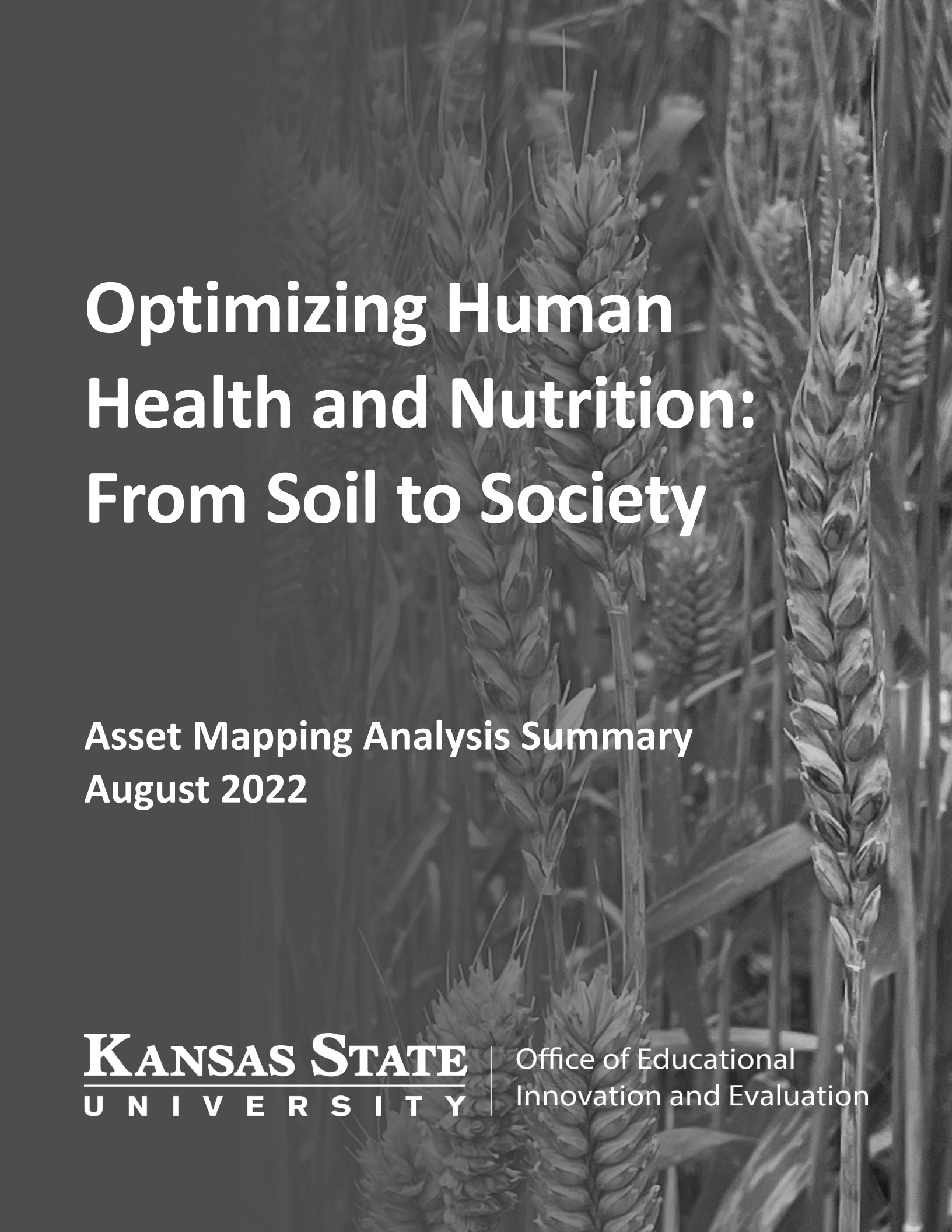

Optimizing Human Health and Nutrition: From Soil to Society

Asset Mapping Analysis Summary
August 2022

KANSAS STATE UNIVERSITY | Office of Educational Innovation and Evaluation

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Background: In 2021, Washington State University 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 i) the investigation of the contribution of novel, biofortified crop varieties and food products to human health through clinical and epidemiological evaluations, and ii) 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.
2. Develop new varieties of barley, wheat, peas, lentils, quinoa, and buckwheat with enhanced health and nutritive value.
3. Confirm the impact of nutritionally enhanced varieties on key indicators of human health and assess acceptance using consumer panels.
4. Develop a diverse and innovative suite of flavorful, affordable, and nutritious food products that will be accessible to consumers from all income levels.
5. Conduct population studies to explore impacts on dietary quality by increasing target crop consumption in US diets and assessing consumer acceptance and valuation of whole grain and legume-based foods.
6. Focus educational capacity on secondary student instruction, teacher professional development, and farmer training.
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.

