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Pilot in-field food safety training assessment of donation gardens managed by Master Gardeners in Iowa

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Abstract

Lack of access to safe, healthy food is a significant concern. Many non-profit organizations, such as local food pantries, are exploring ways to increase access to fresh produce in both rural and urban areas. Due to the vulnerability of the target audience that frequents the pantries, gardeners must distribute fresh produce that is safe to eat and free of pathogens. The vulnerable population includes young children, immunocompromised people, older adults, and pregnant women. The objective of this study was to assess Master Gardeners' (n=39) awareness, knowledge, and attitude following a pilot in-field food safety training on managing donation gardens. Each hands-on activity in the training was designed to teach gardeners the importance of reducing risk in the garden. To evaluate the training, the team adopted a three-stage process: 1) Qualitative research to learn more about Master Gardeners' perceptions of food safety and their motivations for engaging in the volunteer activity, used to inform workshop development, 2) Pre/post measurement of changes in awareness, knowledge, and attitude at the time of the workshop, and 3) Measurement of any changes in the practice of key food safety protocols two to three months post-workshop. The evaluation results showed that knowledge increased significantly after the gardeners participated and completed hands-on activities. For example, we observed that the gardeners gained significant knowledge regarding what items were crucial in a food safety tool kit. The post-training follow-up evaluation indicated that participants made significant changes too many but not all of their practices. However, gardeners purchased items to help them implement food safety practices in donation gardens throughout Iowa.

Keywords

produce safety, hands-on activities

Disciplines

Food Science | Other Food Science

Presenter Information

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Pilot in-field food safety training assessment of donation gardens managed by Master Gardeners in Iowa

Abstract

Lack of access to safe, healthy food is a significant concern. Many non-profit organizations, such as local food pantries, are exploring ways to increase access to fresh produce in both rural and urban areas. Due to the vulnerability of the target audience that frequents the pantries, gardeners must distribute fresh produce that is safe to eat and free of pathogens. The vulnerable population includes young children, immunocompromised people, older adults, and pregnant women. The objective of this study was to assess Master Gardeners' (n=39) awareness, knowledge, and attitude following a pilot in-field food safety training on managing donation gardens. Each hands-on activity in the training was designed to teach gardeners the importance of reducing risk in the garden. To evaluate the training, the team adopted a three-stage process: 1) Qualitative research to learn more about Master Gardeners' perceptions of food safety and their motivations for engaging in the volunteer activity, used to inform workshop development, 2) Pre/post measurement of changes in awareness, knowledge, and attitude at the time of the workshop, and 3) Measurement of any changes in the practice of key food safety protocols two to three months post-workshop. The evaluation results showed that knowledge increased significantly after the gardeners participated and completed hands-on activities. For example, we observed that the gardeners gained significant knowledge regarding what items were crucial in a food safety tool kit. The post-training follow-up evaluation indicated that participants made significant changes to practices. Gardeners did not suggest significant changes to all of their practices; however, they did purchase items to help them implement food safety practices in donation gardens throughout Iowa.

Keywords: produce safety, hands-on activities

INTRODUCTION

Access to enough food for an active and healthy life at all times and among all populations is one of a variety of conditions that are needed for a community to be healthy, well-nourished, and food secure (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016). Lack of access to safe, nutritious food is a significant concern throughout the U.S. and especially in Iowa. Specifically, the state of Iowa imports over 90% of its food, including fruits and vegetables (Pirog, Van Pelt, Enshayan, & Cook, 2001). According to Feeding America (2020), one in 10 people in Iowa struggles with hunger. Non-profit organizations, such as local food pantries, are investigating ways to increase access to fresh produce in both rural and urban areas. As reported by the United Health Foundation (2019), adults in Iowa consume only 1.9 servings of vegetables per day on average.

