



FAMU-FSU  
College of  
Engineering

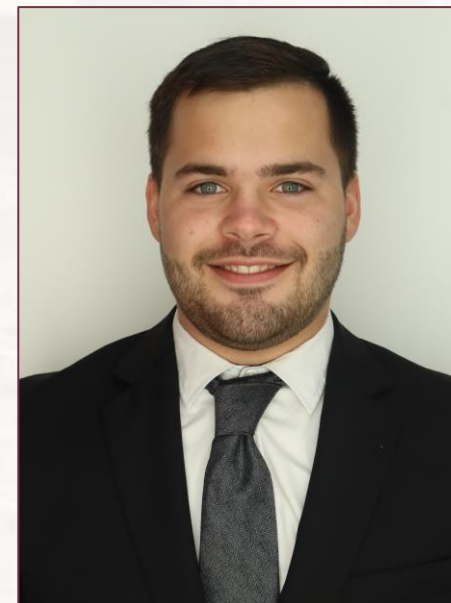
# Team 508

# Engineering Serves

Alejandro Bendeck, Adrian Canepa,  
Cody Hayward, Jared Sizemore



# Team Introduction



Alejandro Bendeck  
*Design Engineer*

Adrian Canepa  
*Computational  
Engineer*

Cody Hayward  
*Systems Engineer*

Jared Sizemore  
*Manufacturing  
Engineer*



# Sponsor and Advisors



Sponsor  
Dean Suvranu De



Engineering Advisor  
Dr. Shayne McConomy



Advisor & Point of Contact  
Mark Orendorf



# Objective

The objective of this project is to optimize the distribution process of dry goods for Beth-El Mission.



The current distribution process at Beth-El Mission



Mark in storage center

# Background

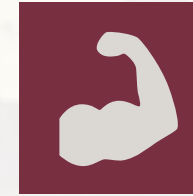
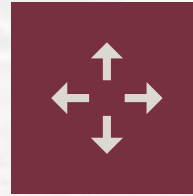
**Beth-El**  
*Farmworker Ministry, Inc.*



# VDR1 Recap

## Primary Key Goals:

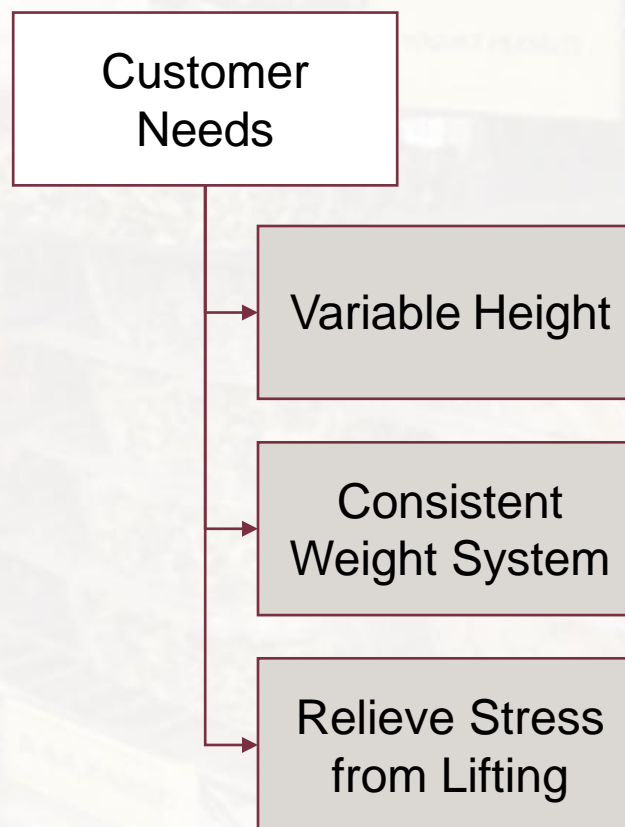
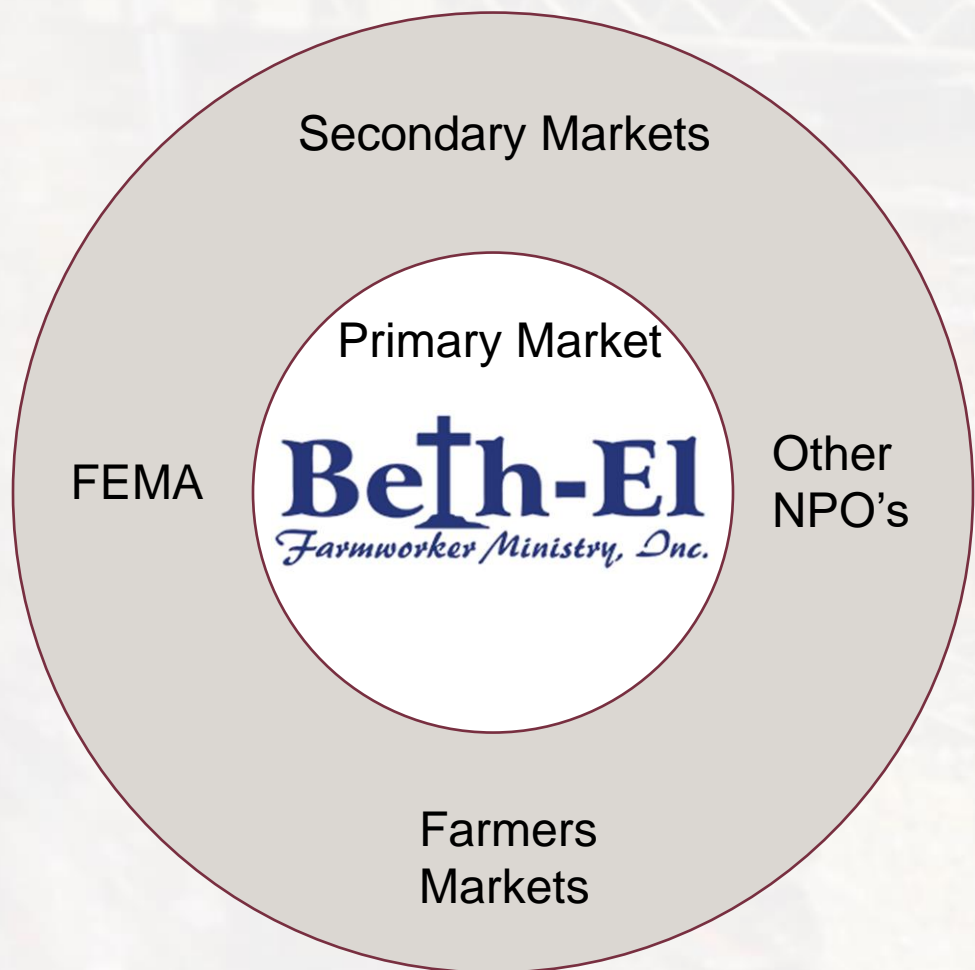
- Speed Up Sorting and Distribution
- Mobility
- Lifting and Handling
- Easily Sanitized
- Universal Design



