Group #I1.02 – CTFB Inventory and Route Optimization

Adaora Anagbogu, Cross Mitchell, Leo Montoya

Jeff Gonzales

CENTRAL TEXAS FOOD BANK

Problem Statement

To mitigate inventory losses from supply chain interruptions due to COVID-19, CTFB must make a financial investment towards declining product categories and optimize delivery routes to better support Central Texans in need.
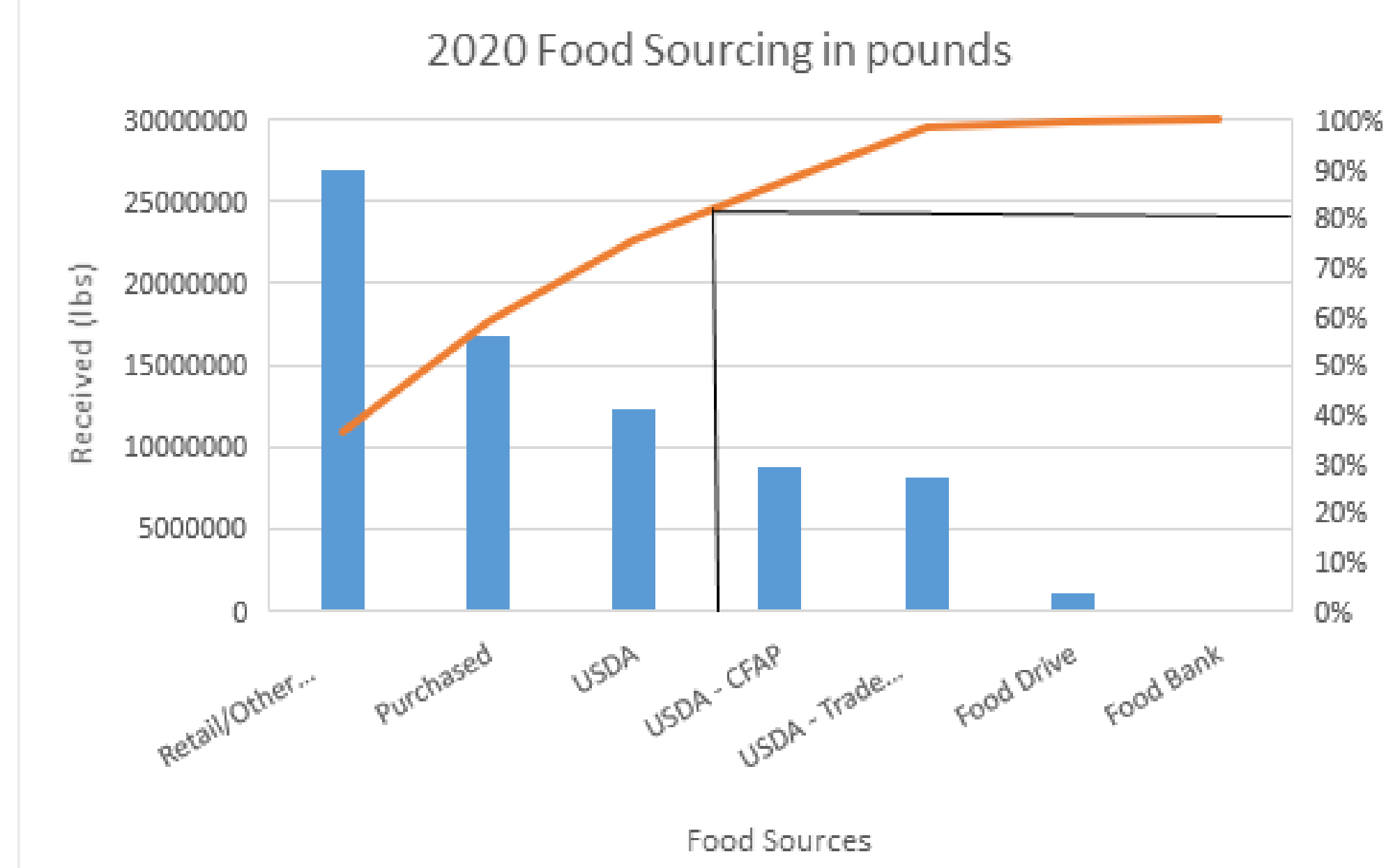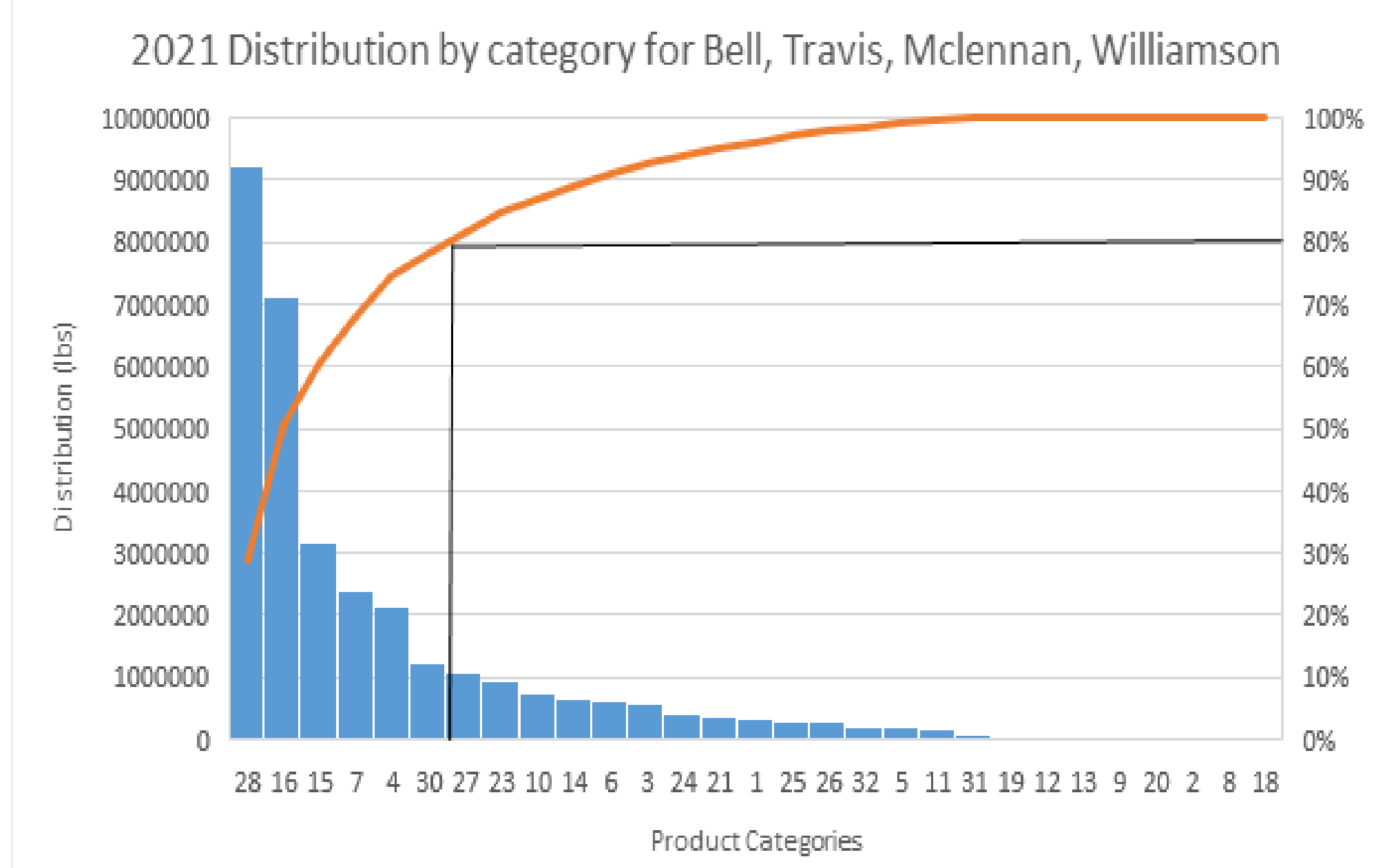
Project Purpose