Over the past three years, the Iowa Master Gardeners unit within Iowa State University Extension and Outreach has donated over a quarter-million pounds of fresh produce to local food pantries (Szymanski, 2019). The donations were made possible through Growing Together Iowa. This program, a collaboration between the Iowa Master Gardener Program and the Iowa Supplemental Nutrition Education Program (SNAP-Ed), provides mini-grants to Master Gardeners' groups who want to establish donation gardens and purchase garden supplies. These community gardens facilitate donations of fresh produce to local food pantries. In 2018, Master Gardeners and Growing Together Iowa donated over 90,000 pounds of fresh produce (ISU Extension and Outreach SNAP-Education, 2018). Iowans who rely on food pantries to access food

often come from vulnerable demographics. The vulnerable population includes young children, immunocompromised people, older adults, and pregnant women. According to Feeding America, (2011), “Over half of seniors aged 65+ accessing food pantries were recurrent clients, meaning they have used a pantry every month for at least 12 months.” Due to the vulnerability of the target audience that frequents the pantries, gardeners must distribute produce that is safe to eat and free of pathogens (Beuchat, 1996).

Continuing education played an essential part in the Growing Together Iowa project. A team comprised of horticulture, food security, and food safety Extension and Outreach experts delivered six hours of continuing education using webcasting in 2016 to 300 Iowa Master Gardeners. Following the webcasts, during the summers of 2016 and 2017, participants received supplemental on-site, hands-on training that included citizen science and basic food safety practices to follow in their gardens. In addition, the SNAP-Ed program supplied several participants with mini-grant funding to purchase supplies, such as handwashing stations. Following the online continuing education, concerns about food safety practices in the community gardens were brought to the attention of the program leadership. Observations during post-training site visits and in reporting photos showed that adherence to good food safety practices was uneven and that gardeners were still unsure what protocols to follow to keep produce safe. Knowledge of basic food safety in produce fields is essential to grow, harvest, and transport fruits and vegetables safely (Beuchat, 1996; Todd, Greig, Bartleson, & Michaels, 2009).

ISU Extension professionals who designed and presented the online and hands-on training continued to be concerned about food safety in the community donation gardens. The ISU Extension food safety specialist recognized that Master Gardeners needed more guidance in the area of food safety, particularly more hands-on activities. Kandel, Ransom, Torgerson, and Wiersma (2010) have found that using hands-on activities delivered during a short amount of time is a useful tool in extension programming. Taylor and Fransman (2004) note that for “many adult educators that experiential, hands-on learning activities offer a powerful medium for promoting transformative learning.” Because observations during post-training site visits in Iowa showed that there was a lack of adherence to acceptable food safety practices, it was unclear if gardeners followed proper protocols to keep fresh produce safe.

The objective of our project was to assess Iowa Master Gardeners’ (M.G., n=39) awareness, knowledge, and attitude towards food safety practices following a pilot in-field training at several Iowa donation gardens. The team wanted to step away from traditional lecture-style learning and incorporate active learning strategies such as in-field hands-on activities. Each activity was designed to teach gardeners the importance of reducing food safety risk, both pre- and post-harvest, in the garden.

MATERIALS AND METHODS

To address these food safety concerns, ISU Extension and Outreach food safety specialists established a team to develop a comprehensive in-field food safety pilot training for Iowa’s Master Gardeners and community partners. The workshop series, entitled “Safe Produce for Donation,” was held during the summer of 2019.

Development of three hands-on activities

Iowa Master Gardeners (n=9) participated in a focus group to provide information about their perceptions of food safety and their motivations for engaging in volunteer activity, which informed the development of in-field activities. The focus group took place in February 2019 through the online conferencing tool Zoom®. The results of the focus group showed that the activity must

emphasize the desire to be responsible while also providing clear outcomes of the activity rather than prescribing practices. It was also found that the activity should prioritize the most critical food safety practices in depth. Finally, it was found that information should be offered in a variety of formats highlighting the same facts. The findings from these focus groups were incorporated into the development of an in-field activity that utilizes active learning principles.

