



# HASS 2D

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## Food Security

Food security relates to the availability of food in a country (or geography) and the ability of individuals within that country (geography) to access, afford, and source adequate foodstuffs.

A wide-angle photograph of a agricultural field filled with young sunflower plants. The plants are in the foreground, their green leaves and stems filling the frame. In the distance, the field stretches to a horizon under a bright, slightly overcast sky.

Nearly **1 in 4** households in the US have experienced food insecurity in 2020

<https://www.npr.org/2020/09/27/912486921/food-insecurity-in-the-u-s-by-the-numbers>



## Background

- World was already off-track to achieve Zero Hunger
- Russian invasion of Ukraine has disrupted global food supplies

## Factors to take note

- What can we reasonably predict?
- Variables that will affect the prediction
- The availability of data and its constraints



# 01

# Problem Statement

How might we address and improve food security issues in the US using machine learning and regression.





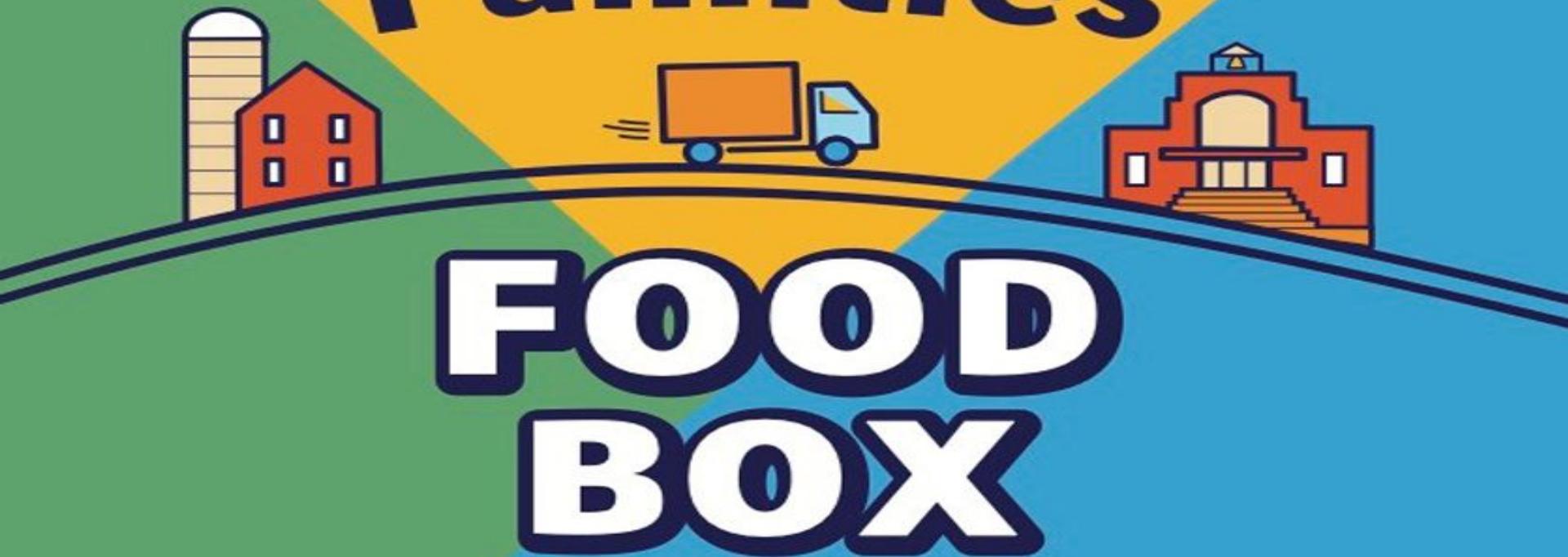
02

# Existing Practices

How US is tackling food insecurity.



