 24)

Response Option	Frequency	Percent
Yes	19	79.2%
No	5	20.8%
Total	24	100%

Table 26: What frequency of project progress updates would be most useful? (n = 19)

Response Option	Frequency	Percent
Every two weeks	1	5.3%
Once a month	8	42.1%
Every six weeks	1	5.3%
Every two months	8	42.1%
Other (please specify)	1	5.3%
Total	19	100%

Note. The "Other" response was: "N/A"

Table 27: Please rate your level of agreement with these statements about your collaboration experiences on the AFRI SAS Soil to Society project.

Statement	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Total (n)	Mean (SD)
I appreciate the contributions of others working on the project	-	1 (4.0%)	-	12 (48.0%)	12 (48.0%)	25	4.4 (0.7)
Others working on the project appreciate my contributions	1 (4.0%)	-	7 (28.0%)	12 (48.0%)	5 (20.0%)	25	3.8 (0.9)
I am included in brainstorming/planning with others working on the project	2 (7.7%)	2 (7.7%)	4 (15.4%)	14 (53.8%)	4 (15.4%)	26	3.6 (1.1)
The benefits outweigh the challenges associated with collaboration on this project	1 (3.8%)	-	3 (11.5%)	12 (46.2%)	10 (38.5%)	26	4.2 (0.9)
Collaborating with others on this project is producing a higher quality product than working individually	1 (4.0%)	-	3 (12.0%)	10 (40.0%)	11 (44.0%)	25	4.2 (1.0)
My experiences on this project have increased my interest in interdisciplinary collaboration on future projects	1 (4.0%)	1 (4.0%)	4 (16.0%)	11 (44.0%)	8 (32.0%)	25	4.0 (1.0)

COVID-19 Impacts:

Table 28: To what extent has the COVID-19 pandemic impacted your work in the following area(s) of the AFRI SAS Soil to Society project in the past year?

Statement	Not applicable (Work is scheduled to start at a later time)	No impact (no changes or delays)	Minor impact (slight changes or delays)	Moderate impact (intermediate changes or delays)	Major impact (significant changes or delays)	Total impact (work cannot begin)	Total (n)	Mean (SD)
Objective 1: Soil Management and Cropping Systems	1 (12.5%)	3 (37.5%)	3 (37.5%)	-	1 (12.5%)	-	8	1.9 (1.1)
Objective 2: Plant Breeding and Genetics	2 (25.0%)	3 (37.5%)	1 (12.5%)	2 (25.0%)	-	-	8	1.8 (1.0)
Objective 3: Human Health and Nutrition	2 (40.0%)	1 (20.0%)	-	-	2 (40.0%)	-	5	3.0 (1.7)
Objective 4: Food Science and Product Development	-	3 (75.0%)	1 (25.0%)	-	-	-	4	1.3 (0.5)
Objective 5: Community-based Health and Nutrition	-	3 (60.0%)	1 (20.0%)	1 (20.0%)	-	-	5	1.6 (0.9)
Objective 6: Education	1 (20.0%)	2 (40.0%)	1 (20.0%)	1 (20.0%)	-	-	5	1.8 (1.0)
Objective 7: Extension	-	4 (66.7%)	1 (16.7%)	1 (16.7%)	-	-	6	1.5 (0.8)
Other (please specify)	-	-	-	-	-	-	-	-

Note. Individuals were only asked to rate those objectives in which they had previously indicated participating. Means are on a scale from 1 = No impact to 5 = Total impact. Means do not incorporate non-applicable answers.

Final Thoughts:

Table 29: What have been the most significant benefits or impacts for you in being a part of the AFRI SAS Soil to Society project? (What have you gained so far?) Consider: Possible improvements to your awareness, knowledge/understanding, skills/abilities, attitudes/mindset, behaviors/practices, and/or communications/networks. (n = 20)

Theme	Frequency
Expansion of individual network of collaborators	5
Gains of specific knowledge, skills, or abilities (e.g., crop systems, new research protocols, understanding project as a whole)	5
Learning about the research conducted by other project teams	5
Project-level inter/cross-disciplinary collaboration (e.g., bridging gaps)	4
Involvement of external, private-sector stakeholder partners (e.g., King Arthur, farmers)	3
Too early to say	2
Establishment of research pipeline across life sciences researchers	1
Shorter surveys	1
Understanding how AFRI staff are involved to help manage grant	1
Understanding strengths and weaknesses of partners and processes in real time	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Table 30: Considering progress and collaboration, what aspects of this project are most successful? (What are the project's strengths? What have been some early "wins"?) (n = 18)