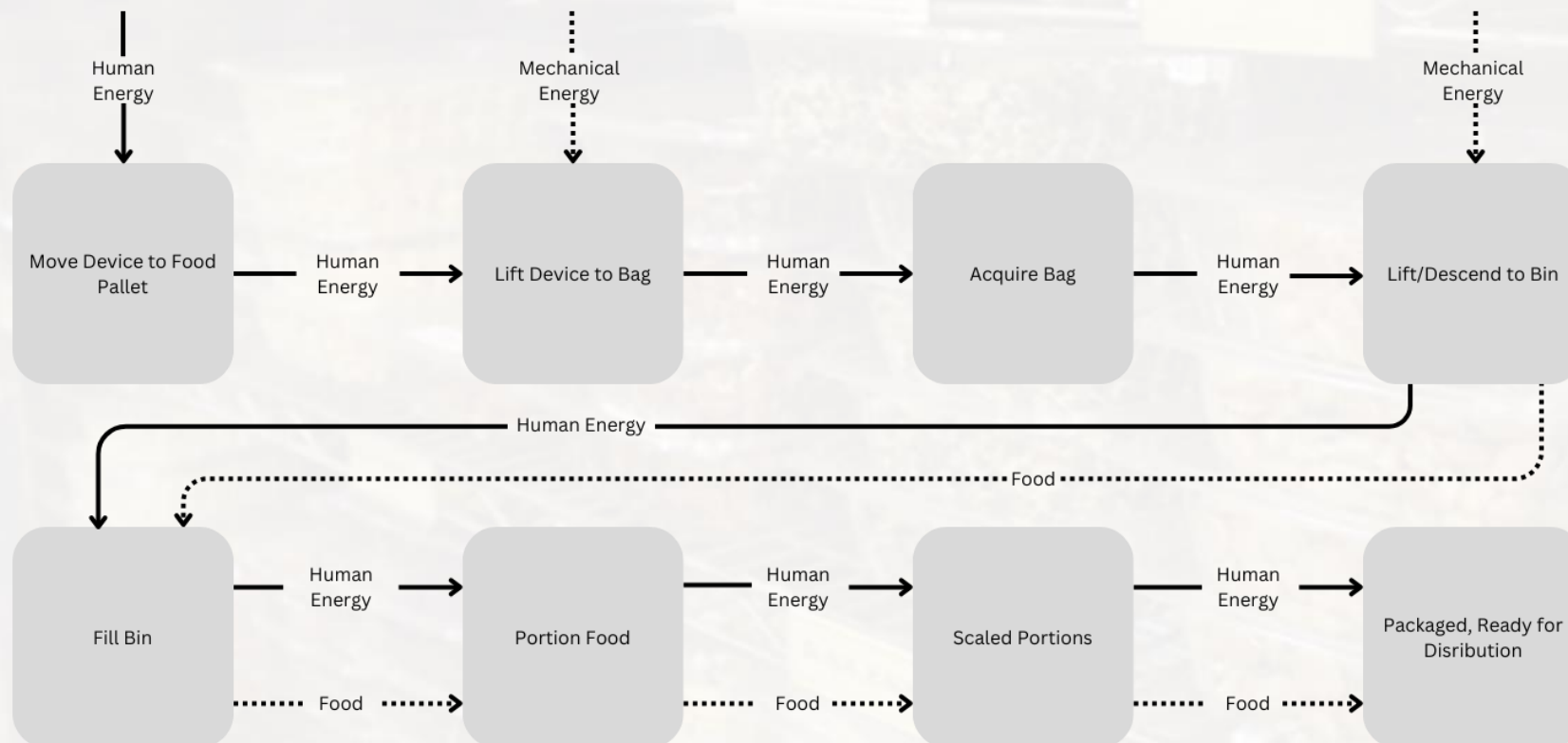
## Assumptions:

- Sufficient Volunteers
- Stable Environment to Store Dried goods
- Dry Goods are Already Sourced

# VDR1 Recap

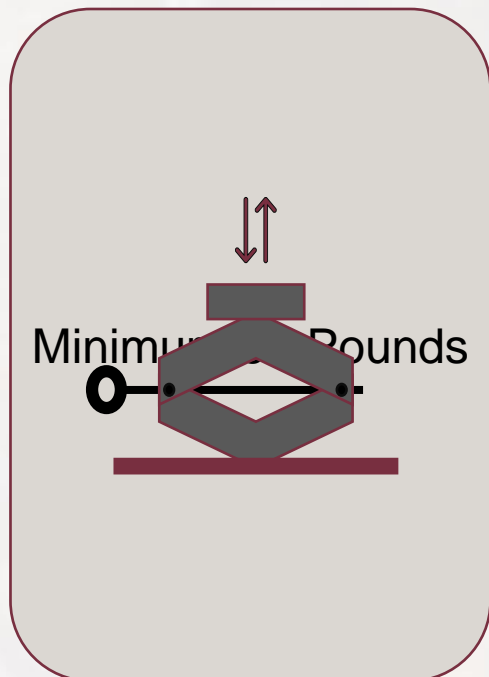


# Revised Functional Decomposition

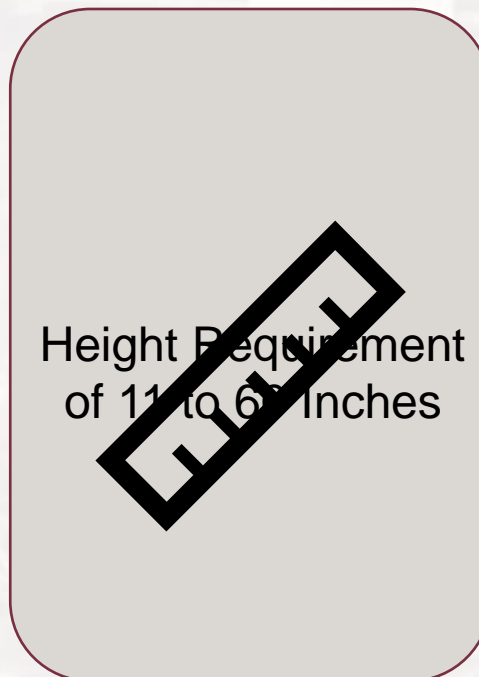




# Critical Targets



Carrying Capacity

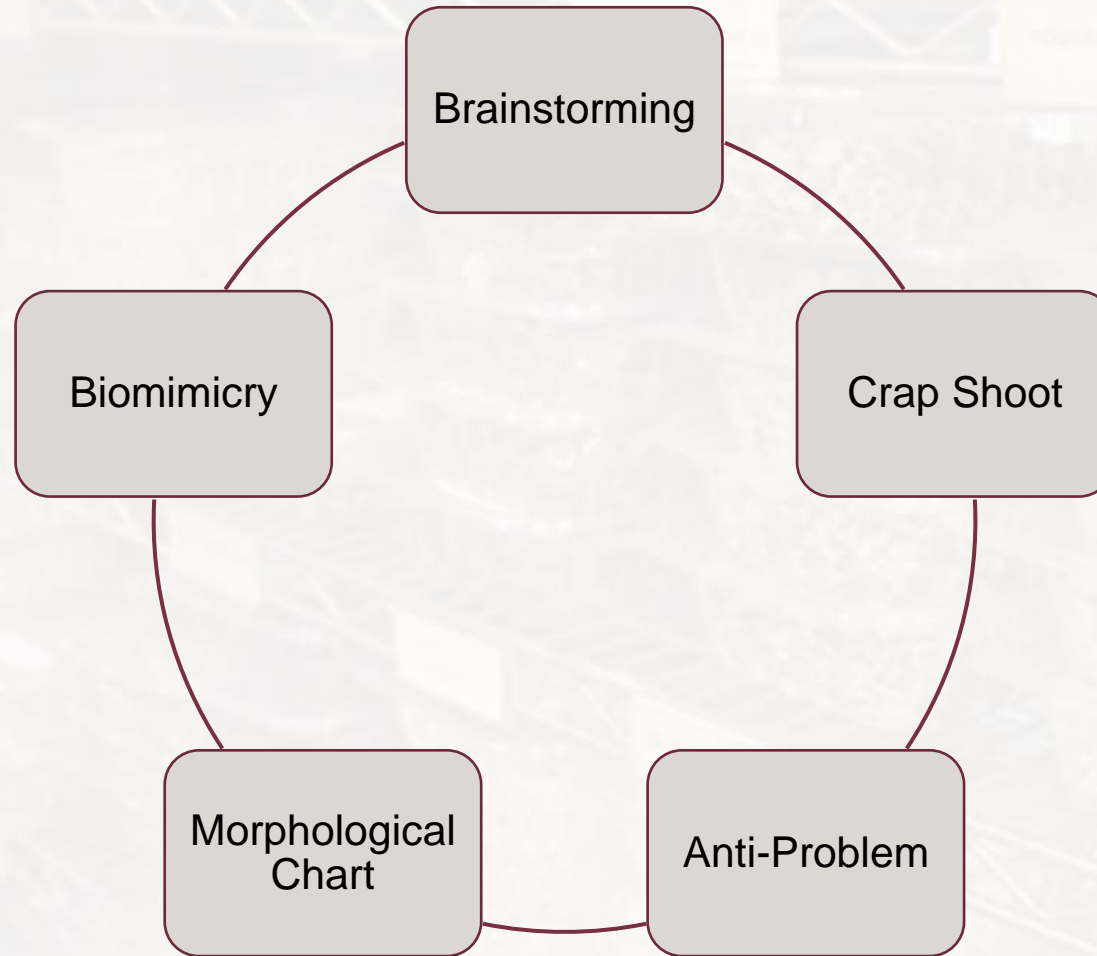


Pallet Bounds



Portion Size

# Concept Generation



# Medium Fidelity Concepts

Engine Hoist-like  
Lift & Scale

