Food Security Education Practices and Perceptions in Minnesota School-Based Agriculture, Food, and Natural Resource Education Programs

The United Nations' 17 Sustainable Development Goals (SDGs) serve as a global "blueprint for shared peace and prosperity" (United Nations, 2025), with SDG 2 focused on achieving zero hunger. In 2022, 12.8% of households in the United States experienced food insecurity, underscoring the need for education that addresses this issue (Rabbitt et al., 2023). Building a globally competent workforce to combat food insecurity starts in secondary schools, where highly trained educators model critical skills (Kerkhoff & Cloud, 2020; Mansilla & Jackson, 2011).

Developing global competence requires teaching about culture, social justice, and inclusion (Goodman, 2020). Food security education can address racial and ethnic disparities in food insecurity, with non-Hispanic Black and Hispanic households experiencing food insecurity rates at least twice that of non-Hispanic white households (Odoms-Young & Bruce, 2018). Educating students on the systemic roots of these disparities, alongside global human rights frameworks like the Universal Declaration of Human Rights, fosters responsibility and awareness (D'Odorico et al., 2019). AFNR educators contribute to student understanding of local and global food security challenges through classroom instruction and curriculum integration (Kakar, 2021; Odoms-Young & Bruce, 2018). Literature emphasizes a comprehensive, justice-oriented approach to food security education that addresses structural inequalities (Kakar, 2021; Odoms-Young & Bruce, 2018). AFNR programs must incorporate these discussions to help students understand root causes like systemic racism and resource disparities. Zero Hunger Strategic Reviews also stress the need for clearer food security frameworks and increased policy awareness, making policy education an essential classroom component (Benson, 2021).

Educators currently address food insecurity through nutrition education, school meal advocacy, and food production opportunities (Rosales et al., 2023). Effective curriculum should also enhance students' understanding of agriculture's interconnection with food security and conservation (Lamm et al., 2018). Foster et al. (2024) highlights the importance of integrating Education for Sustainable Development (ESD) and global learning into AFNR programs to promote sustainable and equitable practices aligned with the SDGs. Teacher perceptions are critical to implementing effective food security education. Spence et al. (2023) identified five educator personas with varying priorities for food security instruction, suggesting the need for tailored curriculum development. Similarly, Murphy-Sweet (2021) found significant variations in global competency among agriculture educators and students, emphasizing the value of Global Citizenship models in classrooms. To prepare students for 21st-century challenges, AFNR educators must integrate leadership, critical thinking, and problem-solving into their curriculum (Davis & Jayaratne, 2015). Their research identified professional development needs around food security, global agriculture, and higher-order thinking, though findings were limited to North Carolina and should be expanded to other states.

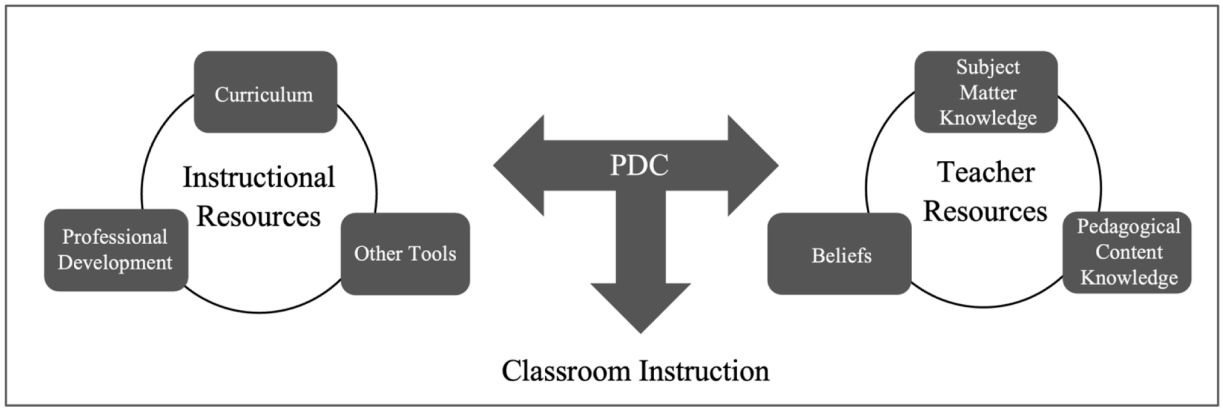
AFNR education can address aspects of food insecurity by incorporating sustainability, advocacy, and global learning into classroom instruction. Strengthening professional development and embedding food security concepts into AFNR programs will better equip students to address global challenges and advance sustainable solutions.