Determine where the food bank should allocate financial investment in order to supplement Inventory losses and optimize routes to better support growing agencies.

Project Objectives

- Determine which and how many of the 32 product categories to procure
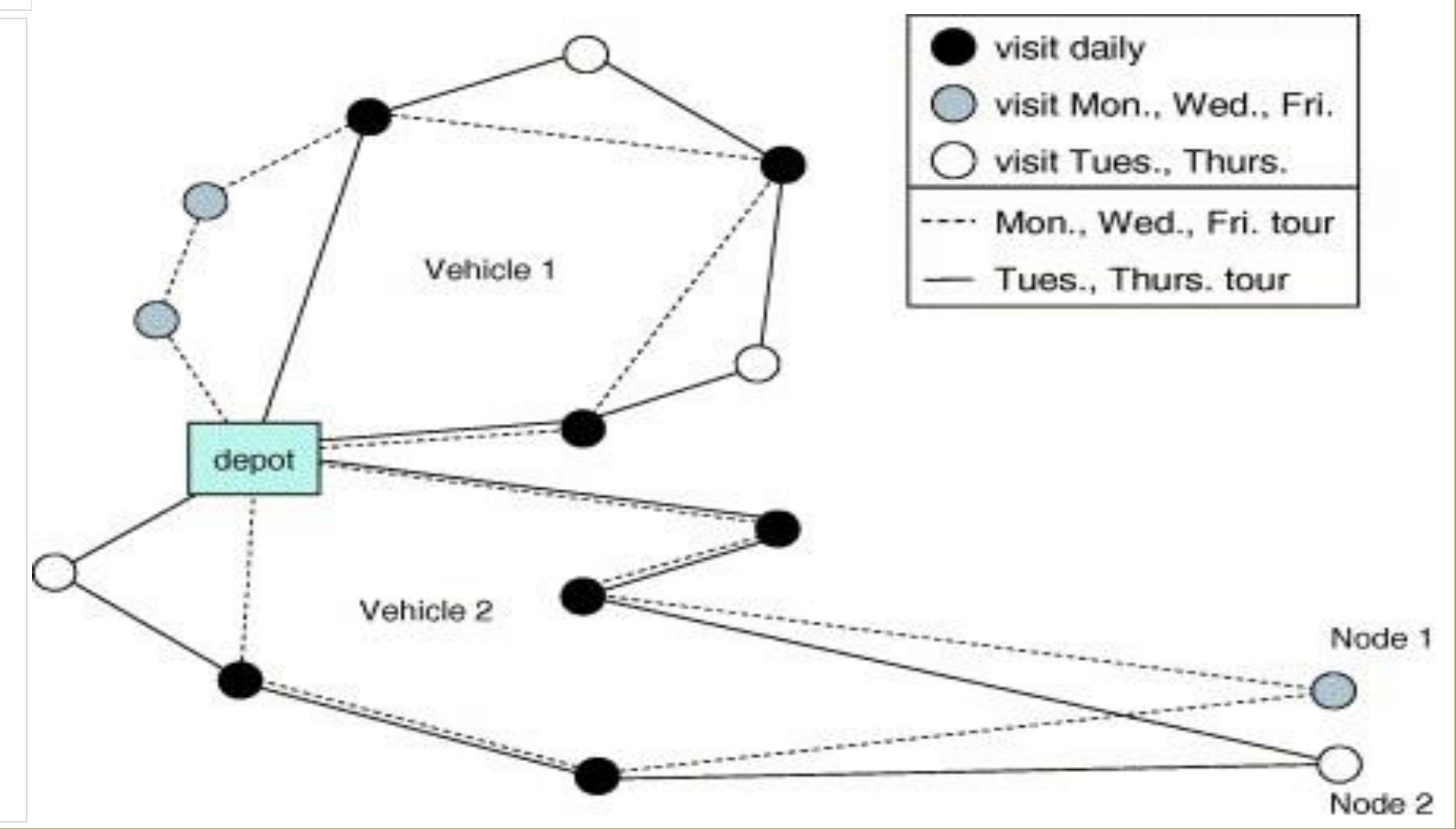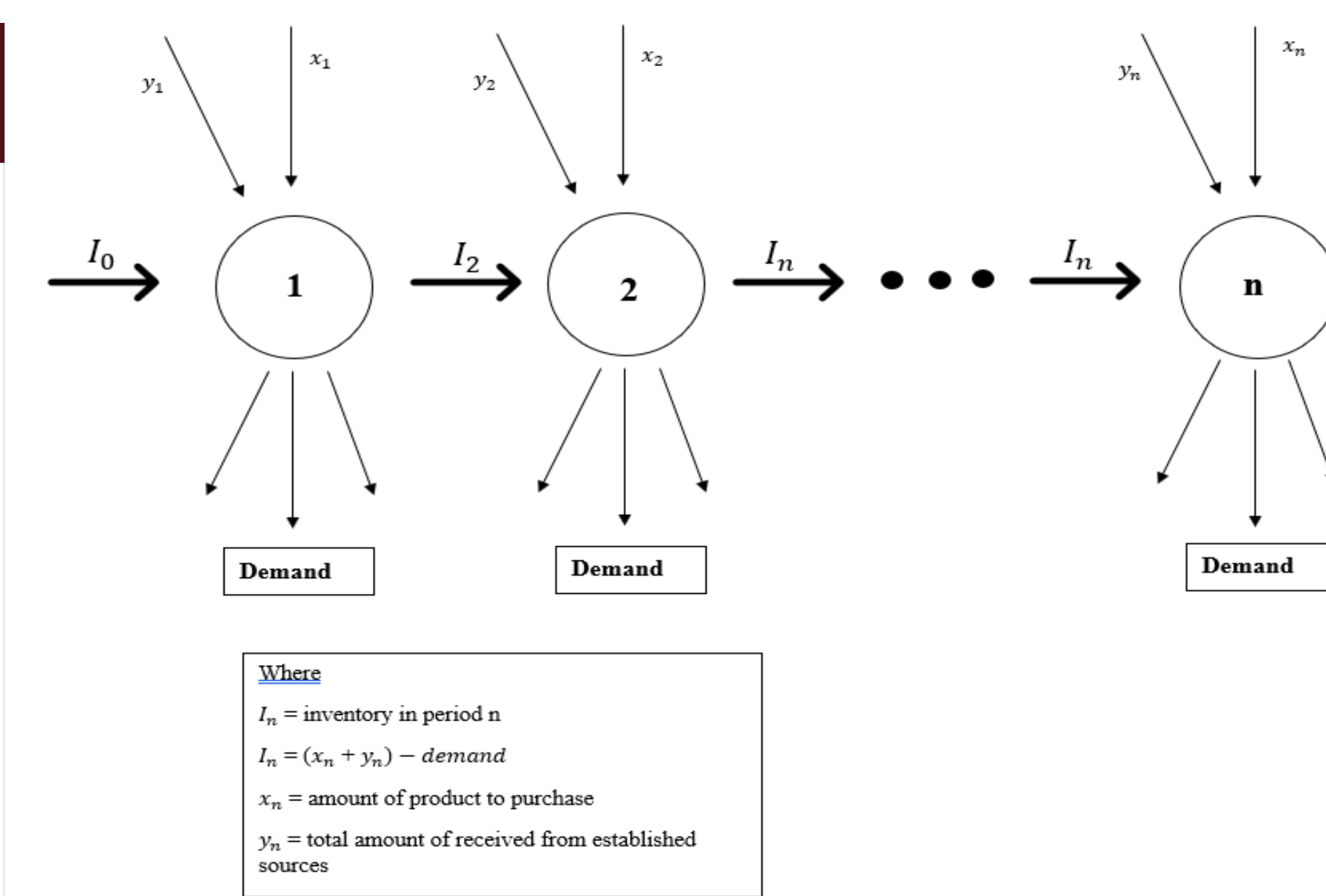