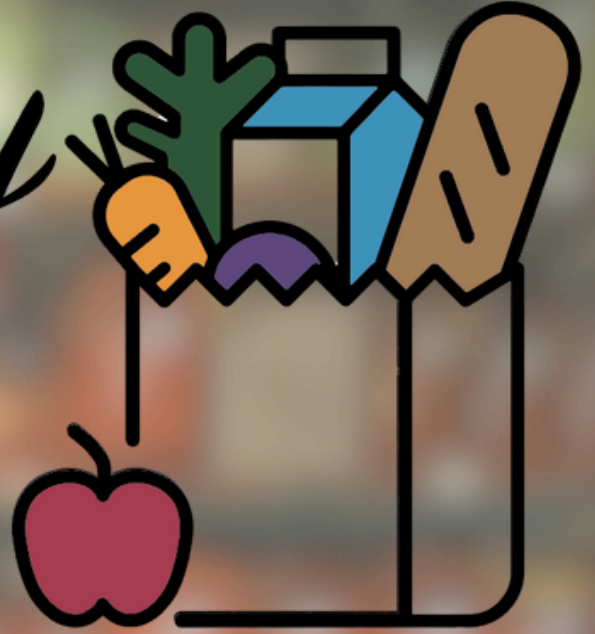


**BUSINESS SOLUTIONS PROJECT**

*Community*  
**FOOD  
PANTRY**



**SLOATSBURG • SUFFERN • HILLBURN • TUXEDO**

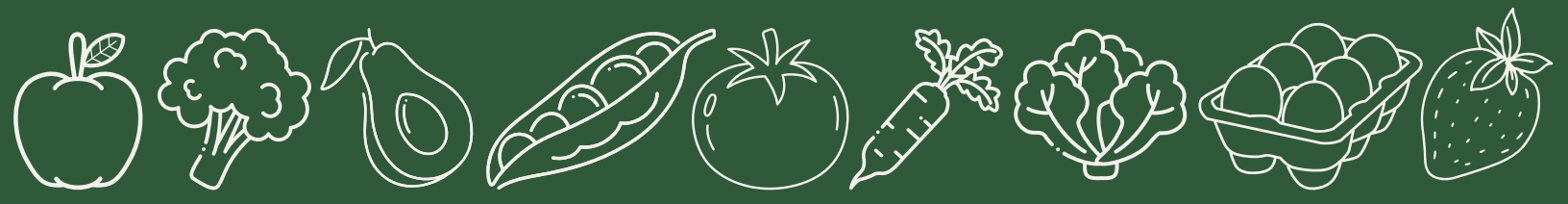


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**March 2026**





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# I. EXECUTIVE SUMMARY

## ORGANIZATION BACKGROUND

The **Community Food Pantry** is a “client-choice” food pantry in Rockland County, NY. Founded in 1990, the pantry serves Sloatsburg, Suffern, Tuxedo, and Hillburn, providing essentials such as fresh produce, cereal, pasta, rice, and frozen meat to families in need. Staff order this produce biweekly from the Regional Food Bank of Northeastern New York. In an area with a high immigrant population, population surges and recent economic and demographic changes have led to an increase in the number of visitors and frequent guests. In recent years, the organization has moved locations to accommodate this increase and has undergone a rebranding to represent the diverse community it serves.

**13,367**

Families Served

**43,352**

Individuals Served

**390,168**

Meals Provided

\*in 2024

### PROBLEM

Pantry demand is volatile and depends on factors such as weather and time of year. Thus, staff have had trouble predicting the amount of food to sufficiently serve all families in need. Recently, both stockouts, when groceries run out before the ordering cycle is over, leaving some families without enough items, and leftover products, which expire, wasting important food and funds, are increasingly common. Moreover, volunteer count is often inconsistent, either over- or understaffed.



### SOLUTION: DEMAND PREDICTION MODEL

A machine learning model predicting the number of households and individuals served per distribution cycle will ensure the pantry can make informed decisions about its orders. The model will estimate the total amount of food needed (lbs), including a category breakdown and ideal volunteer count. After inputting factors and characteristics of the cycle, a simple dashboard will display the predictions and a weekly “Prep Plan.”

### MAIN GOAL

Ensure that at least 80% of distribution cycles maintain adequate stock through at least 75% of the cycle, while keeping food waste under 30 lbs

### BENCHMARKS



#### Forecast Accuracy

The first benchmark is accuracy of our model; effective code is needed

to reliably predict the attendance of clients during a specific distribution cycle. Our model will accurately estimate the amount of food and volunteers needed and present the results in a comprehensive way to pantry staff.



#### Resource Efficiency

From excess food to oversaturated volunteer logs, our project is also

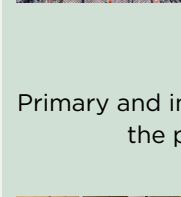
aiming to reduce inefficiencies and waste in the Community Food Pantry. The predictive model aims to predict the exact amount of groceries needed to be ordered and the number of volunteers needed to serve the estimated turnout, reducing food waste and volunteer overstaffing, keeping the pantry running smoothly and efficiently.