Theme	Frequency
Collaborations/creation of partnerships	7
Annual meeting (e.g., to meet the broader team, to showcase research)	4
Non-applicable/too early to say	4
Transdisciplinary framework enables researchers to prioritize integration to achieve project's overarching goal	2
Diversity of grains studied will help bypass "bad year" issues	1
Have not heard anything about project	1
Hiring staff on grant (e.g., project manager, financial manager)	1
Understanding others' research	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Table 31: Please share any suggestions you may have to improve the project’s efforts toward progress and collaboration. Consider: How should the project focus its efforts to maximize impact? What aspects of the project are most in need of improvement? What are the project’s greatest challenges at this point? (n = 17)

Theme	Frequency
More interactions between project teams (e.g., regular all-hands meetings to brainstorm creative connections, share strategies; share information about research components)	5
Plan now for impacts that will come later in project (e.g., dissemination strategy to maximize impact of deliverables, maintain a “seed material bank,” have an outlet for finished food products)	3
Project progress and collaboration is going well so far	3
Do not know enough to answer (e.g., do not have a high-level view of project; don’t know what is going on with project)	2
Field work will be challenging due to being located on east coast	1
Greater clarity on human health project components	1
Integrate newly hired graduate students into projects and with each other	1
NEP is in need of improvement (small department in its infancy, will have growing pains)	1
Too early to say	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Table 32: Please share any additional comments or feedback you may have related to the AFRI SAS Soil to Society project’s progress or collaboration efforts. (n = 7)

Theme	Frequency
Project has the potential to make significant, real-world contributions	2
Proud of/grateful for project	2
Collaboration has been supportive and pleasant so far	1
Excellent effort so far	1
Good working relationships among collaborators is key to success of research	1
None	1
Too early to judge	1
Would be helpful to provide an overview of the bigger picture/moving parts	1

Note. Survey participant responses have been coded to multiple themes as applicable. Therefore, the sum of the frequencies is greater than *n*.

Optimizing Human Health and Nutrition: From Soil to Society

Progress and Collaboration Survey Report

Appendix C - Responses to Qualitative Items

Please note that comments have been lightly edited to protect confidentiality and enhance readability. The numbering corresponds to the table number in Appendix B.

Progress and Satisfaction:

4. For each objective that you indicated is significantly behind schedule or somewhat behind schedule, please briefly describe which parts of the objective(s) are behind and any mitigation plans that have been developed to address reaching the project goals. (n = 2)

- Due to the slow allocation of lab space and issues equipping and supplying our lab due to supply line issues, we are still in the recruiting and collection phase.
- Staffing shortages (a lack of graduate students) are a major hurdle in our department. Our department chair and graduate director will hopefully assist us with resources to recruit new students in the next academic cycle.

6. Briefly describe why you are less than or not at all confident that the project can achieve its goals and any additional supports you feel are needed for the project to achieve its goals. (n = 1)

- I am not aware that any in-depth discussions have happened to brainstorm creative research designs for projects that will bridge the fields of research needed to connect soil health measurements to human health measurements.

8. Please briefly explain why you are not satisfied with the implementation of this project. (n = 1)

- I have not been told whether there is a plan for regular meetings and effective discussion formats so participating researchers can spend the necessary time developing the research that will address project goals.

10. Please describe any initial work being done to integrate work from your objective(s) with other objectives' work this year. (n = 20)

- Constant communication with [another team], with collaborative trials underway as we speak. I've worked as well with [researchers on another team] this year in setting up trials for Year 2. They came to Pullman and visited our field trials, which led to fruitful discussion. I am also communicating with [researchers] in the soils/cropping systems team and will be receiving samples from them post-harvest this fall.
- Developing summer internship program for students to be placed with researchers on each team. Developing objectives for curriculum connected to all areas of the project.
- First annual meeting created a good opportunity to understand the work of other programs and get to know each other. We've coordinated with the breeding teams better to incorporate appropriate varieties into our soils and cropping systems trials.
- I am working to increase collaboration between teams and establish internal structures to increase communication. This and establishing the project website will integrate work between objectives.