# USDA Farmers to Families



# FOOD BOX

USDA

Farmers ,  
Crop  
Producers



## Farmers to Families Food Box

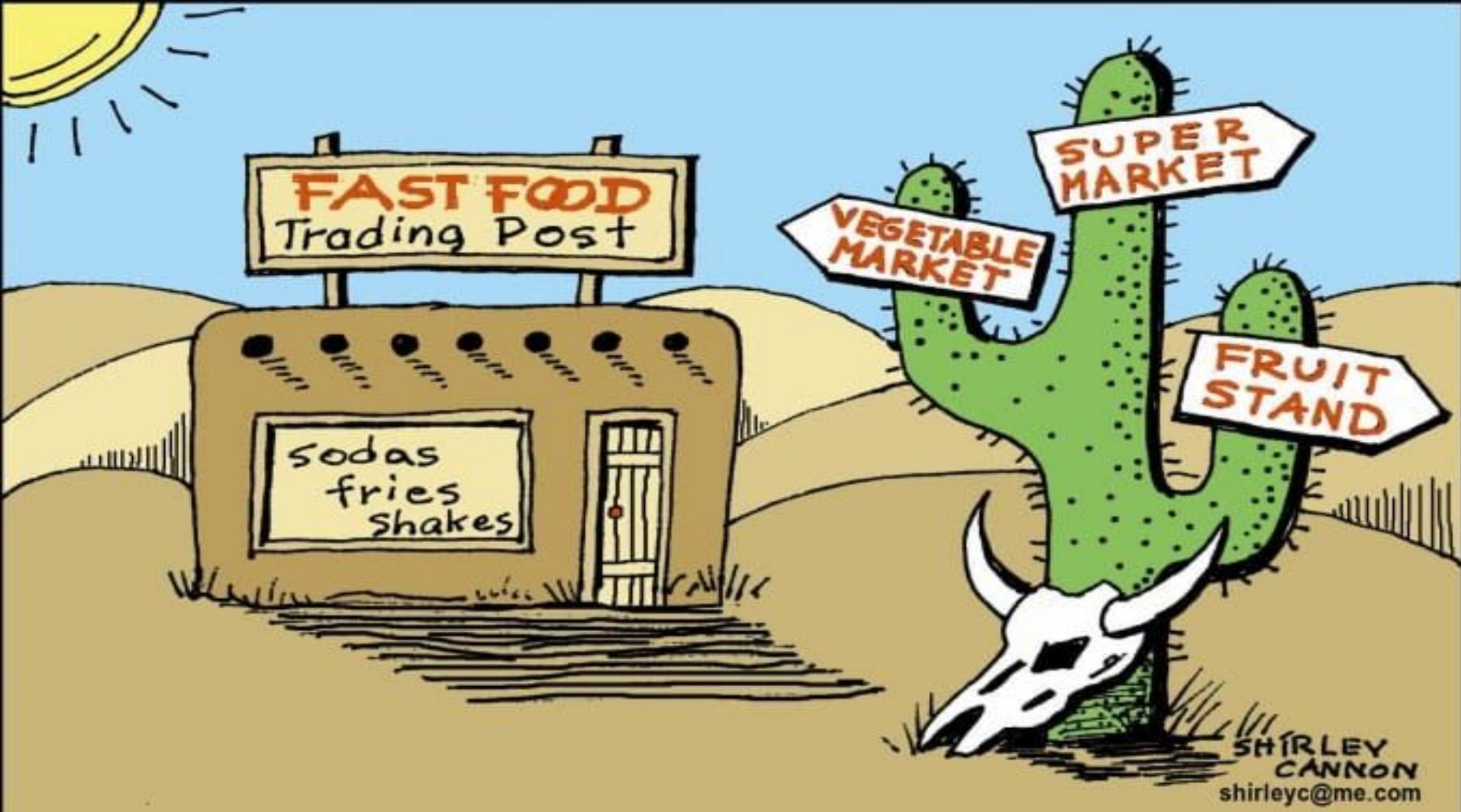
USDA is partnering with farmers, ranchers, specialty crop producers, food processors and distributors, and non-profit organizations to ensure that all Americans have access to the fresh and wholesome food they need during the COVID-19 national emergency.