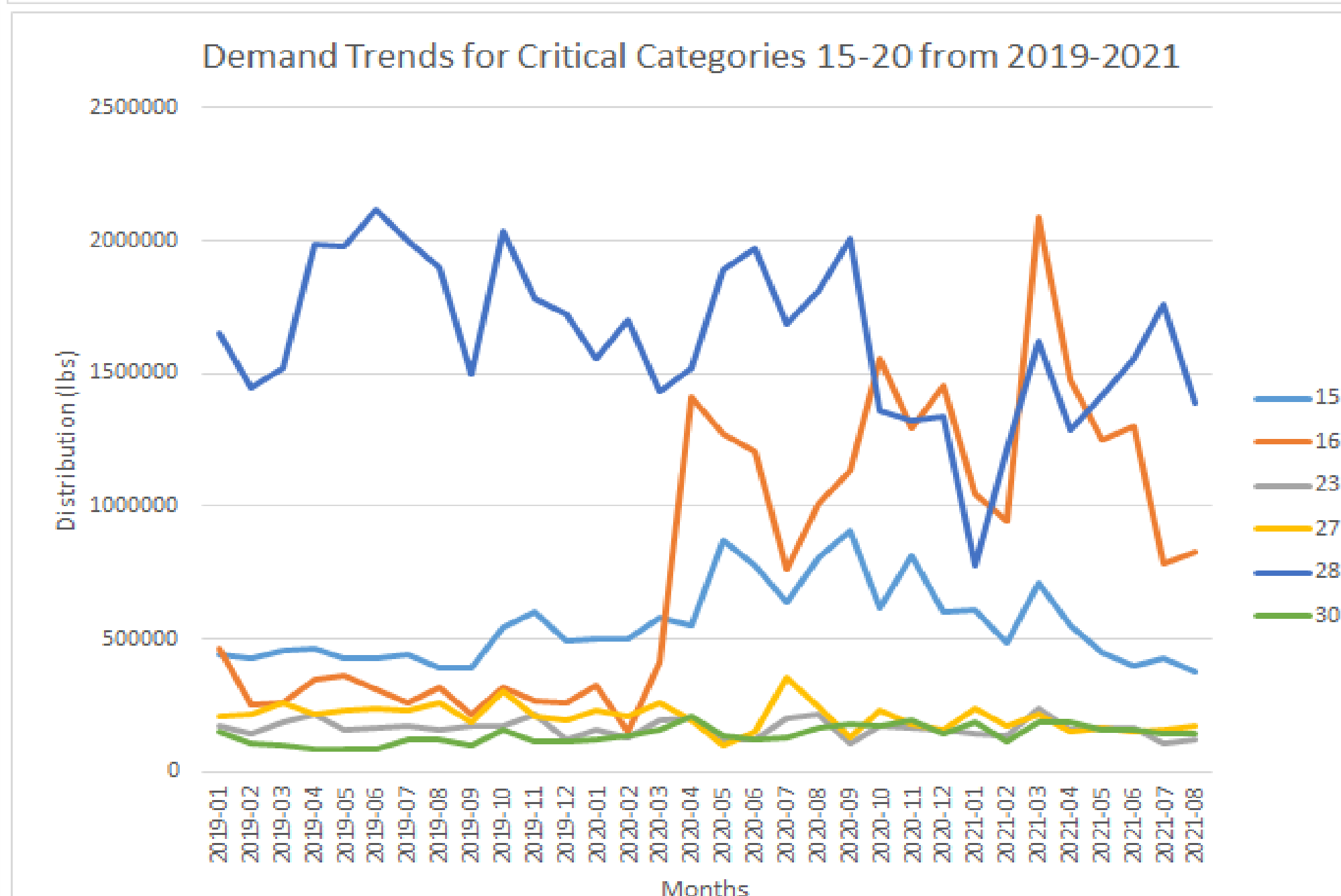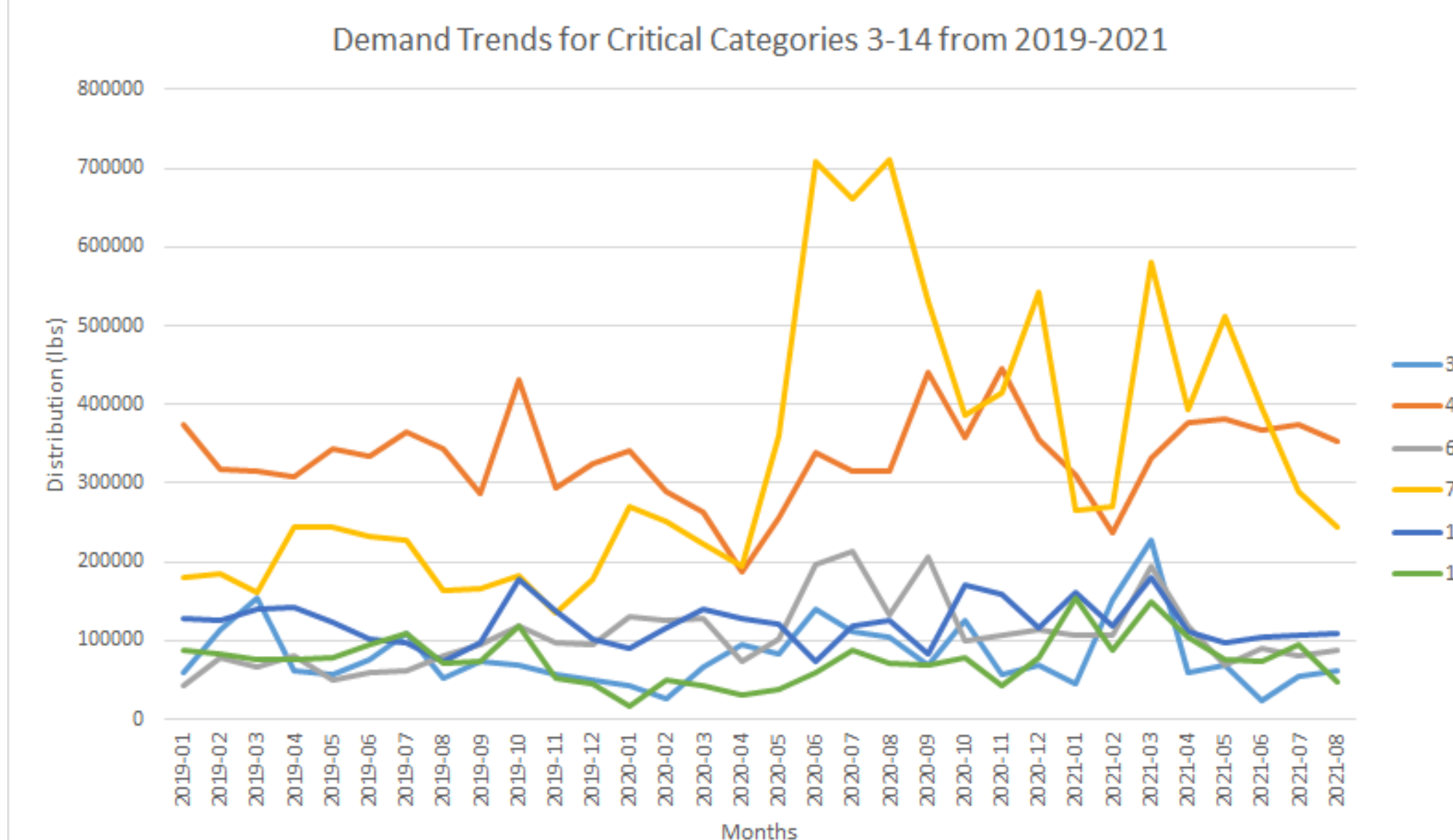- Develop a model to optimize partner agency delivery routes

