

Introduction:

Since the start of the Green Revolution, farmers have shifted from growing rotating crops that are well adapted to the region to growing monoculture crops that require more water, fertilizer, pesticides, and herbicides^{1,2}. The application of these components to crops damages the land, creating a positive feedback loop that necessitates even more supplements². Water and soil quality continue to suffer, negatively impacting not only the ecosystem, but also the people within the agricultural system.

The Green Revolution, which intended to feed more people for less work, has left thousands of Texans living in food deserts³. The US Department of Agriculture Economic Research Service (USDA ERS) defines a food desert as a census tract that is both low income and low access. A low income tract has a poverty rate of 20% or higher, a median family income of no more than 80% the national median family income, or if the tract is urban, a median family income of no more than 80% of the urban area's median family income. A low access tract has at least 33% of the population or 500 people living beyond a specified distance from a supermarket. The sets of distance requirements are ½ mile for urban areas and 10 miles for rural areas, 1 mile for urban areas and 10 miles for rural areas, and 1 mile for urban areas and 20 miles for rural areas³.

In food deserts, where grocery stores fail to be reliable, alternative food channels can be a more effective way to improve people's lives by improving their health. Alternative food systems provide healthy, locally-grown food through channels outside of traditional grocery stores, such as farmers markets, community-supported agriculture programs, and community gardens⁴. However, for them to become viable replacements for the current food system, a framework must first be set to ensure that current issues are addressed.

Objectives:

- Locate food deserts in Texas that affect the most people to determine areas requiring the most focus
- Understand the current food justice system in Dallas-Fort Worth and the goals for the future of the local food movement

Methods:

- Identified problem areas in Texas by calculating populations living in food deserts (Figures 1-5) using GIS
- Explored potential solutions to the broken food system illustrated in Figures 1-5 by interviewing four fruit and vegetable farmers in Fort Worth

Findings:

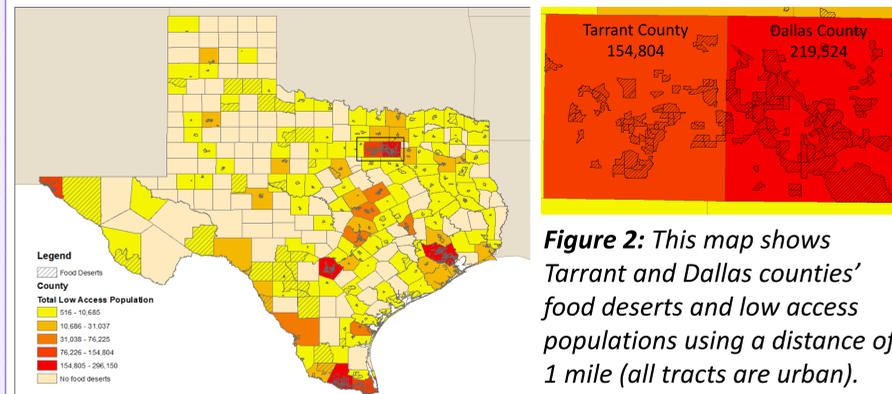


Figure 1: This map displays Texas census tracts that are low income and low access at 1 mile in urban areas and 20 miles in rural areas.

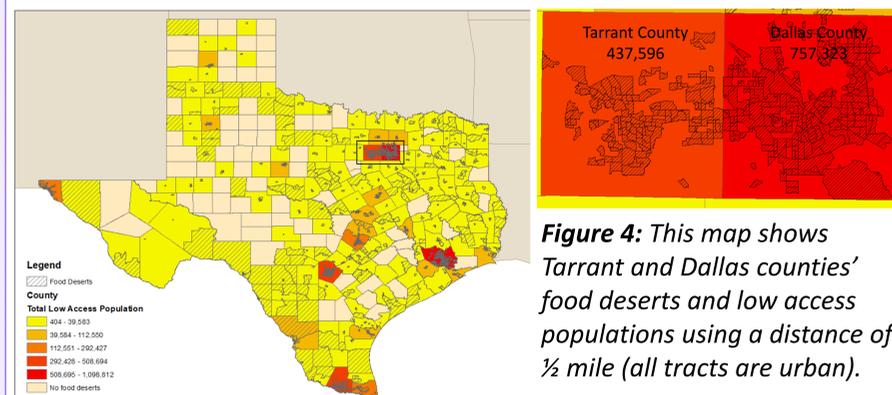


Figure 3: This map displays Texas census tracts that are low income and low access at ½ mile in urban areas and 10 miles in rural areas.

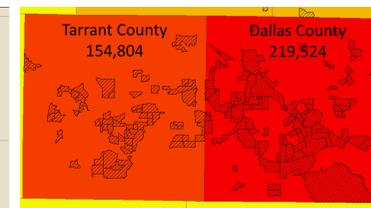


Figure 2: This map shows Tarrant and Dallas counties' food deserts and low access populations using a distance of 1 mile (all tracts are urban).

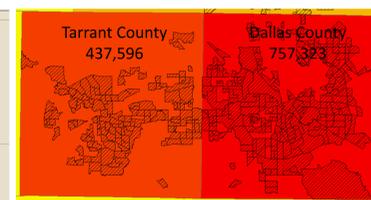


Figure 4: This map shows Tarrant and Dallas counties' food deserts and low access populations using a distance of ½ mile (all tracts are urban).



Figure 5: This diagram depicts several interconnected main themes that arose from interview data along with the total number of times that each theme was mentioned by interviewees.

Discussion:

- Figures 1-4 illustrate that the highest concentrations of food deserts occur in urban areas
- Harris, Dallas, Bexar, El Paso, and Hidalgo Counties all contain large low access populations
- Efforts to eliminate food deserts must begin in urban areas where the most people are affected
- Interviews highlighted numerous possible solutions to issues of food access in Texas, including the following top three:
 1. Resource protection
 - Healthy, water-retentive soil creates higher quality food that relies less on chemical inputs.
 2. Agricultural education
 - Low access populations must interact with farmers to appreciate the work that goes into growing food and create a personal connection with their health.
 3. Nutritional education
 - Children and adults in food desert tracts must understand why they should eat healthy food and support urban agriculture in their communities.

Future Directions:

- Greater quantity of interviews to allow for more qualitative analysis
- Explore areas beyond Dallas-Fort Worth
 - Harris, Bexar, El Paso, Hidalgo, and Cameron counties
- Extend definition of food desert to include access to locally-grown food
 - Expectation that a greater number of people do not have access to food that is fresh, local, and affordable

References:

- ¹Leslie, J. (2000, July 01). Running Dry. Retrieved from <https://harpers.org/archive/2000/07/running-dry/>
- ²Shiva, V. (2016). *Water Wars: Privatization, Pollution, and Profit*. Berkeley, CA: North Atlantic Books.
- ³Documentation. (2017, December 05). Retrieved from <https://www.ers.usda.gov/data-products/food-access-research-atlas/documentation/>
- ⁴Alkon, A. H., & Agyeman, J. (2011). *Cultivating Food Justice: Race, Class, and Sustainability*. Cambridge, MA: MIT.

Acknowledgments:

Thank you to the NSF Research Experience for Undergraduates (REU) program for the research opportunity and funding (Award #1658984). Thank you to the farmers who allowed me to interview them. Thank you to Lisa Akinyemi, Dr. Bellows, Dr. Venkataraman, and Dr. Zubair for their guidance and assistance.