Theoretical Framework

The theoretical framework for this study is based on Pedagogical Design Capacity (PDC) PDC refers to teachers' ability to engage in instructional design by perceiving and mobilizing personal and curricular resources (Brown, 2002, 2009; Brown & Edelson, 2003). Teachers naturally function as curriculum designers as they plan, implement, and assess instruction, often adapting existing materials (Brown, 2002, 2009; Brown & Edelson, 2003; Remillard, 2005). As visualized in Figure 1, Knight-Bardsley and McNeill (2016) expanded the PDC framework, broadening the concept of curriculum resources to include all instructional resources, including professional development tools. Supporting teachers in identifying these key resources is essential for implementing effective instructional changes (Knight-Bardsley & McNeill, 2016; Brown, 2009, 2011). This framework emphasizes that teachers play a vital role in mobilizing resources to design instruction that strengthens students' understanding of food security issues and highlights the need to enhance instructional resources to improve Minnesota's AFNR global food security education.

Figure 1

Framework for Pedagogical Design Capacity



Note. As expanded by *Knight-Bardsley & McNeill, 2016*

Objectives

The purpose of this research was to explore current practices and perceptions of food security education of MinnesotaAFNR teachers. The following research objectives guided the study.

Objective #1: Describe perceptions and practices of MinnesotaAFNR teachers concerning teaching global food security-related topics.

Objective #2: Identify professional development needs for implementing food security educational instructional materials of Minnesota AFNR teachers.

Methods

This study utilized both quantitative and qualitative methods to examine Minnesota AFNR teachers' perceptions and practices regarding global food security instruction. Teachers were contacted through the Minnesota AFNR instructor email listserv, and two reminder messages were sent over a four-week period. Participation was voluntary, and all responses were collected anonymously through Qualtrics. A survey was distributed to all 326 school-based AFNR teachers in Minnesota to collect data. A total of 79 teachers responded, yielding a 24.2% response rate. Participants provided demographic information including gender, race, ethnicity, age, years in the profession, community type, certification pathway, and personal experiences with food insecurity.

The survey instrument was adapted from Letot (2023), which builds on validated tools such as the Global Perspectives Inventory (Research Institute for Studies in Education, 2017), Global Competency Measurement (Tichnor-Wagner, 2019), and the Global Competence Aptitude Assessment (Global Competence Associates, 2018). Letot's instrument demonstrated high reliability ($\alpha = .949$). Survey questions were grouped thematically based on their intent to analyze teacher perspectives on food security.

In addition to the survey, qualitative data was collected through semi-structured focus group interviews with seven Minnesota AFNR teachers (Seidman, 2012). Focus group participants were recruited from survey respondents who indicated willingness to participate in follow-up interviews. The interviews were conducted via Zoom, recorded, transcribed, and checked for accuracy. Thematic analysis followed Braun and Clarke's (2012) six-step process: familiarization, coding, theme development, review, defining themes, and locating exemplars. Thematic analysis emphasizes patterns across the data, even if not representative of the majority (Braun & Clarke, 2006; Scharp & Sanders, 2019). Open-ended focus group responses were analyzed using MAXQDA software.

Findings

This study is limited by a 24.2% response rate (79 of 326 teachers) and the potential for self-selection bias, as educators with a stronger interest in food security may have been more inclined to participate. Without a formal non-response bias analysis, claims of generalizability beyond the sample are restricted.

Theme 1: Instructor Motivators. Teachers are motivated to teach food security due to a growing disconnect between students and food production. One explained, "We're becoming more and more distant from where our food is coming from," while another emphasized, "Getting students connected back to food again." Student curiosity also drives engagement: "They really want to know." Educators highlighted the importance of local and personal relevance, noting that connecting lessons to Minnesota agriculture or students' communities raises awareness: "Students don't really connect the dots that their classmates are food insecure." Exposure to diverse food systems and the desire to support families further motivates teachers to integrate this topic.

Theme 2: Maintaining Student Interest. Teachers used a variety of curricular and extension resources, including Ag in the Classroom, World Food Prize materials, USDA data, and online simulations. Teachers sustain engagement by linking content to students' lives, leveraging curiosity, and using hands-on activities. One noted, "[Students] keep their interest when finding something that they're passionate about or finding something that they can physically interact with." Relevance was emphasized: "Keeping it relevant, making students see how it affects them… giving them those lightbulb moments." Local examples, personal perspectives, and safe spaces for student voice also support engagement: "I had students submit questions anonymously, so then they could feel like they could share their own experiences or ask their own questions without being judged."

