



AGRICULTURE TECHNOLOGY &  
FOOD ACCESS IN EASTERN AND  
CENTRAL KENTUCKY:  
COLLEGE STUDENT PERSPECTIVES

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## ***Background***

As young professionals with the Community Innovation Lab at the University of Kentucky, we are working to build a foundational program that will create awareness and educate citizens across the Commonwealth of Kentucky about agricultural technology (agritech) and food production. We believe that learning from the broad base of stakeholders in Central and Eastern Kentucky will set the stage for bringing awareness and knowledge of agricultural technology and food production in the region.

AgriTech can be defined as the use of technology in agriculture with the aim of improving yield, efficiency, and profitability. It includes products, services, and applications that improve various input/output processes. It includes innovations related to software/hardware, precision agriculture, big data, state-of-the-art equipment, and related technologies that support the farms of the future. Controlled Environment Agriculture (CEA) is defined as the combination of engineering, plant science, and computer managed greenhouse technologies that are used to optimize plant growing, quality, and production efficiency. CEA allows control of the plant's environment including temperature and light. CEA provides secure, healthy, and cost-effective year-round production of many different plant species.

Kentucky AgriTech states that agriculture in Kentucky is one of the state's leading and most vital industries, contributing about \$45.6 billion to Kentucky's economy each year. "AgriTech seeks to enhance the manner in which we manage our resources to ensure quality, safety, and the overall well-being of consumers, while at the same time providing enhanced economic opportunities in related fields." (Kentucky, 2020).

Increasing stress on natural resources, continued depletion of agriculture land, and the need to feed a growing population require dramatic increases in productivity. In addition, there is a need to reduce our waste of resources and energy. Given Kentucky's signature agriculture, equine, food, beverage, and advanced manufacturing industries, the state is uniquely positioned to offer an environment that can attract, develop, and sustain agritech-related enterprises.

## ***Research Methods***

The goal of this project was to identify diverse stakeholders primarily in the Central and Eastern Kentucky region, and learn about their awareness and knowledge of agricultural technology and food production in their communities. We purposively sampled students at colleges and universities within the Central and Eastern Kentucky region. A seventeen-question survey was developed by the researchers, that asked about student's perspectives regarding food security, food access, and food technology in Kentucky and it was then sent to eleven colleges or universities. We sent the survey link and an introductory letter to each college or university's Office of Diversity and Inclusion and asked them to forward the link to 10 diverse students. The online survey was facilitated through Qualtrics; it remained open for three weeks – from October 20 to November 13, 2020. The survey was confidential and anonymous with the option to leave an e-mail address if the individuals wanted us to follow up after the completion of our project. We sent it to 110 students and received 28 responses, giving us a 25% response rate.

There were several limitations associated with the study. One limitation was having to go through administration channels to have the survey emailed out to students. In addition, it is

understood that the personal choice of these administrators (who selected the 10-12 diverse students to forward the email to) influenced student selection. Another limitation was the regional focus of the study. Finally, the fact that we are currently living through a global pandemic may have impacted the student morale, potentially leading to lower response rates.

### ***Results<sup>1</sup>***

The results from the questionnaire are below.

On average, our respondents:

- Eat fresh produce 3.54 days a week.
- Shop for fresh produce once a week.
- 78.57% of the respondents get their fresh produce from the local grocery store. (see figure 1)
- Mango and pineapple were the most popular fruits among the responses. (See figure 2)
- Broccoli, spinach, asparagus, corn, and carrots were the most popular vegetables. (See figure 3)
- The most common barriers were cost, shelf life of fruits and vegetables, and availability (see figure 4)
- When asked to list ways to improve the likelihood of them buying fresh produce, access and cost were among the most common responses.
- When asked to state what comes to mind when they hear the term “controlled environment agriculture”, these were the phrases that most commonly occurred:
  - GMO’s
  - Chemical free
  - Greenhouse
- Most common words used to describe Appalachia:
  - Poverty
  - Mountains
  - Mining
- When asked if they have heard of the company AppHarvest, 89.29% said no.
- When asked to rank the economic opportunities in order for Kentucky’s Appalachian Region; agriculture was commonly placed as first, followed by healthcare, forestry, manufacturing, mining, and technology. (see figure 5)
- The age of the respondents went from 18 years old to 40+ years old. (see figure 6)
- See figure 7 for ethnic demographics
- See figure 8 for gender demographics

### ***Conclusions***

In conclusion, students surveyed are shopping for fruits and vegetables on an average of every other day. This leads us to believe that the majority of students are buying food as they are consuming it rather than shopping once or twice a week. This could be a reflection of the response to access, cost, and shelf life being barriers to those individuals.