The AFRI SAS Soil to Society project is collaborating with Kansas State University's Office of Educational Innovation and Evaluation (OEIE) for the evaluation of the project.

Purpose: As part of the project's evaluation, OEIE conducted an in-person asset mapping activity during the Soil to Society 2022 Annual Meeting. The exercise asked project members, including researchers, students, and stakeholders, to provide their perspectives on assets that they contribute to or utilize for the project. These assets include existing project assets, assets that have been gained by the project, and those that are still needed. The purpose of this activity is to document project strengths (e.g., availability, utilization) and needs related to project assets, including expertise, resources, and partnerships. Project members were also asked to identify additional opportunities that could be pursued either in their geographic region or in their discipline, utilizing the assets previously identified.

Asset Mapping Background and Use: Asset mapping is observing an increase in applied research as a technique that produces "valid and reliable data that help researchers and stakeholders understand the strengths of a community and its ability to solve its problems" (Lightfoot, McCleary, & Lum, 2014, p. 60). The information gained from asset mapping can determine how the assets of a community can be used for improvement as well as help mobilize and empower invested stakeholders. Generally, the process of asset mapping includes determining an asset mapping framework, defining community boundaries, identifying assets that will be inventoried, selecting an appropriate method to represent the assets, then finally, creating an asset map and inventory list (Lightfoot, McCleary, & Lum, 2014). The targets of the asset mapping data collection include stakeholders most closely involved with a community, including individual community members, organizations, and common interest groups. Data collection methods can vary depending on the type of data that is most beneficial to communities and thus may take the form of interviews, focus groups, surveys, or asset inventories (Goldman & Schmalz, 2005).

Although asset mapping has traditionally been used to map local community assets, it also has the potential to be expanded to different types of community networks that share a common goal. OEIE is applying asset mapping to project evaluation to document the strengths, resources, and capacity of grant-funded projects at multiple stages (baseline [e.g., project proposal], mid-project, end of project) for a longitudinal look at how project assets grow over time. Additionally, asset mapping used in project evaluation gauges the distribution of project resources. For example, do the project's current assets favor particular objectives or goals over others? If so, what additional assets are needed to address that gap and get the resources needed to support other objectives or goals?

Mapping assets of a project can engage project leadership in efforts that maximize the strengths of existing assets to aid in achieving project objectives. The asset map and full list of reported assets can be used to demonstrate the project's effectiveness and sustainability, determine available assets that solve project-related problems or challenges, and inform project improvements or modifications. These deliverables may also serve as resources or guides for similar projects, identifying what may be needed to accomplish those goals or objectives. Furthermore, these resources can function as a conversation starter, allowing stakeholders to see what is available, ask questions about how particular assets are being used, and assess what assets they may have to complement or boost the impact of a certain set of assets.

Methods: OEIE provided in-person attendees of the Soil to Society 2022 Annual Meeting with an Asset Mapping Worksheet. Meeting attendees broke off into small groups to discuss project assets and complete the worksheet. Worksheets were collected at the end of the project meeting. Participants who attended the meeting virtually rather than in-person completed a brief Qualtrics survey asking the same questions as the physical Asset Mapping Worksheet and attended a Zoom meeting facilitated by OEIE staff to discuss project assets. OEIE was also available throughout the meeting to answer any questions or assist participants with the activity. See Appendix A for the asset mapping activity documents.

Respondents: OEIE received a total of 16 completed worksheets from in-person participants and 9 completed Qualtrics surveys for a total of 25 responses. Note that number of responses (e.g., *n*=25) refers to the number of participant/participant groups that submitted a response but does not equal the number of participants, as in-person participants completed the Asset Mapping Worksheets in small groups and virtual attendees provided individual responses. Individuals, both in-person and remote, could provide multiple responses to question prompts.

Analysis: OEIE analyzed the asset mapping data by coding qualitative responses for themes, with individual responses coded to multiple themes as applicable. Highlights of this analysis and the project asset map are described in the following sections. The full list of reported assets is located in Appendix B.

Highlights:

Personnel Skills & Abilities Project members shared a variety of skills and abilities from a number of fields. Skills and abilities contributed ranged from research abilities in various disciplines, education and outreach, including bilingual education, farming and agriculture, and developing connections with farmers. Research skills including general skills (e.g., statistical analysis, field research trials, handling large data sets) and in a variety of fields, such as plant breeding and soil and water science were most frequently cited, followed by skills in food science, cooking, and baking.