- I have been sent several reminders to participate in the survey, however, I am not truly a part of any objective, nor on any research team. I am simply an interested graduate student. I fear I have little to contribute to understanding the progress of work on this grant.
- I have not heard anything about this project since I was invited to the retreat in Mt. Vernon in April or May. I have not worked on this project yet.
- I think it's too early for our work to feed into those of other objectives (or the other way around).
- My work requires coordination with the cropping systems group, but I need at least a year of completed data to start my direct work. I have been involved in discussions to make sure that I will get what is needed when my work starts.
- Not a lot to integrate yet. We don't have our graduate student yet, so we are just getting started.
- One student has been hired for the PD objective. Communicating with the plant breeding team to understand when the grains/seeds will be available. We are also finalizing the test protocols at this time.
- Our part of project (processing whole grain meals based on the varieties developed and pre-screened by the breeding scientists) is scheduled to start in the second year. We are prepared by sending right staff to participate in the annual meeting in Mount Vernon to get to know the scope of the overall project and other team members.
- The meetings with all partners have been helpful to cross pollinate. We have had initial discussions with other education team members to align our work and leverage resources.
- This is perhaps our biggest challenge. We are a very small component of the entire project. As the primary group working on the educational and farming implementation objectives, we are a bit out of the loop in terms of how/when our work will integrate with the research component of the project. We are rather siloed in terms of our work, and much of our school implementation focus will occur much later in the project. We aren't sure who on the team is our partner in terms of the "pass off" from the research phase into the farming and educational phase.
- Took preliminary soil samples for [another researcher] to evaluate to guide future sampling protocol for arthropods.
- We are breeding specifically for developing whole grain products and we are working closely with the soils on their field trials.
- We are collaborating with [another researcher] to get the EDR-XRF optimized for barley in order to evaluate the World Barley Core Collection and experimental lines for micronutrient accumulation. We also have a high throughput analysis pipeline established to evaluate material utilizing the Robotic Gallery Analyzer for Beta Glucan levels in material generated by the Soil Management and Cropping Systems team. We are assisting in production and harvest of existing lines for the Food Science and Products Development team.
- We are in close communication with leaders in Crop and Soil Science to obtain critical information and resources to meet our objectives.
- We conducted preliminary soil sampling on both locations of the project. We are currently assessing soil biodiversity at a subsample of soil management treatment plots. I recruited a graduate student who will work on this project in the upcoming years.
- We continue to work with areas school districts, schools and school gardens, school food service providers along with other local partners to build a more a healthy school food system environment. These relationships and partnerships are crucial to the future work anticipated in this grant.
- We went to observe and discuss about buckwheat lines in Pullman with the lead PI.

11. What support or resources would help facilitate the integration of work from your objective(s) with other objectives' work? (n = 17)

- I would like to know what tools will be used: a) to brainstorm (e.g., collaborative tools like Jamboard or Miro would be great for more visual workspaces), b) where data should be saved for everyone to access, c) what other info will we be given at what frequency? e.g., do we get to see progress reports?
- At the moment we are well supported for the work planned for year 1.
- At this point it's all going really well, and no extra support is needed.
- Continue annual face-to-face meetings with the whole project team, have project team members present on their research to the team occasionally, so that we all understand each other's work better.
- Early-stage engagement with both grain crops and products derived from them so as to better inform and integrate with school and student level preferences and acceptance. Early-stage school garden use of some of these grains to stimulate interest and "buy in."
- Faster allocation and approval of space from WSU.
- I am not quite sure yet. We will definitely reach out to a couple of the leaders of other objectives (particularly food tech/product development) after we have completed our initial review to see what opportunities might exist to find synergies. If they exist, additional resources might be required for unplanned activities, but we are just not sure yet.
- I think Ali (the new project manager) will play a significant role in facilitating integration of work in Year 2.
- Increased utilization of Teams and the future project websites.
- It is happening.
- It was great to have the first meeting this summer.
- None.
- Not sure. Perhaps a partner on the research side that is a point of contact for staying aligned.
- Now that we have a program manager, I hope that there will be some sort of newsletter/update being distributed through an appropriate medium to keep track of what is going on, what is available etc...
- Our challenges are constrained mainly to lack of human resources within department; the integration from other departments is strong; it will take pragmatism on our department to strengthen our ability to deliver on our responsibilities in this project.
- Time to meet with other teams, feedback from other objectives, findings synopses and sample data sets.
- We are good right now.