Information

2021 Distribution by category for Bell, Travis, Mclennan, Williamson

2020 Food Sourcing in pounds

Critical Categories

Code	Material Description
03	Beverage: Coffee, Tea, Soda, Drinks
04	Bread/Bakery: Bread, Biscuits, Rolls, Batter, Tortillas, Pie Crusts
06	Complete Meal/Entree, Soup
07	Dairy: Yogurt, Cheese, Milk, Butter, Sour Cream, Ice Cream
10	Fruit: Canned and Frozen
14	Juice: 100% Fruit or Vegetable
15	Meat/Fish/Poultry
16	Mixed and Assorted Food
23	Protein - Non-Meat: Peanut Butter, Beans, Eggs, Pork & Beans, Nuts
27	Vegetables: Canned and Frozen
28	Fresh Fruits/Vegetables
30	Salvage - Unsorted

Demand Trends

Demand Trends for Critical Categories 3-14 from 2019-2021

Demand Trends for Critical Categories 15-20 from 2019-2021

Optimization Models

Where
I_n = inventory in period n
$I_n = (x_n + y_n) - demand$
x_n = amount of product to purchase
y_n = total amount of received from established sources

- visit daily
- visit Mon., Wed., Fri.
- visit Tues., Thurs.
- Mon., Wed., Fri. tour
- Tues., Thurs. tour

Vehicle 1

depot

Vehicle 2

Node 1

Node 2

Performance Metrics

Metric 1: Difference of weight (Food Received - Food Distributed = X)	Score
0 > X	1
X ≥ 0.25 million lbs.	2
X ≥ 0.50 million lbs.	3
X ≥ 0.75 million lbs.	4
X ≥ 1 million lbs.	5

Metric 2: X = Total Distance Travelled	Score
$1.30X > C	1
$1.30X = C	2
$1.30X < C	3

Where C = Current Transportation Cost

Future Plans

- Complete Analysis
- Research and select route optimization model
- Formulate models
- Ensure model feasibility

Acknowledgements