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<sup>1</sup> Charts and graphs in the appendix

Mango and pineapple were the most common favorite fruits of the group surveyed. Ironically these two fruits are grown in tropical environments and seasonal at best in our region. The favorite vegetable of the individuals surveyed was broccoli carrying 35.7% of the common vote.

The “controlled environment agriculture” portion of the survey left many questions to be answered. We asked people to state what comes to mind when they hear this phrase. Individuals explained base knowledge from “No idea. Farms.” to “GMO, in season” and “Plant production in a closed, heavily managed space such as a greenhouse or hoophouse that modifies factors such as temperatures and humidity.”. GMO stands for genetically modified organism. Meilan (2016) describes them, “GMOs are living beings that have had their genetic code changed in some way”. One individual simply replied, “N/a”. One could draw a conclusion that education should be done for further examination of this concept to those outside the field to remove bias and misunderstanding.

The majority of the individuals surveyed are shopping at local grocery stores or on their dorm meal plan. In regard to thinking of the Appalachian region’s themes emerged that actively showcased both enthusiasm and stereotypes of people and the culture.

### ***Implications & Recommendations***

Our first recommendation is that of an educational program which focuses on AgriTech and healthy food. This hands-on experience would include youth of all ages and incorporate school systems and companies who have similar missions to exchange new ideas within the context of agriculture. The broader reach of this program would create awareness and educate citizens across the Commonwealth of Kentucky about agricultural technology and food production.

Secondly our research shows that cost is the largest barrier of students to fresh food. We would like to propose a voucher program for college campuses to integrate access to fresh produce at reasonable prices to their communities. A program as this could remove difficulties for those who desire to eat healthy, however cannot afford the cost of such items in addition to their meal plan or basic food purchases. Although this type of program requires funding and sources to cover costs, we believe the health of individuals could be greatly impacted by this measure.

There are many opportunities to move forward to serve those with renewed resources of fresh food initiatives and within the AgriTech sectors. After surveying students from different colleges in the area, we believe that additional steps should be taken in the future to achieve long term goals. This will require the next group of young professionals to combine stakeholders needs and AgriTech of the future to find solutions in the midst of ongoing challenges. We believe additional initiatives could bridge the gap between those at the forefront of new agriculture enterprises and those who need access.

### *References*

Why Kentucky? (2020). Retrieved November 18, 2020, from <https://agritech.ky.gov/Why-Kentucky/Pages/default.aspx>

Meilan, R. (2016, September 12). What are GMOs? Retrieved November 20, 2020, from <https://ag.purdue.edu/GMOs/Pages/WhatareGMOs.aspx>