### MANAGEMENT TEAM

Joy Yin and Ayushi Mehrotra  
**Project Managers**



Elizabeth Takacs  
**HR and Operations Coordinator**  
Provided the necessary Community Food Pantry historical data, final approval of proposal



Marisol Roman  
**Director**  
Primary and initial contact with the pantry, aided with implementation



Terry Deasy  
**Food Pantry and Recovery Coordinator**  
Ensured accurate data collection and inventory logs

## KEY METRICS

Longevity of Orders during Cycles of Distribution

Amount of Perishable Food Waste

Predictive Model's Forecast Accuracy

Volunteer Efficiency and Utilization

## RISK MANAGEMENT

- Data Quality and Consistency
- Model Error and Demand Surges
- Inventory and Supply Variability
- Staff Adoption and Utilization
- Client Privacy and Data Protection

## PROPOSED BUDGET

Category	Cost
Hosting & Deployment (6 months)	\$30
Backups & Security (6 months)	\$120 (\$20/mo)
Staff Training & Handoff	\$40
Contingency	\$100
<b>TOTAL</b>	<b>\$290</b>

## TIMELINE



May 20<sup>th</sup> to June 10<sup>th</sup>



June 10<sup>th</sup> to July 12<sup>th</sup>



July 12<sup>th</sup> to July 30<sup>th</sup>



July 30<sup>th</sup> to Dec 7<sup>th</sup>

## MONITORING

&

## CONTROLLING

Turnout, distribution, and waste were logged to compare predicted vs. actual outcomes.

Unusual conditions were flagged for updates.

Staff feedback was collected to ensure the dashboard and Pantry Prep Plan were accessible.

Two-Tier Forecasting: standard plan for a typical week and Surge Plan to handle demand spikes

Model was refined with adjusted calculations and visuals for staff clarity

Missing or inconsistent data was flagged and corrected

## KEY FINDINGS

- **Highly accurate forecasts:** Model achieved 1.32% error across 9 live cycles
- **Stockouts reduced:** Before model, 41.7% of pantry cycles ran out of food. With the model, only the first live cycle had a full stockout; after retraining and adding buffers, 0/8 later cycles stocked out.
- **Food waste controlled:** In all 9 model cycles, perishable waste stayed under 30 lbs, with most cycles seeing only 10–20 lbs of unavoidable waste.
- **Volunteer use improved:** Households served per volunteer-hour increased by 30%, and days rated over-staffed/under-staffed decreased by 61.9%.
- **Staff-friendly system:** Dashboard + weekly “Pantry Prep Plan” gave a simple ordering and staffing guide, saving staff planning time and increasing confidence for both normal and high-demand weeks.

## RECOMMENDATIONS

### Expand Scope

- Create a model applicable to multiple food pantries or regions
- Create predictive model for other charities and causes

### Community Engagement and Feedback

- Obtain feedback and suggestions from community members and volunteers

## LESSONS LEARNED

### Understand Staff Needs

- Volunteer recommendation predictions, comprehensive dashboard, Pantry Prep Plan
- **Continuous Improvement**
- Initial struggles with underestimation of demand, recent distribution cycles added to training data, improvement in accuracy recently

## II. INITIATING

### Statement of Problem

A food pantry serving Rockland County, NY, the Community Food Pantry offers food and hope to struggling members of the community. A 501(c)(3) not-for-profit organization, it allows clients to select their groceries based on their preferences and available selections. Since the early 1990s, this “client-choice”

model has been successful. Recently, however, the Pantry’s clientele has recently expanded dramatically, from a reported number of 5,189 households in 2020 to 13,367 in 2024. This is likely as

# 157.6%

increase in clients  
from 2020 to 2025

a result of demographic changes in the area and widespread economic changes. Staff have reported that this client increase has caused the number of visitors per distribution cycle to become difficult to predict, especially as attendance and turnout are volatile and depend on multiple confounding

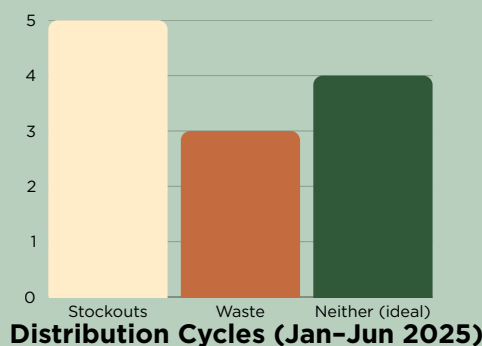
factors, including weather and time of year. Moreover, volunteers are often unevenly distributed, with some days or weeks having too many and others being understaffed. The Community Food Pantry has experienced both stockouts and excessive products, especially in the past two years.

Their biweekly orders from the Regional Food Bank of Northeastern New York have often not

been able to accurately represent the needs of their clients, leading to some families without groceries or food being wasted. Given this unpredictability, from January through June 2025, the pantry ran out of food before the cycle was at least 75% complete during five distribution cycles and wasted at least ten lbs of food in three cycles out of twelve total cycles.

### What is the **client-choice** model?

In client-choice foods pantries, such as the Community Food Pantry, clients select their own groceries like a grocery store instead of receiving pre-packed bags, promoting dignity and reducing food waste.



Out of 12 distribution cycles in early 2025, five were stockouts, three had leftovers, and four were balanced. Balanced cycles are ideal. Some results could be attributed to holidays or bad weather.

### Project Scope

Through a demand prediction model, our goal was to **better align** the Community Food Pantry’s orders from the Regional Food Bank of Northeastern New York with **actual client needs**.

In Rockland County, the Community Food Pantry’s efforts are becoming increasingly crucial. In 2023, out of the 104,325 households in the county, 12,713 lived below the federal poverty line, and 9,469 households lived below the ALICE—Asset Limited, Income

### What is the ALICE threshold?

Developed by United Way, the ALICE threshold represents the income needed for a household to afford basic necessities in their specific county.