Using the findings from the focus groups, the team designed three primary hands-on activities. A short description of the activities can be found in Table 1. The team used hierarchical typologies used to classify educational learning objectives for each activity (Bloom & Krathwohl, 1956). During the activities, the participants worked in groups to actively engage in each activity.

Table 1. Titles and descriptions of the three in-field hands-on activities developed for the Safe Produce for Donation workshop series through Iowa State University Extension and Outreach.

Activity Title	Description
<i>Cross-Contamination Activity</i>	Participants identify potential sources of cross-contamination and how to prevent them.
<i>Food Safety Kit Assembly Activity</i>	Participants choose items needed to ensure safety pre- and post-harvest and in-transit.
<i>Basic Food Safety Scenario</i>	Participants conduct a situational assessment and recommend corrective action(s).

The “Cross-Contamination Activity” allowed participants to utilize a case study that outlines unsafe food practices that could occur in the donation garden. Six of the participants served as actors in the scenario. The instructor read aloud the case to the participants, and each participant performed their role in the case. During the reading of the case, participants came in contact with Glo germ® powder. The powder served as a tool to illustrate cross-contamination through various contact props used during the demonstration. After the activity, participants identified the source of contamination and were instructed in proper handwashing techniques.

The “Food Safety Kit Assembly Activity” allowed participants to utilize the method of informing participants with inappropriate prior knowledge about the proper tools needed for a food safety toolkit. The group was presented with various items that could serve as tools for following food safety practices in the garden. At the end of the activity, participants were asked to identify items that would be useful in their donation garden. After the activity, the instructor reviewed each item and shared with the participants explicitly the norms behind whether each product was appropriate or not.

The “Basic Food Safety Scenario” allowed participants to utilize the active learning method of a “gallery walk” (Francek, 2006). The groups actively worked together and reviewed each scenario. During the activity, the groups took notes while they presented their ideas. After the activity, participants were asked to identify the food safety risk and the recommended corrective action for each scenario.

Evaluation of hands-on activities

Pre/post measurement of changes in awareness, knowledge, and attitude at the time of the activities was collected via a paper survey at the time of the training. Also, two to three months after the training, the Master Gardeners who participated were surveyed using Qualtrics® and results were shared with participants via email.

Answers were coded by response option, where 1 = no knowledge to 5= highly knowledgeable. Data were analyzed and descriptive information about each prompt was summarized using means, standard deviations, the difference in change, significant difference (.05 confidence level) using Paired two samples T-test via Microsoft® Excel.

RESULTS AND DISCUSSION

The Safe Produce for Donation pilot training was delivered to a total of 40 participants who attended the three-hour workshops in five Iowa locations (Cedar Rapids, June 17 (6 participants), Storm Lake, June 18 (9 participants), Boone, June 20 (11 participants), Sioux City, June 29 (2 participants), and Urbandale, July 13 (12 participants). Thirty-nine (98%) Master Gardeners completed the paper pre/post evaluation on-site.

Pre- and post-assessment

Knowledge levels about food safety risks before and after the trainings are shown in Figure 1. The data provide evidence that participants gained knowledge about how cross-contamination happens in a garden and how it can be corrected, and about the importance of handwashing. At the end of the training, most gardeners reported more confidence in being able to choose the right items to include in a food safety kit for their donation garden.

Training participants were asked to rate their knowledge in six critical areas of food safety on a five-point scale with 1=No knowledge and 5=Highly knowledgeable. Participants reported significant (.05 confidence level) gains in knowledge in all six areas. They started the training with knowledge ratings ranging from 1.84 (how to assemble a food garden food safety kit) to 3.44 (risks of cross-contamination due to lack of improper handwashing). After the training, they rated their knowledge above 4.5 in all of the areas. They rated their “overall” knowledge at 4.61.