Space & Facilities Participants were also asked to consider the spatial and facility assets they utilize to complete project tasks. Project members primarily use laboratory resources when working on project tasks, but also relied upon farmland and research fields, greenhouses, and NWREC facilities that can be utilized for activities such as seed cleaning and plant drying.

Materials, Equipment, & Technology Soil to Society project members rely on a variety of materials, equipment, and technology assets to complete project work. As with space and facilities, participants primarily utilize laboratory equipment in the completion of project tasks. Other assets in this category that project members regularly use include farming equipment, food processing equipment, computing equipment, and statistical analysis software.

Collaborations Project members contribute intangible assets in the form of collaborations. When asked "which institutions, organizations, and stakeholders have you collaborated with or engaged in your work on this project?", participants listed a number of relationships, including partnerships with project researchers and partners, Washington State University, food companies and producers, and other institutions of higher education. Additionally, farmers were named as an asset by approximately one-fifth of participants/participant groups.

Additional Opportunities Participants/participant groups (*n*=19) identified a range of future opportunities for the project to pursue, including collaborations, development of accessible recipes, and additional research practices, including clinical trials, economic analyses, and additional soil analyses. Project members suggested pursuing collaborations with local schools and communities and other food companies or producers, as well as expanding collaborations with Washington State University. Incorporating indigenous and other cultural agricultural and cooking practices into the project was also suggested as an additional opportunity.

What additional opportunities may be present in your geographical area or discipline?

Collaborations with local schools/communities	7	Expand collaborations with WSU	2
Incorporating indigenous & other cultural agricultural and cooking practices	5	Identify additional assets (e.g., research venues, survey platforms)	2
Clinical trials	3	Improve accessibility/approachability of whole grains	2
Collaboration with other food companies or producers	3	Improve existing research practices (e.g., quinoa calibration)	2
Developing accessible consumer recipes/commercial food products	3	Additional analysis of soil composition	1
Commercial/professional kitchens	2	Economic analyses	1
Develop small-scale/scale-appropriate seed & grain processing	2	Identifying gaps in decision-making around food behaviors	1

Observations and Recommendations: Based on the analysis of the reported Soil to Society project assets, OEIE offers the following observations and recommendations to assist project leadership in moving forward with evaluation results. This summary contains highlights of survey results. The evaluation team recommends project leadership also review the detailed compiled results located in Appendix B.

The asset mapping activity conducted at the project's annual meeting was successful at gaining input from a variety of project stakeholders (e.g., researchers, students, advisory board members, and other stakeholder groups) who attended the annual meeting either in-person or remotely.

Respondents identified a variety of assets that they contribute to the project in the form of skills, abilities, and partnerships, as well as physical assets that they utilize in the completion of project work. The range of knowledge and ability resources provided by project members demonstrates the value of available expertise for accomplishing project work. Additionally, the project can draw on the identified networking and physical resource assets to bridge gaps in resources and enrich project efforts. The asset assessment results may be a helpful tool to identify areas where coordinating available assets could address current gaps and engage team members in efforts to maximize the strengths of existing assets to aid in achieving project objectives.

The project should continue to build a common understanding of current assets available across the project and look for ways to link and leverage these resources to maximize and develop a strong system of assets. The perspectives gained will help not only deepen scientific understanding and improve engagement and collaboration among the project's key stakeholders but also lead to the identification of practicable and sustainable societal solutions to challenging problems.

The evaluation team recommends project leadership review respondents' suggestions of additional opportunities based on identified assets. This report could be used to facilitate further discussions on the extent to which to project is capitalizing on its available assets to accomplish project goals/objectives, and how to leverage these assets to pursue additional networking and knowledge-creation and knowledge-sharing opportunities. The asset inventory can also be used to engage external partners, identifying areas where these partnerships may be useful or additional partnerships are needed to ensure progress toward sustained networks, increased knowledge and awareness of problems related to optimizing human health and nutrition, and the adoption of science-based solutions addressing these problems.