Graduate Students/Postdoctoral Researchers:

14. Please describe the ways that you believe your involvement in the AFRI SAS Soil to Society project will help to advance your career. (n = 2)

- I am most interested in this project to be able to view how a large research team works to achieve goals (or fails to) b/c I'm interested in leadership strategy for translational change.
- I will hopefully be able to submit a grant that will emplace a clinical nutrition trial that will complete the story.

15. What personal or professional benefits or outcomes do you hope to gain through working on the AFRI SAS Soil to Society project? Consider: What knowledge do you hope to gain or improve? What skills do you hope to develop? What opportunities are you looking forward to? (n = 1)

- A personal benefit is that I can continue working with faculty at WSU in a postdoc capacity. I am skeptical about whether I will receive much professional benefit beyond observing the process and having more faculty at WSU aware of my existence. I am interested in participating in research design discussions and learning about the basic science in fields I have no background in...to broaden my general knowledge of ag systems.

22: Why do you prefer to use Slack/Teams/Other for instant messaging?

Microsoft Teams (n = 10)

- Already using Teams, provided free by WSU (vs. payment for features in Slack).
- Because I wouldn't have to learn Slack.
- Because WSU uses it already. I don't really want to install yet another piece of software to basically do the same thing.
- Have used it some already.
- I like both Teams and Slack and am proficient at both. I use Teams for work currently so it would be easier to integrate into my current work.
- Instant communication and ability to share files.
- It is the platform I'm familiar with.
- Probably because I currently use it.
- Recommended and maintained by WSU's IT. Allows for easy sharing, storage, and organization of files.
- Used more frequently.

Slack (n =5)

- Easier to use on the phone! More similar to texting, so it seems more instantaneous.
- I don't have a Microsoft account and it's hard to access when you don't have one.
- Only because I have used it before.
- That is the only one I know of.
- Works better across organizations.

Other (n = 4)

- Easier and many already know them.
- Have been used Zoom since pandemic.
- In our post-pandemic era, I have burned out on instant messaging and find it invasive and stressful. I feel that scheduled virtual or in-person meetings, phone calls, or returning emails on my schedule are a calmer and more productive use of my time than the twittering that has become an unwelcome component of our hybrid environment. To be sure, no one on this project has negatively influenced or is cause for my opinion on this ""tool"". Rather, this is from my lived experience as an academic through the pandemic. I have no more patience for instant messaging in my professional life. /end rant.
- Will go with whatever the group decides.

Final Thoughts:

28. What have been the most significant benefits or impacts for you in being a part of the AFRI SAS Soil to Society project? (What have you gained so far?) Consider: Possible improvements to your awareness, knowledge/understanding, skills/abilities, attitudes/mindset, behaviors/practices, and/or communications/networks. (n = 20)

- Better awareness of the work of others and more opportunities for collaboration.
- Better understanding of non-traditional and local crop systems. Opportunities to collaborate with other researchers and students...
- Collaboration across disciplines.
- Discussion about human and medical components of the project and discussion from the agronomic team.
- Expanded network of potential future collaborators.
- I have learned a lot about the food class of barley and the expectations on the breeding for biofortified barley varieties.
- I took this job because I believe in this type of pipeline across life sciences researchers - it gives both application and credibility to our work to positively influence the communities who rely on our food for health. My sincere wish is this project is a bellwether for our research pipeline for the entirety of my career at WSU.
- Improved awareness/knowledge of how AFRI staff are involved to help manage large research grants/teams.
- Increased knowledge about and awareness of the research conducted by other team members, particularly those in by colleagues in the College of Medicine. Establishing new interdisciplinary connections.
- I've found the regular meetings to be very interesting. I enjoy learning about other how disciplines approach research and problem solving, and this project has a tremendous amount of interdisciplinary expertise. I like that private sector partners such as King Arthur Flour are part of the project and will be pursuing conversations with them about the private sector state of knowledge on topics we are exploring. I often think that knowledge about consumers never finds its way into peer review papers and depending on their ability to share such information will be very interested in learning.
- Knowledge of new protocols and equipment for determining seed quality parameters.
- Networking across WSU faculty and outside of WSU.
- Relationship building in interdisciplinary work areas, connecting farming to research.
- Shorter surveys.
- Still early to say.
- The interdisciplinary approach is exciting. Bridging all these historic gaps between soil scientists, producers, food scientists, value added companies and consumers is leading to great synergy and exponential impact across sectors. Being able to connect the dots and understands both strengths and weaknesses of project partners and processes in real time is huge. I do have an increased knowledge of partner organizations, both the people and process which enables me to have more vision of our connections, collaborate effectively, and leverage our combined knowledge and resources.
- The project is only one year in and my component has not started. Too early to say.