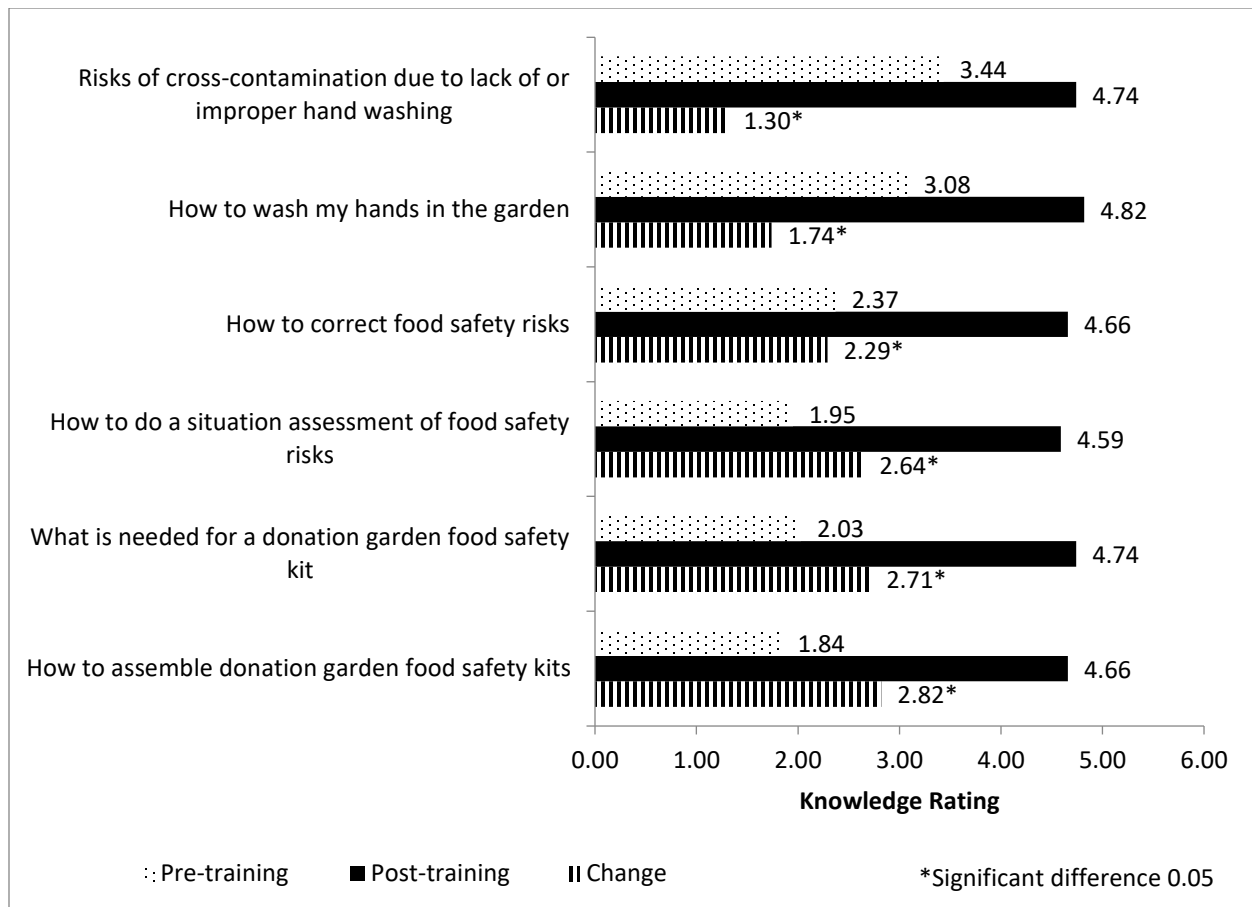


Figure 1. Pre-, post, and change in knowledge of six essential food safety risks (n=39) of participants in the Safe Produce for Donation training. Ratings range from 1-5, where 1=no knowledge and 5=highly knowledgeable. Significance of change was denoted using an asterisk (*).