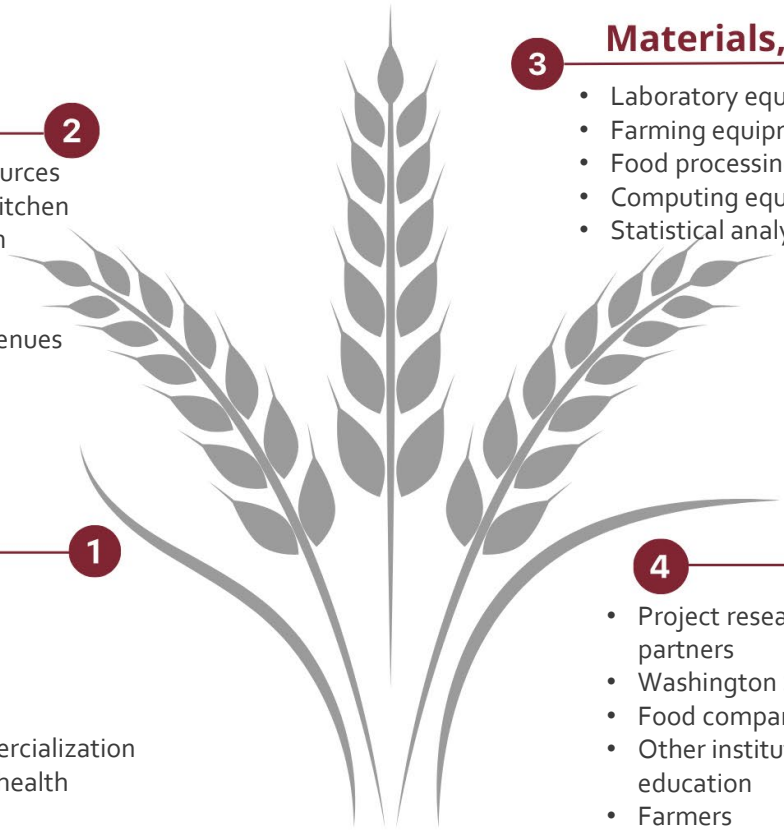
Not all project members were able to attend the annual meeting or participate in the asset mapping activity. Additionally, project stakeholders not in attendance did not have an opportunity to provide responses regarding project assets. Therefore, this analysis and summary does not provide a comprehensive list of project assets but rather a smaller picture of those assets from the perspective of those who participated. OEIE recommends leadership look for ways to document project assets that were not reported during the activity at the annual meeting to gain a better understanding of the assets available to the project. The evaluation team plans to implement a follow up asset data collection in future project years to gain information on the growth and utilization of project assets. Such information will provide insights into how these assets are enhancing project knowledge, encouraging adoption of practices, establishing long lasting partnerships and networks, and sustaining project activities, outputs, and outcomes beyond the funding.

References:

Goldman, K., & Schmalz, K. (2005). Accentuate the positive!: Using an asset-mapping tool as part of a community-health needs assessment. *Health Promotion Practice,* 6(2), 125-128.

Lightfoot, E., McCleary, J. S., & Lum, T. (2014). Asset mapping as a research tool for community-based participatory research in social work. *Social Work Research*, 38(1), 59-64.

AFRI SAS Soil to Society Project Assets



1 Personnel Skills & Abilities

- Research skills
- Food science/ cooking/baking
- Education/outreach
- Farming/agronomy/ agriculture
- Networking
- Bilingual education
- Farmer connections
- Experience
- Nutrition
- Grant writing
- Microbiome
- Students
- Business/commercialization
- Global & public health perspective
- Latin American farming

2 Space & Facilities

- Laboratory resources
- Farmland
- Research fields
- Greenhouses
- NEWREC facilities
- WSU Breadlab
- Classroom/education facilities
- Computing resources
- LARC building kitchen
- Food production resources
- Viva Farms
- Social media avenues

3 Materials, Equipment, & Technology

- Laboratory equipment
- Farming equipment
- Food processing equipment
- Computing equipment
- Statistical analysis software
- Education resources
- Kitchen/baking equipment
- Data
- Language
- Library/publication database resources
- People
- School garden equipment

4 Collaborations

- Project researchers/ partners
- Washington State University
- Food companies/producers
- Other institutions of higher education
- Farmers
- Agricultural educators
- Local educational institutions
- Organic Seed Alliance
- Plant breeders
- Consumers
- Corporate donors
- Food scientists
- National agricultural/ educational associations
- Soil scientists
- Students

This map presents the list of assets reported by AFRI SAS Soil to Society project collaborators, students, project stakeholders, and advisory board members in June 2022. OEIE provided in-person attendees of the annual meeting with an Asset Mapping Worksheet to complete in small groups while virtual attendees completed a brief Qualtrics survey mirroring the worksheet and attended a Zoom meeting facilitated by OEIE staff to discuss project assets. An asset is anything that is used to achieve project goals/objectives and may include the skills and abilities of project personnel; space and facilities; materials, equipment, and technology; and partnerships with institutions, organizations, or stakeholders. Identifying assets can help project leadership, collaborators, stakeholders, and the public fully understand the strengths of a project, ways to improve and maximize project efforts, and how project goals/objectives will be achieved and sustained.