- This is a new collaboration for me. New in terms of its magnitude (the total amount of the award), the number of collaborators and the diversity of disciplines. My project is relatively well defined and has only indirect connections (via soil health) to the other components. It was an eye opener to learn about the other aspects, such as connecting crops to nutrition, economy, and health. The location (West Coast) is also new to me, as I conducted most of my research in the Mid-Atlantic. I am learning a lot.
- Understanding of the research being done and possible improvements regarding internal structures and organization.
- Working in a large group allowed me to appreciate the big picture.

29. Considering progress and collaboration, what aspects of this project are most successful? (What are the project's strengths? What have been some early "wins"?) (n = 18)

- Creating partnerships.
- Each discipline within this project is incredibly rich in breadth and depth. These overarching projects force us to take the best of our knowledge and to apply them across disciplines to yield both tangible products and programs meant to optimize human health through improved nutrition and education. I think the hidden beauty is every scientist in this project would agree that this is a central tenant of each of our disciplines, but this framework makes it a priority that we must keep coming back to; it keeps our work and our research questions focused on what's most important.
- Getting a chance to showcase whole grain products at the first in person meeting.
- Getting to know the broader team.
- Having a diversity of grains studied will be helpful to bypass potential issues brought by unpredictable "bad year" for one specific crop.
- High level of communication among collaborators.
- Hmm. A bit early for wins, but I would say that hiring Ali as Project Manager was a win. I haven't worked too much with Jennifer T. yet, but I think that is a win too as we certainly need help with budgets. The Breadlab hosting the annual meeting was a huge success for all who came in person. They did an amazing job. Kudos to Gabe and Deirdre as well for hosting the annual meeting. The field visits at Viva Farms and WSU NWREC were excellent.
- I haven't heard anything since the first full group meeting besides an invite to the second full group meeting.
- N/A yet.
- One of the strongest aspects of the project is outlined above: it integrates many pieces of food production and human health that are often examined separately. In my research group/objective, I hope to contribute to an integrated definition of soil health. This work has a field and a lab component that we just started, thus there are no 'early wins'. Second year will be more intensive.
- Still too early to say.
- The amount of acumen and experience is incredible. I'm excited to work with everyone and have the meeting of the minds when these experts connect across disciplines.
- This is a complex project. It is impossible to make progress without collaboration.
- Too early for results but the initial collaborations, particularly the all-team meeting, has been very successful.
- Too early to say.

- We are at early stages, and again, understanding each other's work and connections to ours is paving a path for increased impact.
- We have the collaborative infrastructure in place for analyses needed across disciplines and the genetic materials and populations in place to meet the objectives of the project.
- We've reviewed the literature and have been having conversations with a number of external researchers that have worked on similar topics and who have conducted online surveys using different platforms. These conversations have been very helpful in informing our direction forward, both in terms of shaping the content of our survey and in terms of helping us decide on a platform given available resources. It has been reassuring to learn that many possible options exist at different price points and that some of the questions we intend to ask indeed seem to be evidence gaps (while for others, being able to explore changes to existing knowledge in this new era 2+ years into the COVID-19 pandemic will lead to novelty).

30. Please share any suggestions you may have to improve the project's efforts toward progress and collaboration. Consider: How should the project focus its efforts to maximize impact? What aspects of the project are most in need of improvement? What are the project's greatest challenges at this point? (n = 17)

