

A Systematic Review of Youth Programs Addressing Agricultural Literacy and Nutrition

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Introduction/need for research

In Priority 7 of AAAE's *National Research Agenda*, Roberts et al. (2016) stressed the need for agricultural education to assist in solving complex societal issues. A multitude of agencies have established their own call to actions regarding the urgency of merging the forces of agriculture and nutrition to improve public health. The USDA underlines the need for agriculturists to investigate the connections between agriculture, food, and health (USDA, 2018). Relatedly, the United Nations' Sustainable Development Goals highlight necessities of discovering solutions to improve education, eradicate hunger, and fostering good health (Lee et al., 2021). These align with the demand for achieving the food safety and public health goals outlined by *Healthy People 2030* (Office of Disease Prevention and Health Promotion, 2018).

High schoolers have produced low scores on the third theme of the National Agricultural Literacy Outcomes (NALOs), food, health, and lifestyle, regardless of their enrollment in agricultural education courses (Pense & Leising, 2004). This reinforces the need for nutrition-sensitive agriculture programs that assist in tackling nutrition problems (Gutestam et al., 2014; Strong, 2012). This nexus of agricultural literacy and nutrition education is essential for eliciting food behavior change in our youth (Raj et al., 2017). Change agent competencies are essential for behavior change (Harder & Strong, 2010; Strong & Irani, 2011). Blair (2010) discovered that teaching youth the origins of their food increased awareness of how to make healthy choices. Further, Dillon et al. (2005) revealed immersing students in the study of crop production, livestock, and the process of farm to fork, improved attitudes and awareness of health and food.

Conceptual Framework

Agricultural literacy varies from agricultural education as it strives to inform the general public about agriculture rather than train individuals for a career (Vallera & Bodzin, 2016). Spielmaker and Leising (2013) group the learning benchmarks for agricultural literacy into themes. These themes are (a) agriculture and the environment, (b) plants and animals for food, fiber, and energy, (c) food, health, and lifestyle, (d) science, technology, engineering, and mathematics, and (e) culture, society, economy, and geography. Meischen and Trexler (2003) highlight the competencies of an agriculturally literate person. These are: (a) ability to engage in conversations regarding agricultural systems, (b) assess the validity of media claims, (c) recognize agricultural issues on local, national, and international levels, and (d) scientifically judge agricultural arguments.

Purpose and Methodology

The purpose was to assess peer-reviewed literature reporting on youth programming within agricultural literacy and nutrition. The objectives were (a) Identify current youth programs that are addressing agricultural literacy and nutrition, and (b) Describe trends of such programs. The systematic review entails conducting an extensive search of peer-reviewed literature using structured protocols (Lee et al., 2021). Five essential steps were followed to gather, evaluate, and decipher the literature. The driving question was established: "What peer reviewed research has been published about youth programming focused on agricultural literacy and nutrition?". Search parameters were based upon this question and implemented using database searches. The data was analyzed using meticulous interpretation and summarization (Harris et al., 2014).

The research team established a list of keywords that would aid in answering the research questions through the analysis of relevant literature. The defined keywords were agricultural literacy, agricultural education, nutrition literacy, nutrition education, and youth. Utilizing the Web of Science database, researchers aimed to understand the current state of youth programs that are merging nutrition and agricultural literacy. Researchers ensured that articles would be selected for analysis based upon specific criteria: (a) the publication was peer reviewed; (b) the target population of the program was youth; (c) keywords appeared in the title and throughout the article; and (d) the article was published between 2012 and 2022.

Findings

The initial electronic search using the Web of Science database yielded 948 ($N = 948$) results. A total of 890 studies were excluded prior to screening on the basis of year published, language, and article type. Following the primary screening, 30 articles were thoroughly evaluated for eligibility to be included in the review. Review and duplicate articles were removed along with articles that assessed programs that were not tailored to youth participants or did not pertain to nutrition or agricultural literacy. The final screening stage engendered 14 ($N = 14$) articles to be included in the final review. A majority of the program participants identified were in elementary school, kindergarten through sixth grade ($n = 11$). Two ($n = 2$) programs encompassed a wide array of participants ranging from Grade 3 to Grade 12. Only one program's efficacy was assessed on only high school aged students ($n = 1$).

Less than half of the programs directly addressed agricultural literacy in their programs ($n = 3$). Of the three programs, only one program incorporated the nexus of agriculture and nutrition ($n = 1$). This experiential program utilized grain science to model the connections agriculture has to nutrition and the environment. The two programs' focal points were on specific aspects of agricultural education such as poultry industry, plant biosecurity, entomology, and current agricultural issues. A vast majority of the programs were concerned with improving youths' nutritional literacy ($n = 14$). Though these programs did not formally state an intent to affect students' agricultural literacy, many infused agricultural literacy themes into the curriculum ($n = 13$). Only two programs integrated all five themes of the agricultural literacy benchmarks ($n = 2$). Five of the programs merged three to four themes ($n = 5$). The remainder of the programs only focused on one agricultural literacy theme ($n = 3$).

Conclusions

Agricultural literacy and nutrition are systematically linked to agricultural education. The data indicated opportunities exist for agricultural and nutritional education programs to collaborate, develop synergy, and elicit impact in a national area of concern (USDA, 2018).

Implications and Recommendations

Nutrition is interconnected with agriculture and youth. Annual chronic healthcare costs underscore the need to understand the relationship between agriculture and nutrition to better inform stakeholders such as parents, youth, teachers, and producers. Additional research is needed to inform youth programming; this systematic review provides a starting point.

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