Appendix A:
AFRI SAS Soil to Society Asset Mapping Analysis Summary

Asset Mapping Activity Instruments

Optimizing Human Health and Nutrition: From Soil to Society
Asset Mapping Activity

An asset is anything that will be used to achieve project goals/objectives. Assets may include the skills and abilities of project personnel; space and facilities; materials, equipment and technology; and partnerships with institutions, organizations, or stakeholders. You cannot fully understand a project without identifying its assets. Knowing the project's strengths makes it easier for the team, stakeholders, and the public to understand how the project will achieve its goals/objectives. *OEIE is asking that anyone attending the 2022 AFRI SAS Soil to Society annual meeting identify project assets.*

Personnel Skills & Abilities

(What skills, abilities, training, or expertise do you bring to the project?)

Space & Facilities

(What space and/or facilities do you use to complete project tasks?)

Materials, Equipment, & Technology

(What materials, equipment, or technology do you use in your work on this project?)

Collaborating Institutions, Organizations, & Stakeholders

(Which institutions, organizations, and stakeholders have you collaborated with or engaged in your work on this project)

Follow-up: *Considering what you learned and shared about the project's assets, what additional opportunities may be present in your geographical area or discipline? (Record group responses on the back of this form)*

Optimizing Human Health and Nutrition: From Soil to Society

Annual Meeting

Asset Mapping Questionnaire

OEIE is asking all attendees of the AFRI SAS Soil to Society annual meeting to participate in this activity to identify assets associated with the project. Thank you in advance for providing your feedback. Your input will help project leadership with implementation and planning.

For each item, we ask that you provide responses based on your experiences. Feel free to list several responses for each item. This activity is voluntary and each item in the questionnaire is completely optional.

An asset is anything that will be used to achieve project goals/objectives. Assets may include the skills and abilities of project personnel; space and facilities; materials, equipment and technology; and partnerships with institutions, organizations, or stakeholders.

You cannot fully understand a project without identifying its assets. Knowing the project's strengths makes it easier for the team, stakeholders, and the public to understand how the project will achieve its goals/objectives.

OEIE is asking that anyone attending the 2022 AFRI SAS Soil to Society annual

meeting identify project assets. Please feel free to list several responses for each item.

Personnel Skills & Abilities

Consider what skills, abilities, training, or expertise you bring to the project:

Space & Facilities

What space and/or facilities do you use to complete project tasks?

Materials, Equipment & Technology

Consider what materials, equipment, or technology you use in your work on this project:

Collaborating Institutions, Organizations & Stakeholders

Which institutions, organizations, and/or stakeholders have you collaborated with or engaged in your work on this project?

Considering what you shared about the project's assets, what additional opportunities may be present in your geographic area or discipline?

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Appendix B:
AFRI SAS Soil to Society
Asset Mapping Analysis Summary

Asset Mapping Activity - Compiled Results

Optimizing Human Health and Nutrition: From Soil to Society
Asset Mapping Analysis Summary
Appendix B – Compiled Responses

Note: Qualitative responses have been lightly edited to enhance readability. The number next to each theme represents the frequency of responses related to this theme. Note that the number of responses (e.g., *n*=24) refers to the number of participant/participant groups that submitted a response but does not equal the number of participants, as in-person participants completed the Asset Mapping Worksheet in small groups and virtual attendees provided individual responses. The frequencies sum to more than the number of responses (*n*) because participants could provide multiple responses to question prompts.

Personnel Skills & Abilities

What skills, abilities, training, or expertise do you bring to the project? (*n*=24)

Theme	Frequency
Research skills • General (e.g., statistical analysis, field research trials, handling large data sets) (*n*=7) • Plant breeding (*n*=5) • Soil/water science (*n*=5) • Laboratory work (*n*=2) • Gut microbiome (*n*=1)	9
Food science/cooking/baking	8
Education/outreach	6
Farming/agronomy/agriculture	6
Networking/collaboration	5
Bilingual education	4
Farmer connections	4
Experience/knowledge of field	3
Nutrition	3
Grant writing	2
Microbiome	2
Students	2
Business/commercialization	1
Global & public health perspective	1
Latin American farming	1

- Ability to perform experiments and analyze data relating to the human gut microbiome.
- Breeders; bakers; PhD students (professional baker, nutritionist/dietician, professor); farmers.
- Collaborative research; farmer participatory research on soil and water science; specialty grain breeding; bilingual education; direct market farming; organic regulations expertise; Latin American farming; people-end of farming; soil science; physical/hydrologic health; teaching component w/ WSU Everett.
- Comm.; networking - knowledge of what everyone's doing; conn. with Viva Farm equipment & land; unique background.