## Appendix

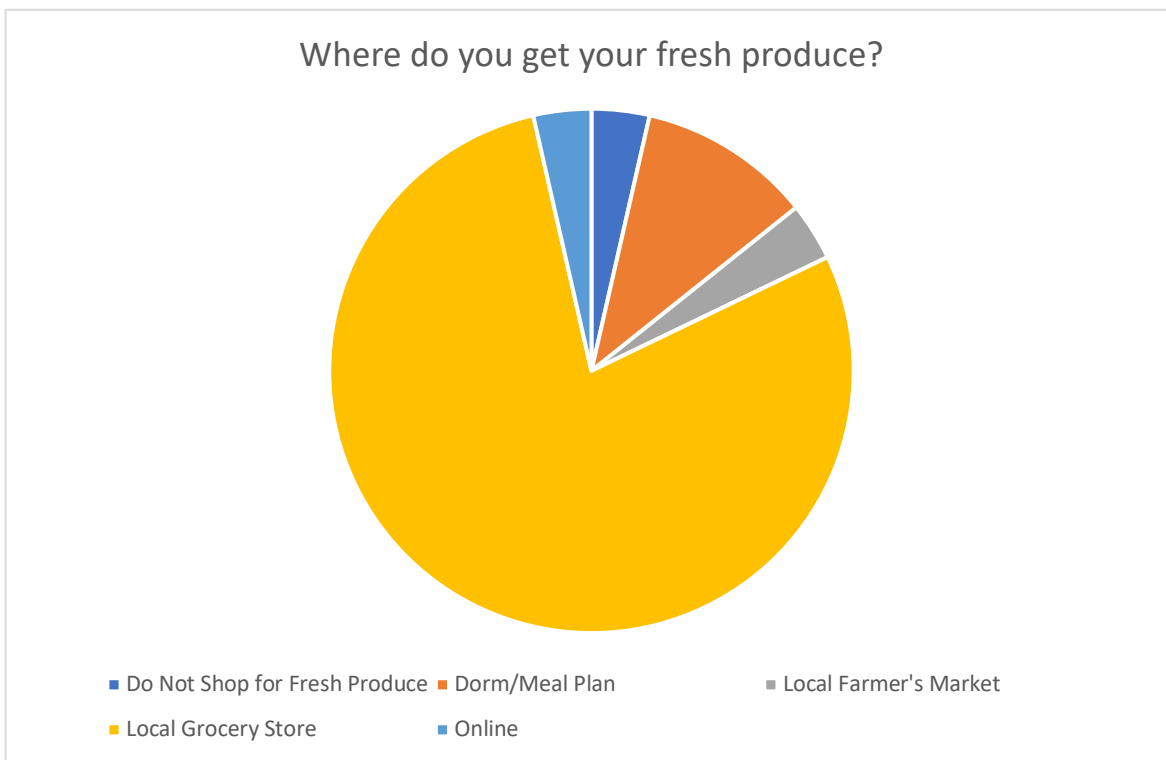


Figure 1

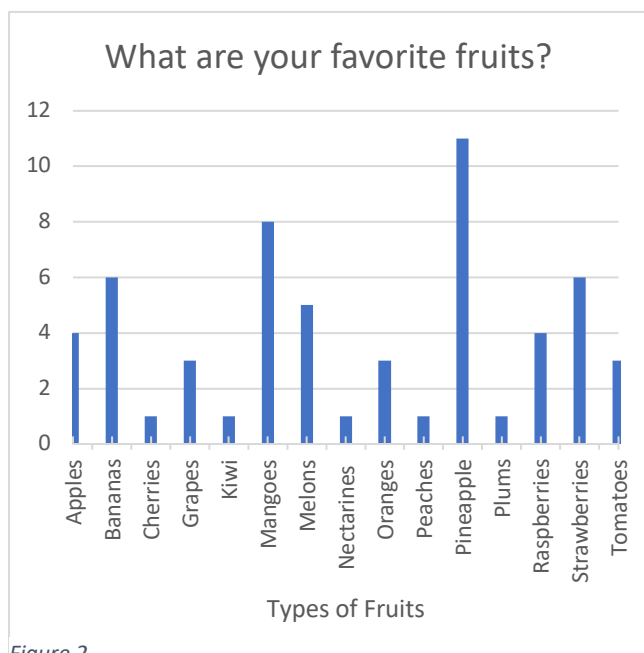


Figure 2