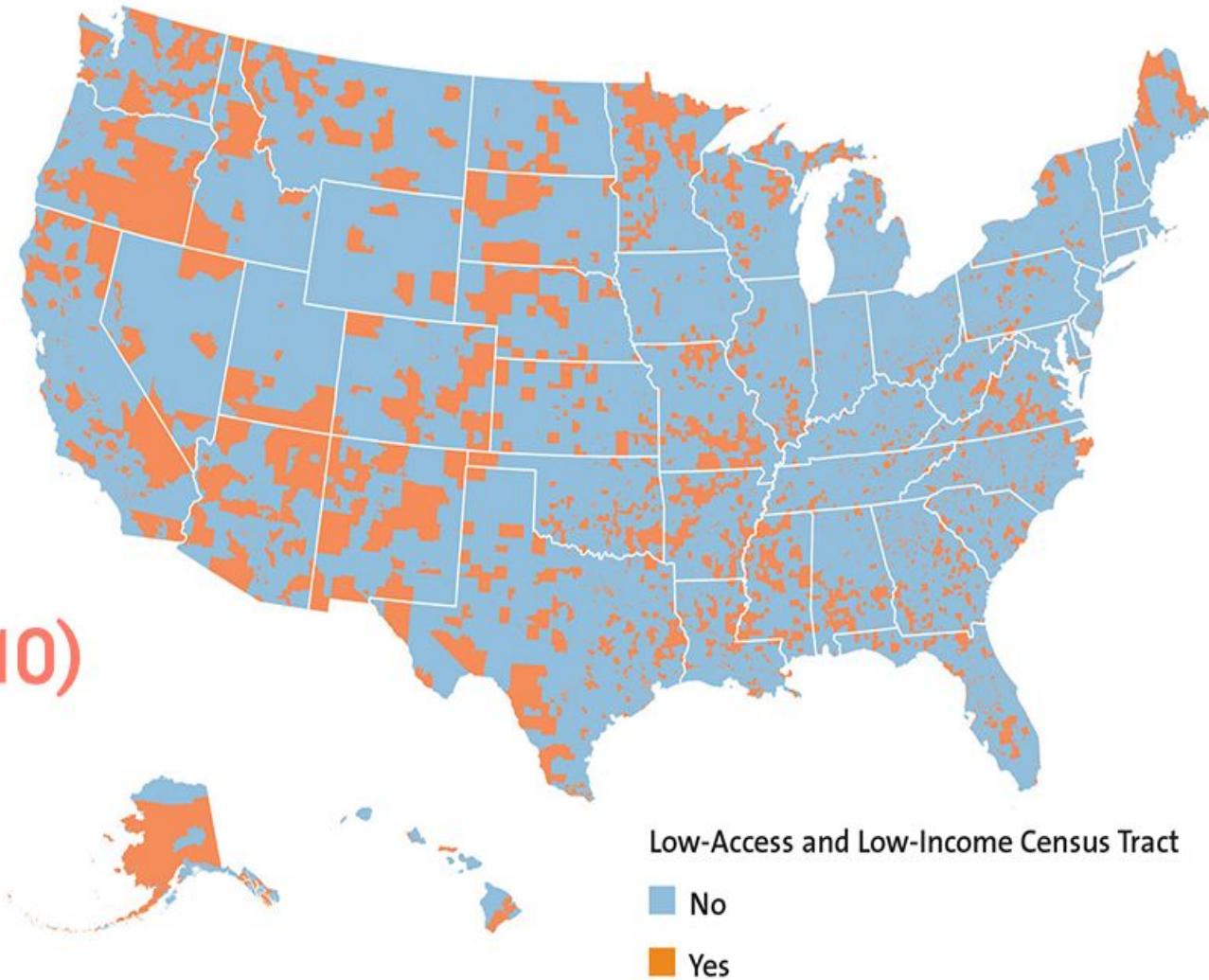


176 000 000

Food boxes has been distributed throughout the US



# Food Deserts in America (2010)



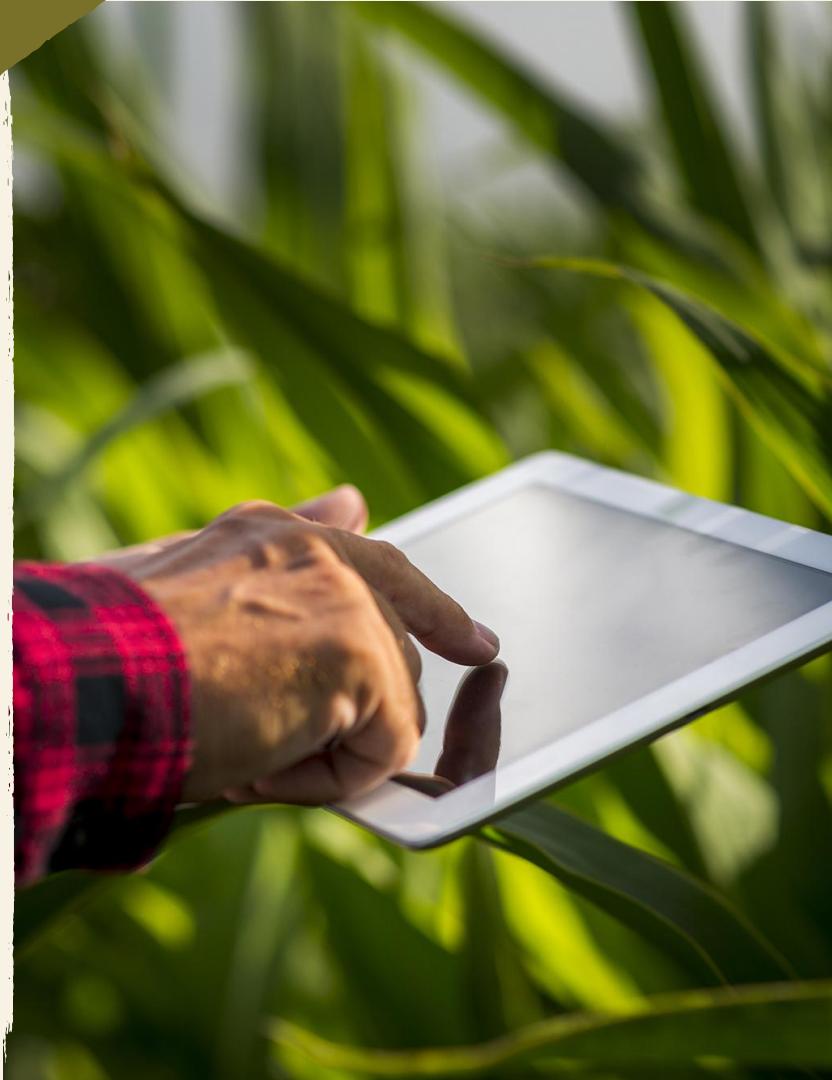


- The Cherokee Nation hopes to open a grocery store in Marble City, Oklahoma. “It’s important to ensure our Cherokee communities inside the reservation have access to healthy foods, especially in our rural areas where there are limited resources including grocery stores,” said Chuck Hoskin Jr, Cherokee Nation principal chief.
- Austin, Texas, where 12 of the city’s zip codes lack grocery stores, plans to open at least one pilot store in underserved eastern Austin.
- Macon-Bibb county, Georgia, is spending \$1m on a grocery store in a low-income neighborhood.
- “We don’t need to make a profit,” “We just need to break even.”

# 03

# Human Relationships

What kind of human relationship does our solution hope to foster?



# Citizens and Government



# Citizens and Government



Panic buying increases perception of lack of supply, which leads to more panic buying

Prediction can reassure citizens

# Panic Buying

- Forces farmers to harvest their crops prematurely to keep up with the supply of crops
- Some crops may lose potential nutrients, limiting the quality of crops





# Farmers and Government



Why farmers need government:

- During years of bad harvest, farmers incomes are negatively affected.
- Support packages from the government would help greatly

# Farmers and Government



Why government need farmers:

- Self sufficiency
- Covid 19 and Ukraine conflict affecting supply chains

# Model

## Independent Variables

- Annual Methane Emissions
- Annual Nitrous oxide Emissions
- Annual Precipitation
- Average Annual Temperature

Multi Linear Regression

Predict

Crop Yield



# 04

# Possible Risks and Plans to mitigate them



# Risks

- People may follow the predictions blindly
- Negative predictions may sway people to panic buy and may cause unnecessary chaos.
- Positive predictions may sway people to inaction and complacency