To test whether Master Gardeners were ready to implement or had already implemented knowledge gained during the hands-on training, the Extension food safety team reached out to the participants and conducted a survey three months post-training. Participants were asked to rate their compliance with seven critical practices covered in the training. They reported a significant (.05 confidence level) change in behavior on the first five items shown in Figure 2, and a positive (but not significant) change in the last two: restricting animal access and clean restroom availability.

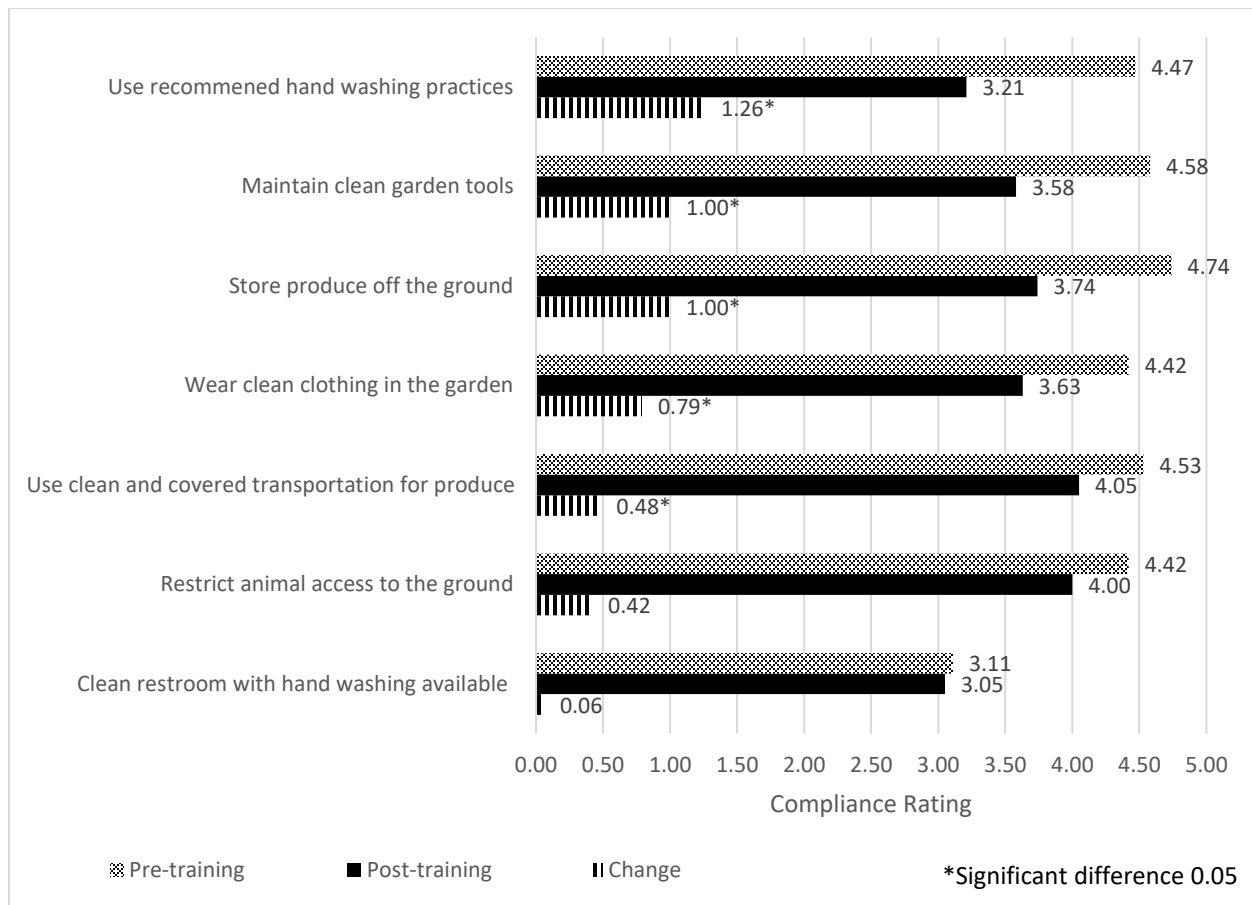


Figure 2. Pre-, post, and change in compliance for seven essential food safety risks 2-3 months post-training among 19 participants in the Safe Produce for Donation training. Significance of change was denoted using an asterisk (*).