- Curriculum development; pedagogy; MD teaching certificate Ag 7-12; CASE curriculum certification (animal sci, plant sci, intro to AFNR, biotech); teacher professional development; secondary education.
- Deep interest in the history of Ag (neolithic to present); 30+ years in the Organic Food Industry - specializing in Frozen, Prepared Meals - Organic Ag systems; working with youth; Yenta! Collaboration and relationship building.
- Education, teaching, curriculum.
- Extension (irrigation); small, medium bilingual education; food safety, 0_2 regulation; people end of farming; soil science - H_20; physical health; farming across scales; teaching component; range of educational; plant breeding; grant writing.
- Experience with soil affected by humans, knowledge of basic soil invertebrate groups, their sampling methodologies, knowledge of literature on soil biodiversity. Connection to new FAO initiative: International Network of Soil Biodiversity (NETSOB), which aims at agricultural systems primarily.
- Experienced scientists and staff with expertise to produce ready-to-eat (RTE) meals that are free from bacterial and viral pathogens, and with extended shelf-lives.
- External viewpoint on global & public health; big picture on nutrition in preventive & restorative medicine.
- Field research trials; plant breeding & genetics; agronomy & crop science; statistical analysis
- Food preparation & processing.
- Food product development skills, experience and understanding of consumer-packaged goods and food service markets, culinary skills, food product ideation to commercialization, consumer and food service recipe development, recipe scale up and commercialization.
- I have been working with analytical instruments since 2015. Operating, maintaining, and implementing QA/QC validation during analysis. Prior to this, after high school I went through a culinary arts program and received a certificate. Then decided to pursue a degree in science, which I received a BS in Wildlife Ecology in Natural Resource Sciences. I bring a variety of experiences through food, the environment, and lab analysis.
- Microbiology; metabolomics.
- Molecular lab techniques (DNA/RNA extraction, genotyping); greenhouse work; field work; breeding experience; handling big genomic datasets.
- My background as an applied economist with data analysis skills, who has worked in transdisciplinary groups for a number of years. Also, my positions have put me in contact with a broad range of individuals with diverse skills, at the university, across the state, and across the nation. This makes for good contacts or people to reach out to.
- Post-harvest ag production & education/training; bilingual - Spanish; curriculum development; sales & business development; training and teaching assist.; product acceleration & distribution.
- Practical farming experience; bilingual/working with farmworkers; direct-market experience; organic certification & food safety; soil science (physical & hydrologic health); teaching & mentorship; agricultural extension; specialty grain breeding; grant writing & collaboration.
- Qualitative and quantitative data collection and analysis skills. Background in human nutrition and social/behavioral science. 25 years of experience relating food systems to nutrition. Creative thinking and approaches to solving problems.
- Research design; writing; quantitative analysis.
- Soil science background, applied work - soil health & microbiome, working across systems & crops.
- Students/staff trained in soils, agronomy, human nutrition.

Space & Facilities

What space and/or facilities do you use to complete project tasks? (*n*=16)

Theme	Frequency
Laboratory resources	9
Farmland	5
Research fields	5
Greenhouses	4
NEWREC facilities	4
Breadlab	2
Classroom/education facilities	2
Computing resources	2
Food production resources (e.g., school gardens, school kitchens)	2
Other spaces (e.g., storage, office, event, collaboration spaces)	2
Program/project visits	2
Viva Farms	2
LARC building kitchen	1
Social media avenues	1

- A laptop; visits to programs.
- Breadlab: 20,000 sq ft space; full kitchen; greenhouses @ station.
- Classroom; computer; zoom; office; collaborations w/ spaces of grant collaborators; social media avenues.
- Farmland - strategic to work with; laboratory facilities.
- Farmland; greenhouses; school gardens; school kitchens/classrooms.
- Kitchen in the LARC building; lab facilities.
- Lab space in Health Science building.
- Land - WSU bread lab; seed cleaning, milling, baking equipment; mimicked digestive system.
- Molecular lab; greenhouses at WSU; Spillman fields in Pullman, WSU.
- Project sites to research for curriculum.
- Research farm & lab facilities (ability to measure a variety of soil properties).
- Storage in western & eastern WA; seed cleaning, plant drying facilities in NWREC; field space in Mount Vernon, Chimacum, Pullman, WA; office space for students and interns; event space in MV & Pullman.
- Viva Farms fields; research laboratories (Pullman & Mt. Vernon); research fields.
- Viva Farms land & equipment; Spillman agronomy farm; seed cleaning facilities; nutritional phenotyping lab.
- Working with school classrooms, school graduations, teaching kitchens at schools; working with school food service directors, providers, staff.
- WSU Mt. Vernon field space; laboratory space in Pullman; small scale seed threshing & cleaning equipment; greenhouses.