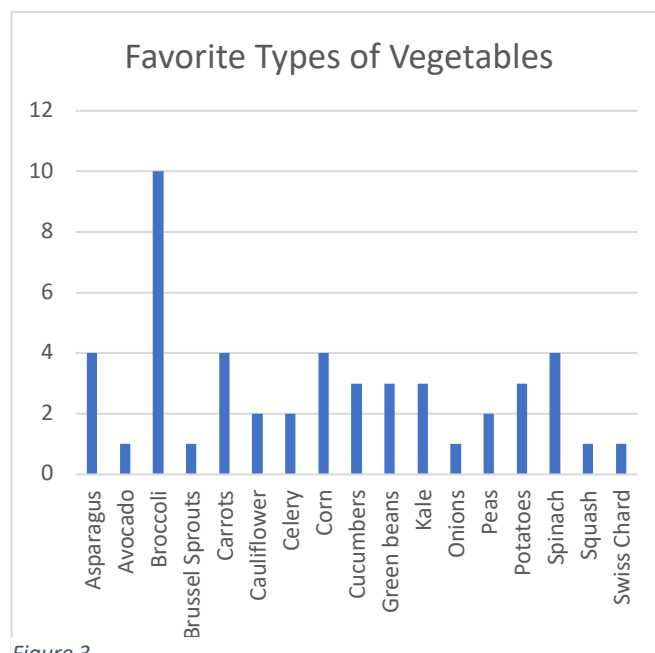


Figure 3

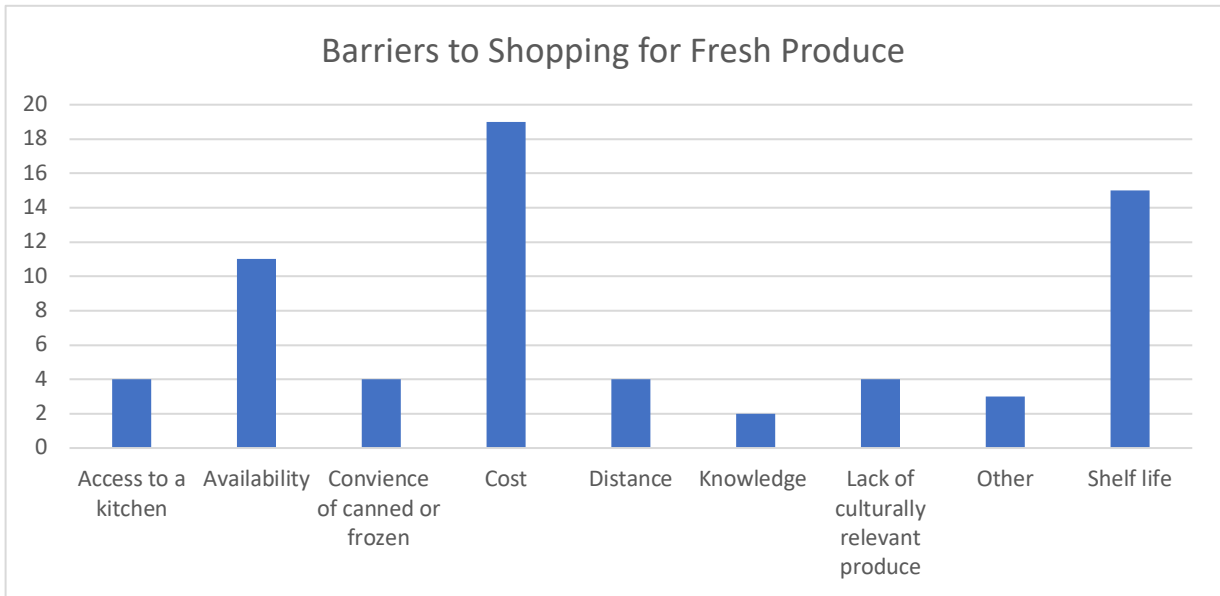
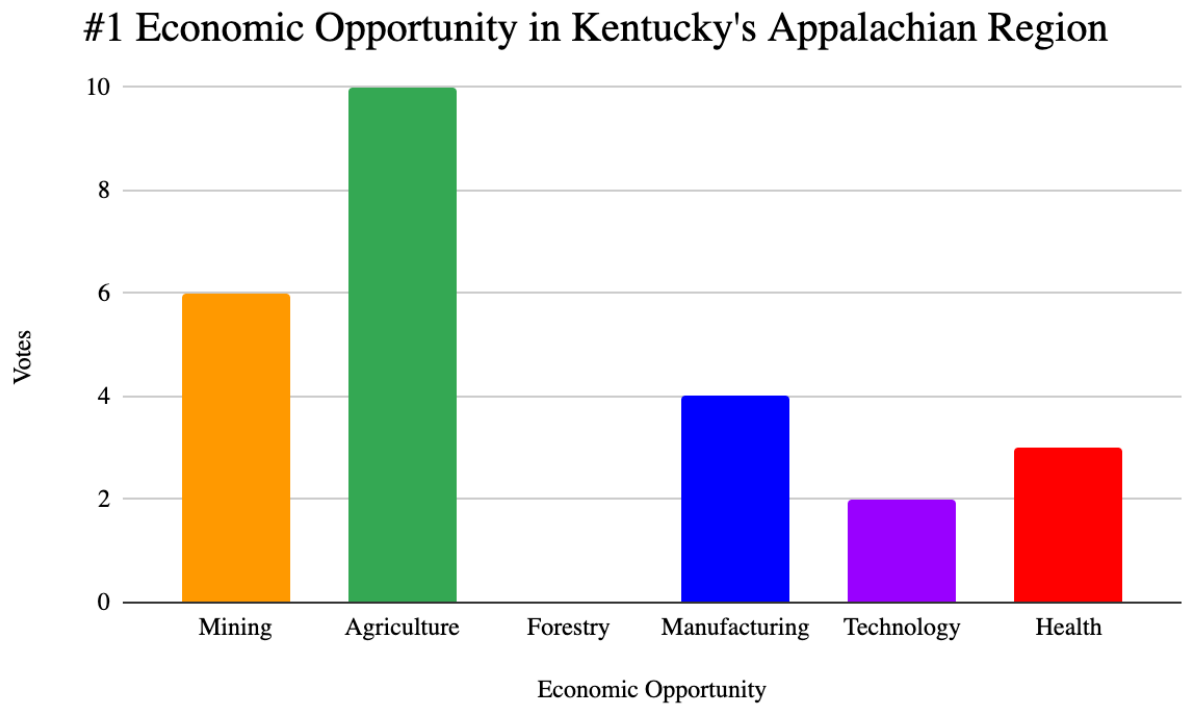