Candy Dispenser  
with a Big Bin and  
Air Displacement  
Lift

Large Bin with  
Grub Screw and  
Pulley System

Waterwheel  
Dispenser

Mechanical Scale  
& Foot-powered  
Hydraulic Lift

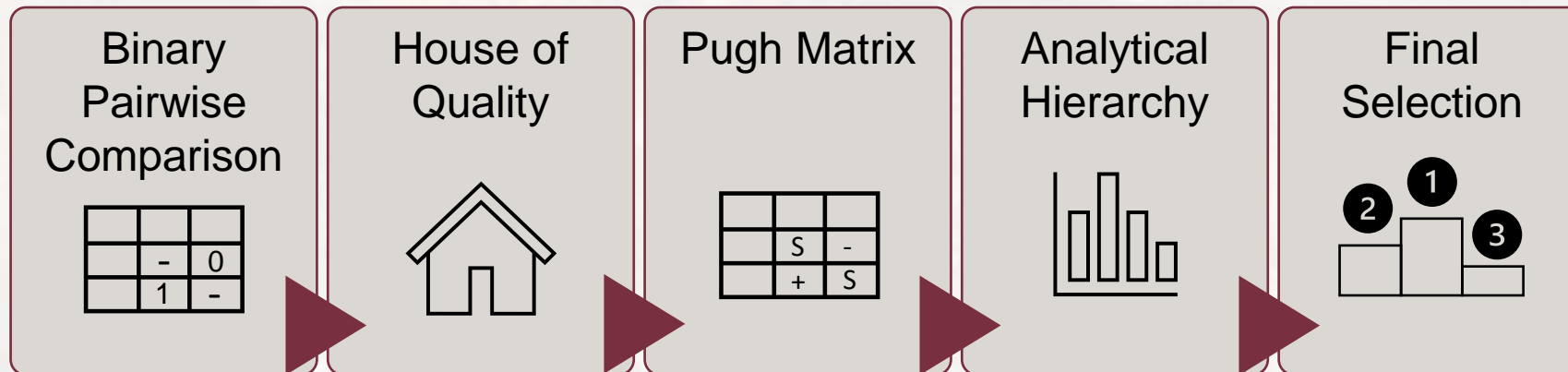
# High Fidelity Concepts

Scissor Lift with  
Electronic Sorting  
Bin

Vertically Movable  
Stand and Scale

Scissor Lift and  
Scale

# Concept Selection



# Binary Pairwise Comparison

Relieve Stress from Lifting