Materials, Equipment, & Technology

What materials, equipment, or technology do you use to work on this project? (*n*=22)

Theme	Frequency
Laboratory equipment	13
Farming equipment	5
Food processing equipment	5
Computing equipment	4
Statistical analysis software	3
Education resources (e.g., Canvas, Office suite, Academic Outreach & Innovation)	2
Kitchen/baking equipment	2
Data	1
Language	1
Library/publication database resources	1
People	1
School garden equipment	1

- Anaerobic chamber; Stomacher; 3D Printer; PCR DNA analysis; chemicals that mimic conditions found within the human gastrointestinal system.
- Anaerobic chamber; microbial bioreactors.
- Canvas; Qualtrics; SPSS; video recording & editing; Word, PowerPoint, excel; WSU - Academic Outreach & Innovation.
- Computer, on-line, large data sets. People.
- Farm equipment; lab instruments.
- Farm production harvest-post-harvest equipment.
- Farming equipment to be able to experiment with soil management.
- High performance computing systems; lab equipment to extract DNA/RNA and genotype; software for statistical analysis.
- High throughput seed analysis equipment; buckwheat dehuller (hopefully).
- Lab equipment.
- Lab/research technology.
- Laptop and peripherals.
- Microwave pasteurization & sterilization food processing system.
- Mineral concentration analyses equipment; seed scanning equipment; protein/amino acids equipment; plot planters/combines; tractors.
- MP-AES, EDXRF, Sample mills, seed scanners, NIR.
- One laptop.
- Research combine; ovens; flour analysis equipment; clipper.
- Research scale seed phenotyping equipment; research scale seed cleaning, processing & storage equipment; tractors/farm equipment; statistical programming software (SAS & R).
- Soil monitoring sensors: we currently are building those. Depending on initial results, we may use stable isotope approach to describe soil food-web.
- Tabletop milling equipment; language (Spanish/English & indigenous (Mixteco/Trique); seed saving; school garden equipment/techniques/training; from Oaxaca.
- We have pilot-scale processing facilities and unique in-package microwave assisted pasteurization and sterilization technologies to produce high quality pathogen free meals. The technologies were

developed by us at WSU and licensed for global commercialization. Those technologies will be used in this project.
- Zotero, library website, PubMed, Google Scholar. Eventually will use lots of technology related to survey tools, administration, analysis.

Collaborations

Which institutions, organizations, and stakeholders have you collaborated with or engaged in your work on this project? (*n*=20)

Theme	Frequency
Project researchers/partners	8
Washington State University	6
Food companies/producers	5
Other institutions of higher education	5
Farmers	4
Agricultural educators	2
Local educational institutions	2
Organic Seed Alliance	2
Plant breeders	2
Consumers	1
Corporate donors	1
Food scientists	1
National agricultural/educational associations	1
Soil scientists	1
Students	1

- Community colleges; wholesale/retail/value ad companies/institutions; other farmer education organizations; foundations; corporate donors; farmers; direct consumer <-> eateries
- Currently collaborating within WSU, grad students, NIFA grant, working on wheat mineral analysis.
- Drs. Griffin-LaHue & Soil science; Dr. Kevin Murphy; Viva Farms
- Farmer relationships
- FFA- WA & National; Washington Association of Agricultural Educators; National Association of Agricultural Educators (region 1); Maryland Agricultural Teachers Association; Curriculum for Agricultural Science Education (National Ag Ed curriculum) advisory committee member; Association for Career & Technical Education (National & WA); Office of Superintendent of Public Instruction (clock hours for teacher certification); Agriscience Fair (WA & National)
- Food companies & institutions
- Lundberg family farms; Ardent Mills
- Many connections to local W. WA farmers, understanding why they do what they do & what's working; already collaborating with breeders & Breadlab on other projects
- Other Ag teachers
- Our collaborating institutions include: US Army Natick Soldier Center, University of Tasmania and Australia Department of Defense Food Research Center (for military rations) on different projects. We collaborate with WSU Spokane Campus on DASH meals.