Figure 4



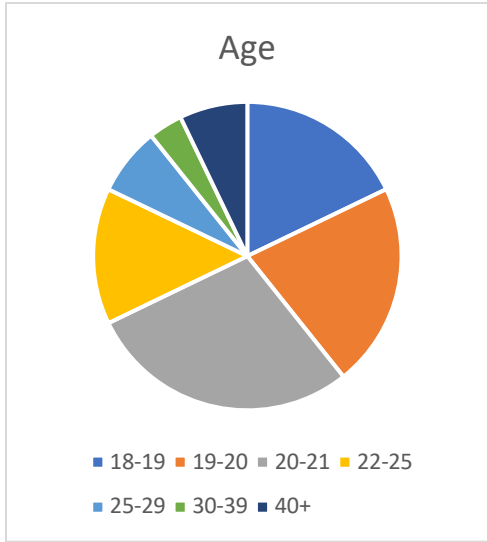


Figure 6

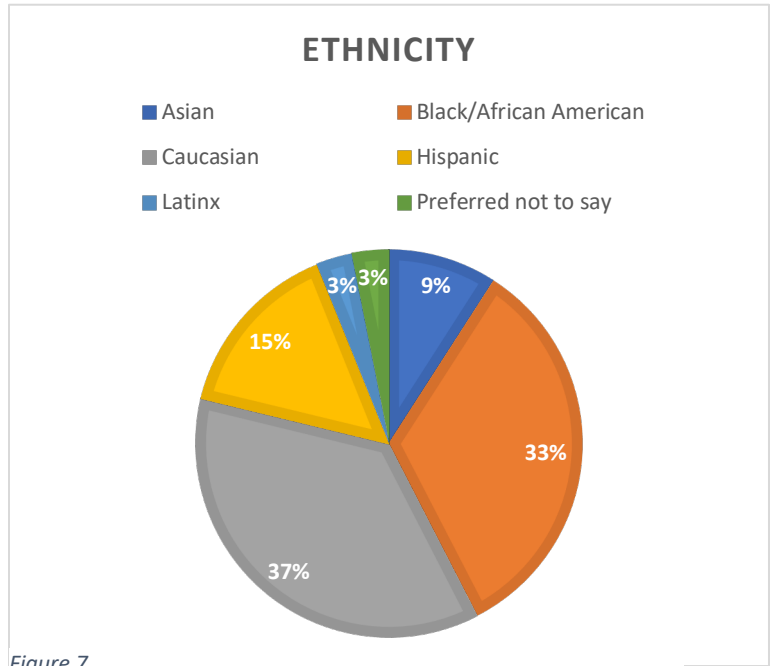


Figure 7

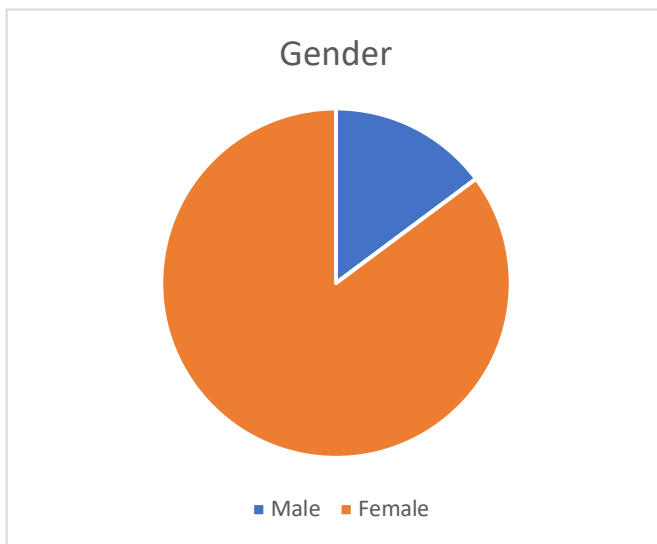


Figure 8