Follow - up assessment

A total of 19 (48%) participants completed the follow-up evaluation two to three months post-training. There was also an increase in the percentage of participants who reported “always” practicing one of the seven critical practices (Figure 3). There was an 82% increase in the number of participants “always” maintaining clean garden tools, and more than two-thirds (64%) of participants increased both handwashing and wearing of clean clothing to 100% compliance. More than half (57%) increased the frequency of storing produce off the ground to 100% compliance. Gains in the percent of participants with 100% compliance in restroom availability (14%) and restrictions on animal access (11%) were lower.

Seventy-eight percent (78%) of gardeners reported they had purchased items that would help reduce food safety risks after taking the training. Just over a third said they had purchased harvesting and storage containers (36%), and handwashing equipment and supplies (36%). Sixteen percent (16%) had purchase other food safety-related items such as hand washing equipment, easy-to-clean and disinfect food-grade containers, and stands to keep harvest containers off the ground.

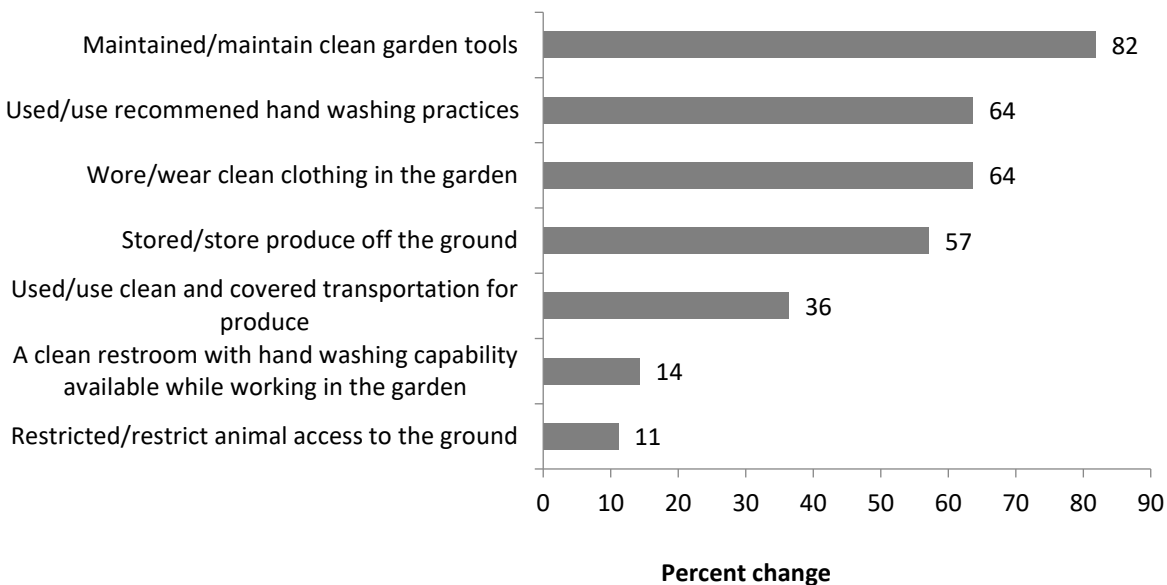


Figure 3. Percent increase in the number of Master Gardeners in 100% compliance 2 to 3 months post-training (n=19).

CONCLUSION

The results of the evaluation showed that knowledge increased significantly after Master Gardener’s participated in and completed hands-on activities. Knowledge added through hands-on practice and group activities gave rich meaning to the newly gained food safety skills. The Master Gardeners considered these activities to be engaging and felt that they provided the in-field experience that they needed to implement changes in their donation gardens. However, for changes in behavior to occur in the gardens, Master Gardeners must be empowered with solid food safety knowledge and enough experience to give them the confidence to apply food safety procedures correctly and efficiently.