Consistent Portion System



Variable Height



Speed Up Bagging

# House of Quality

Carrying Capacity

Storage Volume

Spout Size

Portion Size

Tilt

Lift Velocity

Tray Volume

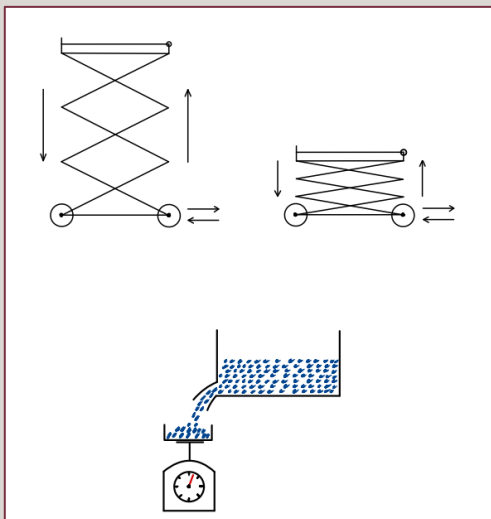
Pallet Bounds

Compatible Dried Goods



# Final Selection

## Scissor Lift and Scale



**Alternative Value: 0.387**

## Key Features

Scissor Lift

Two Castors and Two Uni-Directional Wheels