- I think bi-weekly 1.5 hr. meetings are needed for a few months where the whole team (as many as possible) show up to a virtual meeting for orienting to the meeting goals. Then we get put into virtual meeting rooms in Zoom with 3-5 people to answer prompts visually on a Jamboard/Miro. Then we rotate and meet with a new set of researchers for 15-30 minutes to brainstorm creative connections between our research areas and resources and get to know each other. Prompts should be carefully designed to be thought provoking and work towards project goals. For example: What measurements in your field do you value, and which would you like to avoid. Then, do the measurements you value connect logically with the measurements other people value in their fields. Explain your personal professional goals to your group. Share the most effective strategy/tool used in a previous collaboration. Etc.
- All good so far.
- Challenges will be meeting the breadth and depth of the goals, overall, the project is well-run. Continue to find opportunities to share information about research projects.
- I do not have a high-level view of the entire project. Major challenge for me and my student is that we live on the East Coast, so field work will require a lot of thorough planning.
- I don't know enough about what is going on with the project to answer.
- I have no suggestions. Things appear to be running smoothly.
- I think that greater clarity on the human health projects would be beneficial. It seems like things are very planned and the activities to meet the sub objectives are clear for the crops and breeding portions, but murkier for the human health portions.
- It's useful to think about this but it's still very early. Once we have deliverables to maximize impact it would be useful to organize some sort of dissemination strategy: perhaps a series of webinars...reaching out to podcasters..."Tweeterials" on Twitter highlighting findings.
- More interaction between the project teams to make sure we are producing the materials needed for the success of other team members. This would require that I interact with the other team members on a regular basis.
- NEP is in need of improvement. I think the greatest challenge will be to stay on schedule given the constraints in (barely) post-pandemic work settings. While we strive to make progress on our deliverable, it will not surprise me if we scale back on the amount of work performed in total, or to ask for no-cost extensions in order to fully deliver on our objective. In my view, the CAHNRS

based programs are well established; their research pipelines and personnel are awe inspiring. By comparison, NEP is a small department in its infancy; this SAS project will strengthen its connection to CAHNRS, and to the type of research questions that are prioritized by nutrition departments at other land-grant universities (where such departments are typically housed within a CALS structure). This project will make us better. I just hope that the established scientists in other departments do not become frustrated by our growing pains and delays.

- Not at the moment.
- Not sure if this is planned, but I think it will be very important to maintain a "seed material bank" with any and all material harvested each growing season.
- Now that graduate students are hired, it is time to make them aware of the other projects and other grad students.
- There should be effort early on to market and promote the grant. And to have an outlet for the finished food products.
- This is very wide, deep, and diverse in scope. Hoping to hone this in so that we are well integrated!
- Too early to say.
- Working on the partnerships to create what we can't create in our own silos.

31: Please share any additional comments or feedback you may have related to the AFRI SAS Soil to Society project's progress or collaboration efforts. (n = 7)

- Excellent effort so far!
- I am grateful for this transdisciplinary project. I believe it has the power to maximize the application of our respective disciplines towards the welfare of society.
- I have been part of other large projects (although not this magnitude), and I believe that the good working relationship among the collaborators is key to the success of the research. This collaboration has been extremely pleasant and rewarding for me since the first Zoom meeting when we started planning for the proposal. [T]he soil team has been very supportive, and I enjoyed my conversations with them.
- None.
- Proud of this project and its potential to make a significant contribution to real world food and ag. system issues and concerns.
- Too early to judge.
- Would be helpful to have a bigger picture/bird's eye view of all the moving pieces. As I participate only in one part, I don't yet have a good sense of the whole or how different pieces are progressing together.

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Appendix D – Social Network Analysis

To further understand the baseline network among Agriculture and Food Research Initiative Sustainable Agricultural Systems Soil to Society team members, the evaluation team used key data to complete a social network analysis (SNA) and create a sociogram (i.e., network plot) that represents ways project collaborators are connected (see Figure 2). The SNA used data collected through the Soil to Society Year 1 Progress and Collaboration survey. Survey questions included items related to respondents' primary collaborators. Specifically, respondents shared the name and respective institution/organization of up to five people with whom they collaborate most frequently on the project (either internal team members or external partners) and the history of the collaboration (established due to the Soil to Society project or existed prior to the project).

The sociograms were created using Visone, a software tool for the analysis and visualization of social networks. The following information will assist in interpreting the sociograms:

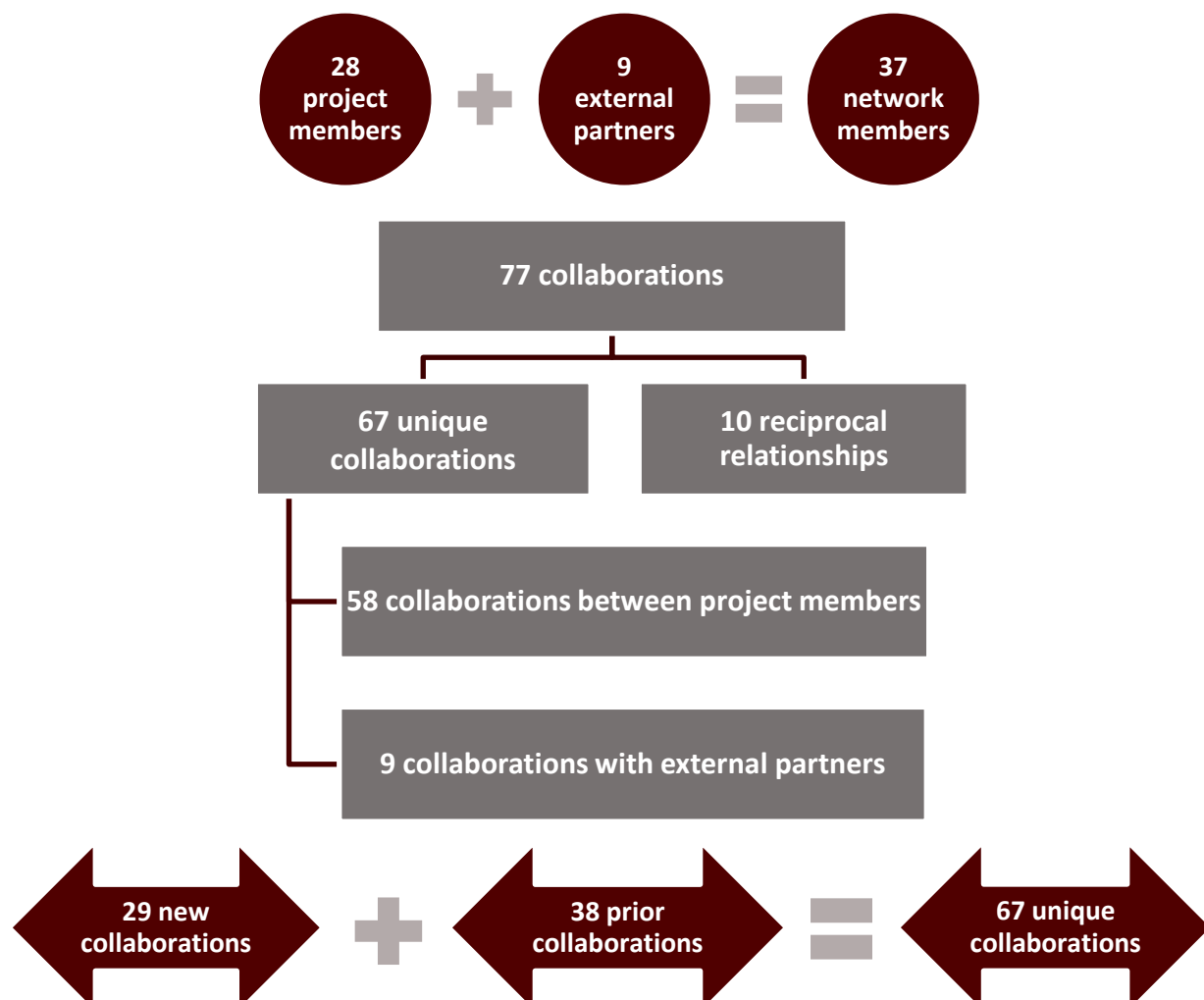
- A sociogram is a graphical representation of the structure of a social network using nodes (dots) and edges (lines) between the nodes. The network includes all nodes and all edges.
- Nodes in a sociogram represent individual members of the network. In this analysis, a node can represent a survey respondent or a primary collaborator listed by a survey respondent. These individuals can be project team members (i.e., people invited to participate in the survey) or external partners.
- Node size, shape, and color represent attributes of network members (e.g., group affiliation). In this analysis, the size of a node represents the frequency with which that network member is a part of reported project collaborations (degree), with larger nodes representing respondents with more reported collaborations. The shape of a node indicates whether the institution is internal to the project (circle) or an external partner (rectangle). The color of the node represents the network member's institution.
- Edges between nodes in a sociogram represent relationships between network members. Physical characteristics of edges (e.g., color) represent attributes of relationships. In this analysis, the color of an edge represents when the collaborative relationship was established (i.e., whether it is a *new* collaboration established due to the Soil to Society project or one that existed *prior* to the project).
- It is important to note that the position of the nodes is not necessarily representative of any factor. However, nodes with more connections tend to be more centrally located. In this analysis, node placement was adjusted to ensure links are legible and node groupings are easy to identify.
- It is also important to note a few limitations of this SNA. Not all Soil to Society team members participated in this survey and provided their responses to the SNA items. In addition, those who did respond were asked to identify up to five people they collaborate with most frequently on this project and were not able to list all possible professional connections. Furthermore, network members external to the project did not receive the survey and, as such, were not able to select other network members as collaboration partners. Therefore, while this SNA presents one possible picture of the connections among and within the institutions involved in the Soil to Society project, it is not an exhaustive description of those connections.