Our study demonstrated that Iowa Master Gardeners are willing to become informed and proficient in food safety issues, are willing to change their behavior, and are motivated to implement practices to make their donation gardens as safe as possible. For example, we observed that after the training, gardeners gained considerable knowledge regarding what items were crucial in a food safety tool kit. In addition, they took significant steps to find the funds and purchase items to include in their kits in each garden according to their needs. While Iowa Master Gardeners will need more guidance from Extension professionals in the future, our study indicates that they have the alacrity and motivation to learn and implement food safety practices in donation gardens throughout the state.

ACKNOWLEDGMENTS

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Literature Cited

Beuchat, L. R. (1996). Pathogenic microorganisms associated with fresh produce. *Journal of Food Protection*, 59(2), 204–216. <https://doi.org/10.4315/0362-028X-59.2.204>

Bloom, B. S., & Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. In *Handbook I: Cognitive Domain*. (1st ed., p. 18). Canada: David McKay Company, Inc.

Coleman-Jensen, A., Rabbitt, M. P., Gregory, C., & Singh, A. (2016). Household food security in the United States in 2014. In *U.S. Household Food Security: Statistics and Analysis for 2014*. <https://doi.org/10.2139/ssrn.2504067>

Feeding America. (2011). *Food banks: hunger's new staple* (Vol. 9). Retrieved from <https://www.feedingamerica.org/sites/default/files/research/hungers-new-staple/hungers-new-staple-full-report.pdf>

Feeding America. (2020). *What Hunger Looks Like in Iowa*. Retrieved July 20, 2020, from <https://www.feedingamerica.org/hunger-in-america/iowa>

Francek, M. (2006). Promoting discussion in the science classroom using gallery walks. *Journal of College Science Teaching*, 36(1), 27–31. Retrieved from <https://eric.ed.gov/?id=EJ752640>

ISU Extension and Outreach SNAP-Education. (2018). *2018 Healthy Food Access Projects*.

Kandel, H. J., Ransom, J. K., Torgerson, D. A., & Wiersma, J. J. (2010). Cooperation with commodity groups and hands-on demonstrations improve the effectiveness of commodity-focused educational programs. *Journal of Extension*, 48(1), 1–11.

Pirog, R., Van Pelt, T., Enshayan, K., & Cook, E. (2001). *Food , Fuel , and Freeways : An Iowa perspective on how far food travels, fuel usage, and greenhouse gas emissions*. Leopold Center for Sustainable Agriculture. Ames, IA. Retrieved from https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1002&context=leopold_pubspapers

Szymanski, C. (2019). *Fresh local produce for food-insecure Iowans*. Retrieved July 20, 2020, from <https://www.extension.iastate.edu/ffed/2018-growing-together-iowa/>

Taylor, P., & Fransman, J. (2004). *Learning and teaching participation: Exploring the role of Higher Learning Institutions as agents of development and social change*. Brighton, England: Institute of Development Studies Working Paper, 219(March). Retrieved from <https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/4014/Wp219.pdf?sequence=1&isAllowed=y>

Todd, E. C. D., Greig, J. D., Bartleson, C. A., & Michaels, B. S. (2009). Outbreaks where food workers have been implicated in the spread of foodborne disease. Part 6. Transmission and survival of pathogens in the food processing and preparation environment. *Journal of Food Protection*, 72(1), 202–219. <https://doi.org/10.4315/0362-028X-72.1.202>

United Health Foundation. (2019). *America's Health Rankings: Iowa*. Retrieved from <https://www.americashealthrankings.org/api/v1/render/pdf/%2Fcharts%2Fstate-page-extended%2Freport%2F2019-annual-report%2Fstate%2FIA/as/AHR-2019-annual-report-IA-summary.pdf?params=mode%3Dsummary>