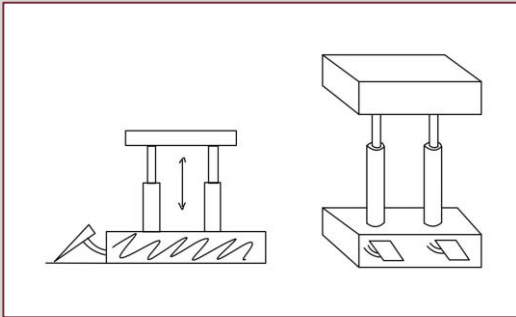
Roller Edge

Automatic Portions



# Final Selection

## Foot-Powered Hydraulic Lift and Scale



**Alternative Value: 0.311**

## Key Features

Two Hydraulic Piston-Cylinders

Two Castors and Two Uni-Directional Wheels

Pedals for Pumping and Release

Automatic Portions

# Final Selection

**Engine Hoist-like Lift  
and Scale**



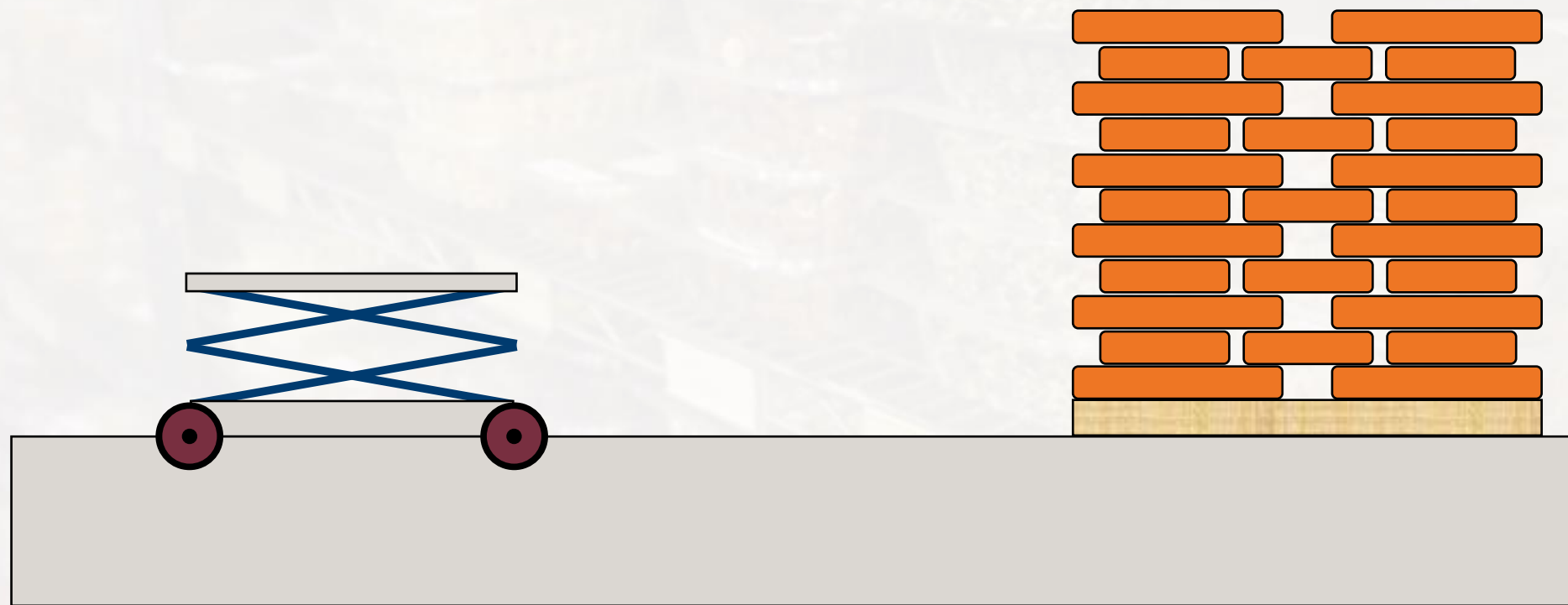