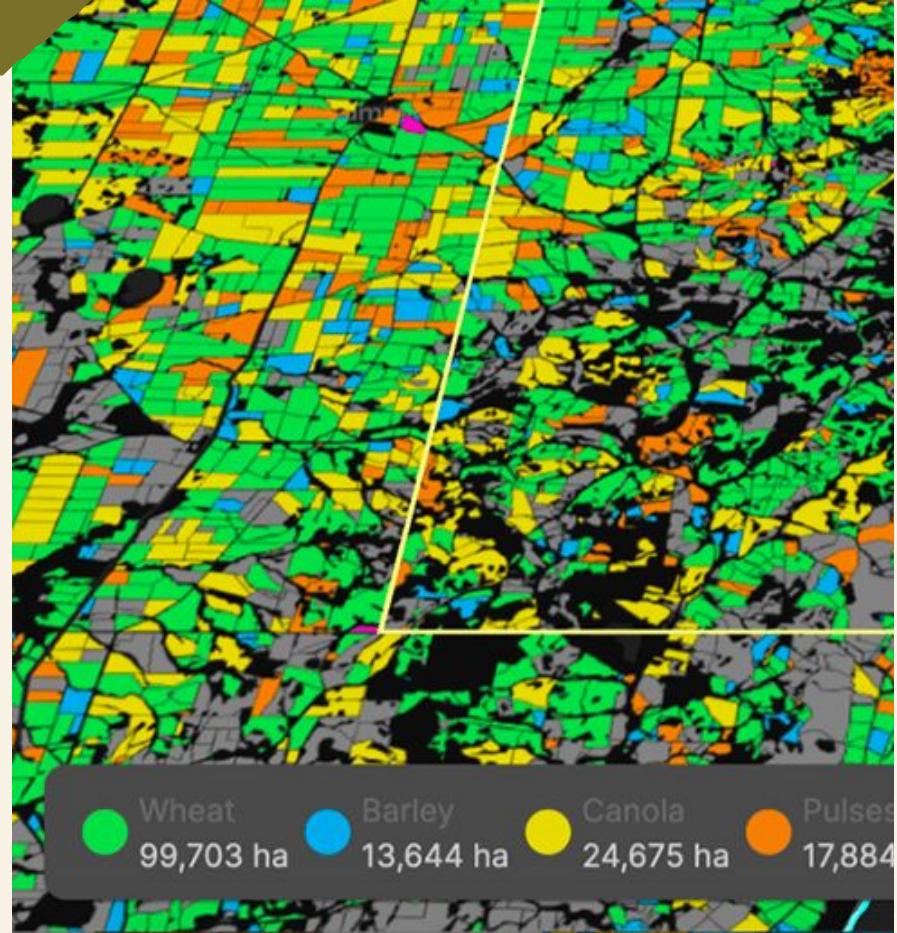
"I'm just doing what the other ones are doing"

# How can we mitigate the risks?

- It is crucial for people in authority like government officials to emphasise that the predictive modelling is only used as a guidance and that relying on it solely to solve food security issues would be foolish
- People can also be educated on the basics of how the prediction model was made. e.g telling them that we only took environmental factors into account

# 05

## Thought process



# a) Initial Approach

Finding farming techniques and how to improve on them



# However...

Agricultural Technology has already been developed in the market

## NIFA's Impact

NIFA advances agricultural technology and ensures that the nation's agricultural industries are able to utilize it by supporting:

- Basic research and development in physical sciences, engineering, and computer sciences
- Development of agricultural devices, sensors, and systems
- Applied research that assesses how to employ technologies economically and with minimal disruption to existing practices
- Assistance and instruction to farmers on how to use new technologies

# Shift of focus towards environmental factors



01

## inevitable

There is no way we can have measures to prevent such things, hence we can only minimise its impact

02

## predictable

By using the knowledge of meteorologists, we can predict patterns and allow others to know when emergencies occur, preparing its citizens.

03

## Impactable

According to the USGS, influence the extent of crop agriculture are terrain, climate, soil properties, and soil water are the most important

Thanks!