- Three schools at JHU (Public Health, JHU main campus and SAIS), Colleagues from Center for a Livable Future at JHU working on similar issues, colleagues from my department working on similar issues colleagues from other universities doing similar research. Will engage our IRB's.
- University of Nebraska; Texas A&M
- Viva Farms; soil scientists; food scientists
- Washington State University
- Working with John Hopkins faculty
- WSDA farm to school program (statewide leadership team); L & OSPI Dept of Health (WA Dept of Education); organic seed alliance; Skagit-Island County Head Start; multiple school districts; water tank bakery; mills; Skagit community foundation; F2S chef/specialist Kent Getzin
- WSU bread lab; farmers; WSU sustainable seed systems lab; WSU extension; Johns Hopkins
- WSU has the field sites.
- WSU SESRC -> survey center; chefs & bakers; CRI - Czech germplasm bank; European buckwheat experts through ECOBREED; collaborating farmers on W&E side with familiarity with buckwheat and millet (20+); Washington producers - largest buckwheat producer in WA; Organic seed alliance
- WSU, US National Academy of Medicine

Additional Opportunities

Considering what you learned and shared about the project's assets, what additional opportunities may be present in your geographical area or discipline? (*n*=19)

Theme	Frequency
Collaborations with local schools/communities	7
Incorporating indigenous & other cultural agricultural and cooking practices	5
Clinical trials	3
Collaboration with other food companies or producers	3
Developing accessible consumer recipes/commercial food products	3
Commercial/professional kitchens	2
Develop small-scale/scale-appropriate seed & grain processing	2
Expand collaborations with WSU	2
Identify additional assets (e.g., research venues, survey platforms)	2
Improve accessibility/approachability of whole grains	2
Improve existing research practices (e.g., quinoa calibration)	2
Additional analysis of soil composition	1
Economic analyses	1
Identifying gaps in decision-making around food behaviors	1

- Clinical trials; scaling up accessibility of whole grain - take out sifters; traditional ecological knowledge - using culturally appropriate grains & cooking practices; -> education -> schools -> teachers from Oaxaca coming to Skagit/Mt. Vernon SD.
- Collaborating on other economic analyses in the project.
- Continue to see one another's work, tour labs, etc.; teaching facilities at food science department: mostly food companies but could be opportunities for high school students; opportunities to engage w/ hospitality program at WSU Everett campus.

- Development of small-scale seed & grain processing: - buckwheat dehulling; quinoa seed de-saponification & cleaning; milling & malting of gluten free grains.
- Engaging closely with Seattle/Portland metropolitan area for education/dissemination.
- Explore other labs; implement curriculum in classroom.
- Framing clinical trials as required mechanisms to demonstrate health benefits of specifically enriched foods.
- Human clinical trials to compare foods produced from crops in health outcomes.
- I am available as a resource for culinary development of consumer recipes as well as collaborating on commercial food products.
- Indigenous grain culture/grains; baking - seed production (variety & testing/dev); eating with members of community; increase school collaborations (farm 2 school): viva -> school partners with Breadlab/King A flour, approachable loaf; left the new/ID'd grains/legumes into school garden programs & processing/preparation/eating in classroom.
- I've mostly been focused on plant mineral analysis. But I do have experience with soil analysis and would like to extend this to determine mineral compositions in soil, micronutrients and soil contamination elements. Would also like to improve the quinoa calibration and or add additional crops to add to the NIR calibrations.
- Oaxacan bread baking event with grains grown by farmers; value-added incubation - commercial kitchen.
- Other colleagues who have previously used the data that I plan to use for the project.
- Potential to compare WSU results with results from the USDA BARC (Beltsville Agricultural Research Center) Farming System Project. There are similarities between the two.
- Science teacher association; use of professional kitchens for teacher training; WA dept of Ag; WA farm-to-school program; WSU campus locations; recipe development (traditional cooking of diverse populations - different recipes regionally); need to build on social media platforms).
- The main opportunities I'm trying to tap into right now are studying how others have approached similar questions related to understanding decision-making around food choices, barriers, and ultimately how to change behavior. We have a lot of networks both in the nutrition/food and econ spaces which we are trying to also use to get a better sense of what the gaps are... all ultimately aimed at trying to make decisions of what to include. We will need to also identify potential assets such as venues to conduct research… and survey platforms… getting an understanding of what others are using will be helpful to informing those decisions...
- Value-added farm business at Skagit Pork & with King Arthur Baking classes; whole wheat cooking with traditional Oaxacan foods.
- We may have a gap in scale-appropriate equipment that our lab might be able to help with: - seed processing; threshing; (clippers); seed storage. We are poised to contribute to the education part of the grant with our OSPI connections and ongoing teacher curriculum. 3. We are geographically close to both Viva & NWREC's facilities.
- We see great opportunities in research related to high quality personalized microbial safe ready-to-eat meals for consumers of special needs, including nursing homes, hospitals, school programs, military personnel, and future space travelers.