**Alternative Value: 0.302**

## Key Features

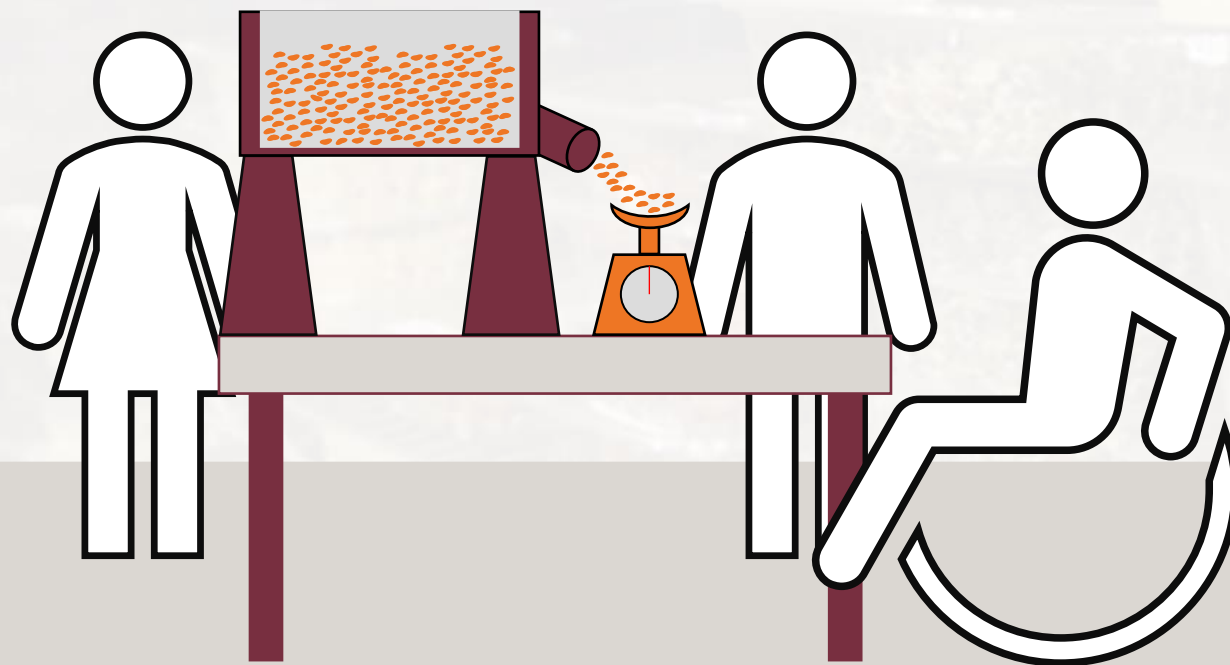
Carrying Platform Attached to the Crane

Automatic Portions

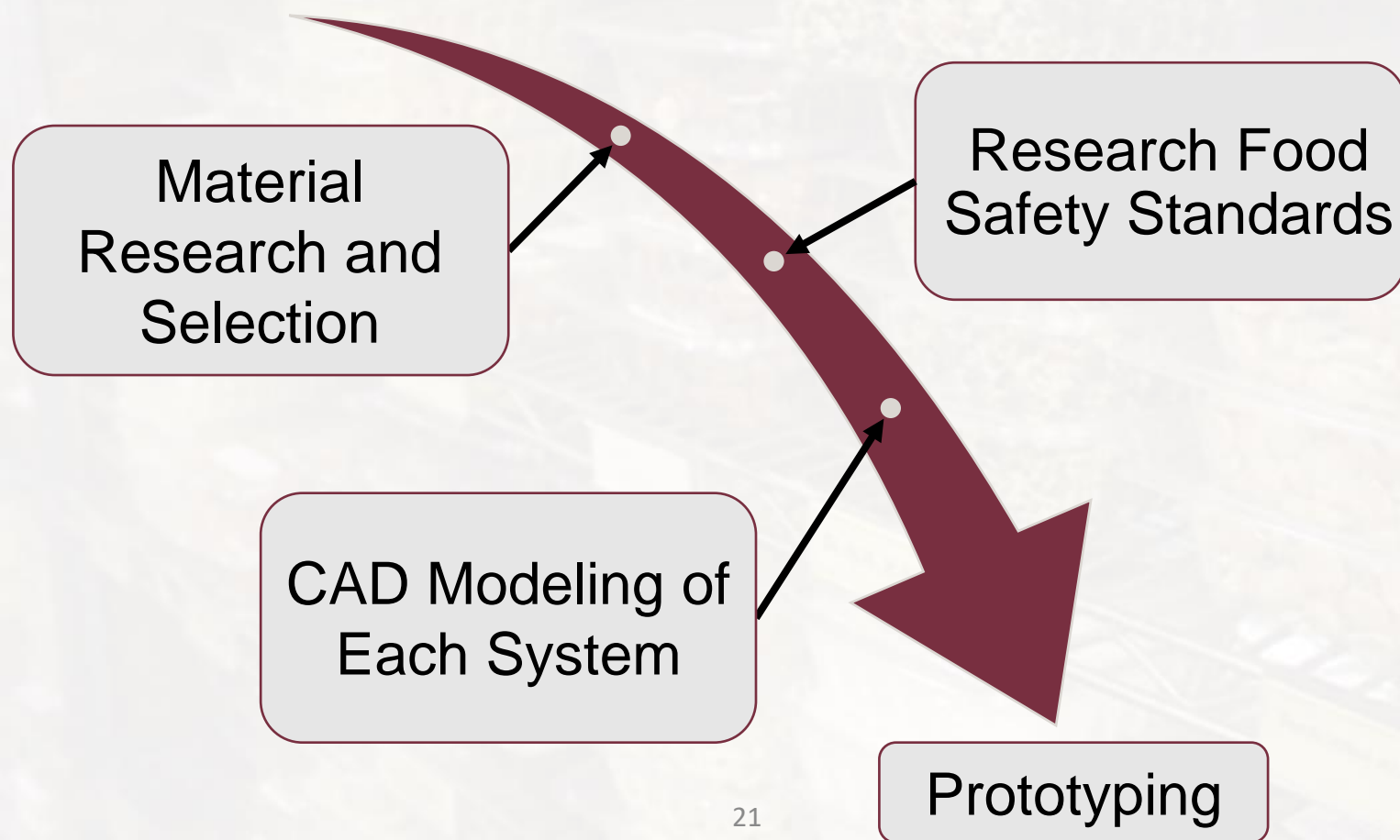
# Final Concept



# Final Concept Continued



# Future Work



# Quasikristal?



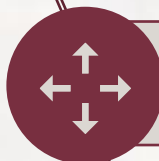
# Backup Slides



# Key Goals



Speed Up Sorting and Distribution



Mobility



Lifting and Handling



Easily Sanitized



Universal Design