Overall Soil to Society Network Highlights

The network is, overall, well interconnected, with many links between project members within and between institutions as well as with nine external partners.

- The Soil to Society network is based on information from 22 project team members who responded to the Year 1 progress and collaboration survey. The reported network consists of 37 total individuals: 28 project team members and 9 external partners, 2 of whom are affiliated with project institutions.
- Survey respondents reported a total of 77 collaborative relationships, 10 of which were reciprocal relationships (i.e., the relationship was reported by both individuals), leaving a total of 67 unique connections. Unless otherwise noted, the SNA reports findings from the 67 unique relationships.
- Of the 67 unique collaborative relationships, 60 are among project team members, and 7 are with external partners.
- Nearly half of the collaborative relationships in the network were developed through the project, or “new” relationships (29 of 67; 43.3%). The remaining collaborations were existing relationships (38 of 67; 56.7%).
- Connections between external partners and project members include five existing and two new relationships.

Figure 1: Summary of the Soil to Society Social Network Analysis



Soil to Society Institution Network

Key findings from the institutional SNA are provided below and represented in Figure 1.

- The Soil to Society network demonstrates multiple connections between project members from the same and different institutions across seven project-connected institutions. The SNA included network members from Washington State University (WSU) ($n = 21$), Johns Hopkins University ($n = 4$), and Viva Farms ($n = 3$).
 - External partners are Cairnspring Mills, Concrete Farm to School, Kansas State University, King Arthur Baking, Mount Vernon School District, Sedro-Woolley Farm to School, and Water Tank Bakery. One individual from each external partner is present in the network.
 - Two network members are affiliated with the project institutions WSU and Johns Hopkins University but are not part of the project team. These individuals are considered external partners.
- At this stage in the project, individuals are primarily collaborating with others from their own institution. The majority of intra-institutional collaborations occur at WSU (43 of 48, or 89.6% of intra-institutional collaborations). Over one-fourth of all collaborations are interinstitutional (i.e., occur across institutions) (19 of 48; 28.4%). The most common interinstitutional collaborations are between WSU and Johns Hopkins University (7 of 19, or 36.8% of interinstitutional collaborations) and WSU and Viva Farms (5 of 19, or 26.3% of interinstitutional collaborations).
- Project team members are also connected to others within their own institution (48 of 67, or 71.6% of unique collaborations). Of the 48 collaborations occurring within the same institution, 17 were new/established due to the project (35.4%) and 31 existed prior to working on the project (64.5%). Most new relationships are collaborations involving WSU.
- WSU has the largest project member representation within the overall reported network, with 22 project members and one external partner ($n = 23$, 34.3%) and composing 56 of 67 total connections (83.6%). WSU is connected to project members from two other project institutions and one external partner at an external institution. Of the 56 collaborations that involve WSU, nearly half (23 of 56; 46.4%) are new connections and nearly one-fourth (13 of 56; 23.2%) are interinstitutional collaborations.
- Viva Farms and Johns Hopkins University are nearly equally represented in the reported network. Viva Farms project members are involved in 12 connections, 11 of which are interinstitutional (91.7%) and 3 of which are new relationships (25.0%). Project team members from Viva Farms listed the greatest number of external partner collaborators. Johns Hopkins University project members are involved in 11 connections, 7 of which are interinstitutional (63.6%) and 8 of which are new (27.3%). WSU project team members reported the lowest percentage of external collaborators.
- Connections formed through the project and those established prior to the project are present both within and across institutions. The majority of new relationships (17 of 28, or 60.7% of new relationships) and one-fifth of existing relationships (8 of 39, or 20.5% of existing relationships) are occurring across institutions.

Figure 2. Soil to Society Project Network by Institution SNA (n = 37)