Theme 3: Food Security in Other AFNR Pathways and Disciplines. About 55% of teachers reported including food security in instruction—39% in learning activities, 12% in lesson plans, 42% in units, and 6% in full courses. The survey also revealed that food security instruction is most commonly integrated into Food Products and Processing courses (32.3%), followed by Introductory (21.5%), Plant Systems (12.3%), Animal Systems (10.8%), Ag Business and Grand Challenge pathways (both 7.7%), Natural Resources and Leadership (both 6.2%), and least in Power, Structural, and Technical Systems (1.5%). Participants identified opportunities to integrate food security across AFNR pathways, including economics, animal science, crop production, horticulture, agribusiness, and communications. One explained, "[Food security] definitely goes into economics… supply and demand–everything–I feel like I can bring back to food–the insecurities that exist because of different economic principles." Another noted the connection to animal science: "Because products come from large animals… [trends in animal production] would increase food insecurities in different locations."

Theme 4: Barriers and Needs. 72% of teachers recognized food security concerns in their schools, and 82% supported teaching it, yet only 45% felt confident integrating these concepts. Challenges faced by teachers include time constraints, low student interest, lack of training and dedicated facilities, difficulty fitting food security into technical courses, discomfort with sensitive topics, insufficient curriculum coverage, and a need for adaptable, pro-agriculture, globally and locally relevant resources. Teachers face challenges including limited time, resources, abstract concepts, curriculum misalignment, and outdated materials. One remarked, "I enjoy teaching it, so I would love to expand it, but the time to build it isn't always there." Another noted, "Modules… some of those things will never get updated." Social and cultural resistance also exists: "There's a little bit of pushback from conventional farmers… changes to their agricultural practices just [isn't] normal." Effective integration requires high-quality, hands-on, and locally relevant resources: "Finding some solid resources… not just a PowerPoint… activities really get the kids engaged." Teachers also highlighted the need for flexible instruction, varied learning methods, professional development, and real-world industry input: "Workshop at one of our conferences" and "professionals come in and speak on it… or share their insights via videos."

Recommendations/Discussion/Conclusions/Implications

This study indicates that a majority of Minnesota Agriculture, Food, and Natural Resources teachers surveyed (82%) support including food security education in classrooms. However, a significant gap exists as only 45% feel confident teaching this content, hindered by

barriers such as time constraints, curriculum misalignment, limited resources, and insufficient professional development. As Brown (2002, 2009), Brown & Edelson (2003), and Remillard (2005) emphasize, teachers act as curriculum designers and require tailored training to effectively integrate complex topics like food security. Current curricula often emphasize religion, use deficit-based narratives, and focus primarily on developing countries, neglecting systemic food justice issues pointing to a need for research-informed, engaging curricula aligned with global learning outcomes (Foster et al., 2024; Spence et al., 2023).

Despite challenges, focus group data show educators' commitment to reconnecting students with food systems. Some teachers reported using strategies such as hands-on learning, authentic storytelling, and connecting lessons to local contexts, while expressing interest in expanding food security education beyond food products and processing to disciplines like economics, animal science, and leadership.

Food security is inherently interdisciplinary, intersecting numerous AFNR pathways. Integrating United Nations Sustainable Development Goals (SDGs), particularly zero hunger, can help students grasp the global-local connections of food challenges. Findings suggest a need for adaptable, culturally responsive curricula that teachers can modify for diverse classrooms, particularly given reported barriers such as limited time, outdated materials, and insufficient professional development. Professional development must focus on content knowledge and pedagogical strategies to build teacher confidence and capacity. Additionally, schools should acknowledge educators' roles in supporting student well-being and provide institutional resources.

To enhance food security education in AFNR programs, it is recommended to promote cross-pathway and interdisciplinary learning by encouraging the integration of food security topics into non-traditional courses such as mechanics, economics, and leadership, supported by sample lessons and collaborative projects. Developing and disseminating curriculum toolkits that are locally relevant, aligned with AFNR standards, and include assessments and case studies will provide teachers with adaptable instructional resources. Expanding professional development opportunities through accessible workshops, webinars, and conferences is essential to build teacher capacity. Establishing a digital platform will facilitate teacher networks by enabling the sharing of curricula, community project ideas, and resources across districts. Supporting community engagement by funding and recognizing student participation in service learning and food justice projects connected to classroom instruction can further enrich learning. Finally, ongoing research should investigate student perspectives, assess the effectiveness of instructional interventions, and guide continuous curriculum refinement. Future efforts will focus on building a repository of vetted instructional resources, organizing professional development seminars, advancing research on food system injustices, and integrating SDGs into AFNR curricula to promote interdisciplinary learning.

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