# Assumptions

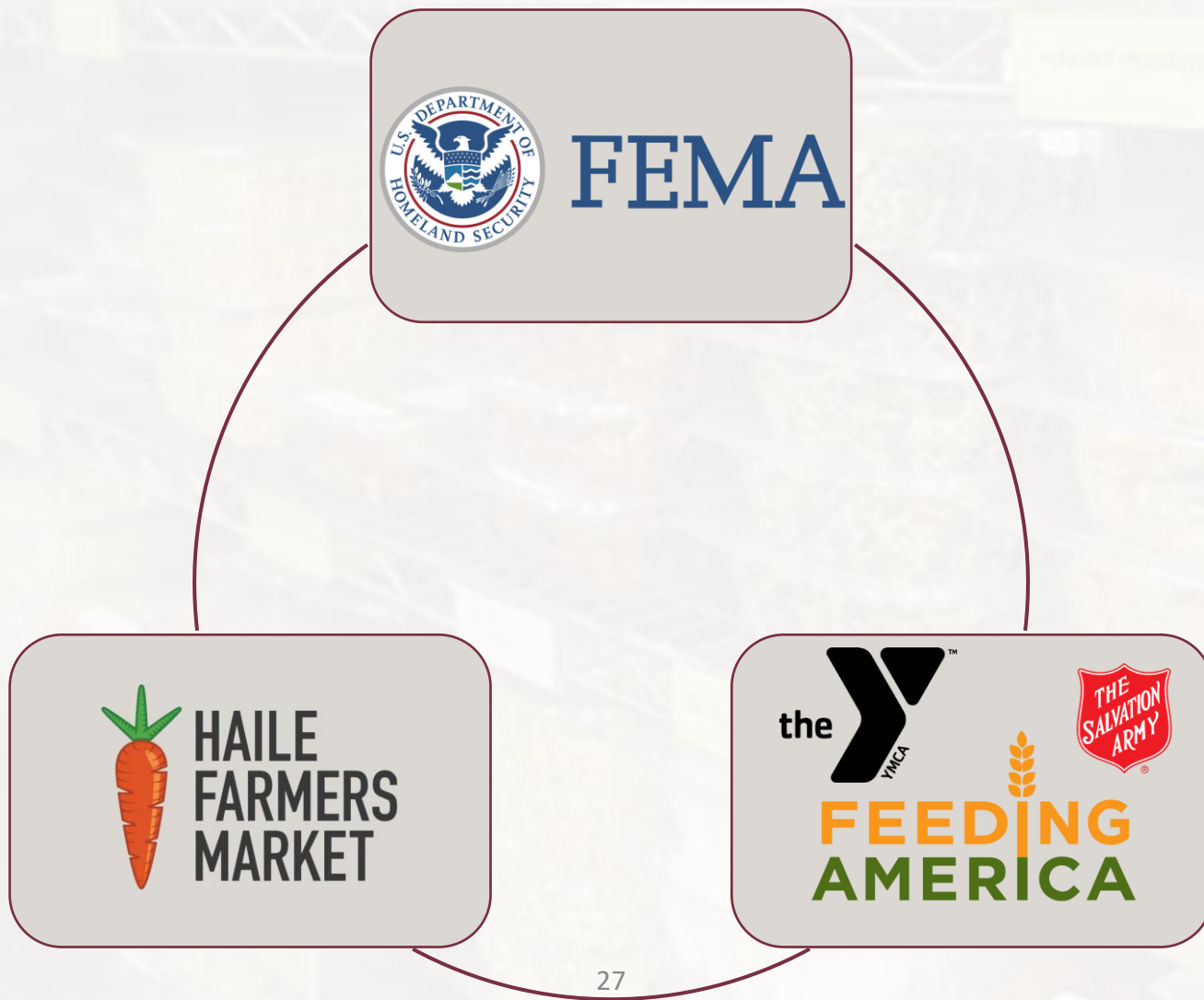


# Primary Market

**Beth-El**  
*Farmworker Ministry, Inc.*



# Secondary Markets



# Stakeholders



## Beth-El Mission

Teresita Matos-Post  
Mark Orendorf

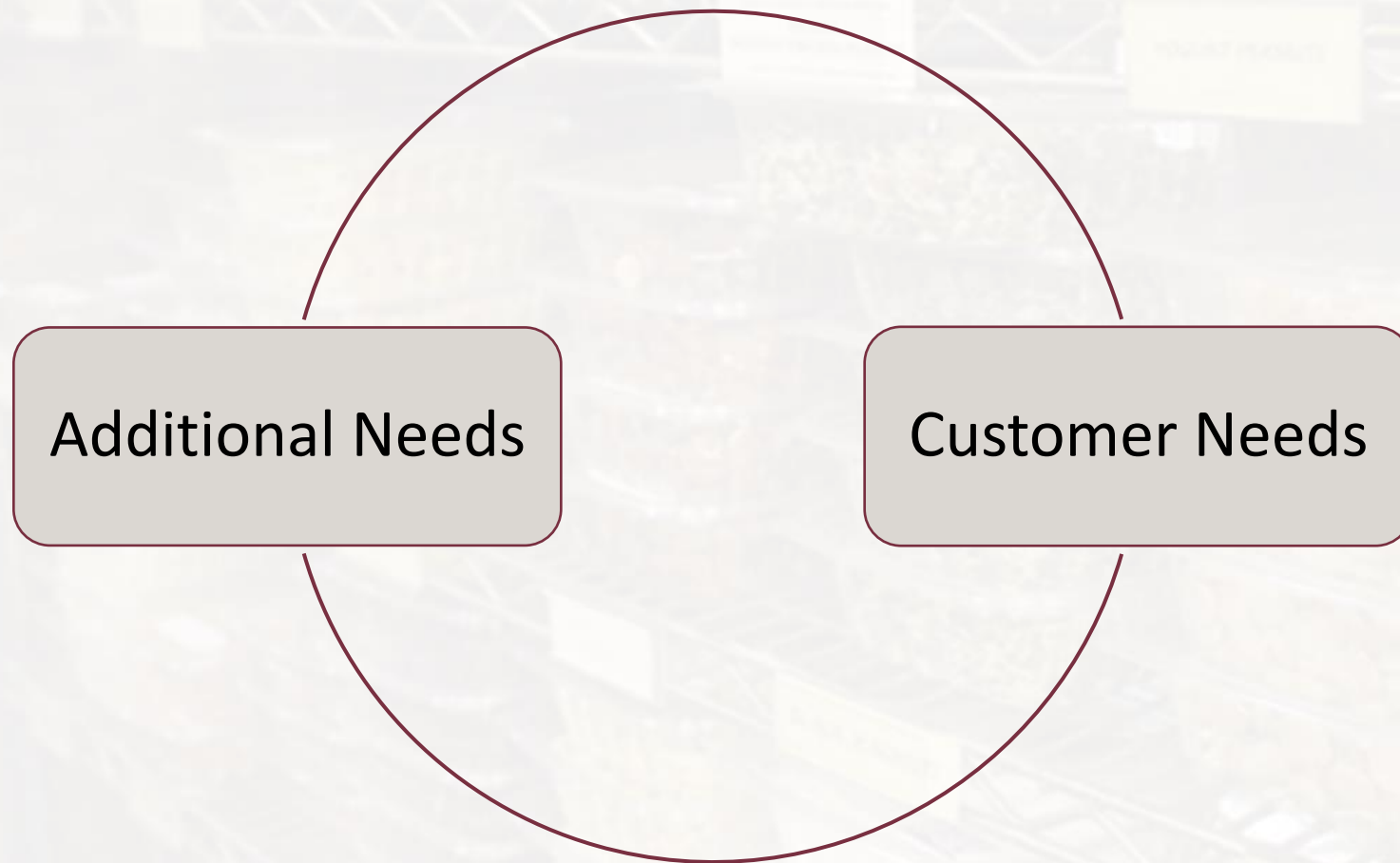
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Dr. Shayne McConomy



# Customer Statements

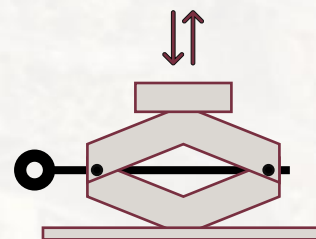


# Customer Needs

Speed Up Bagging

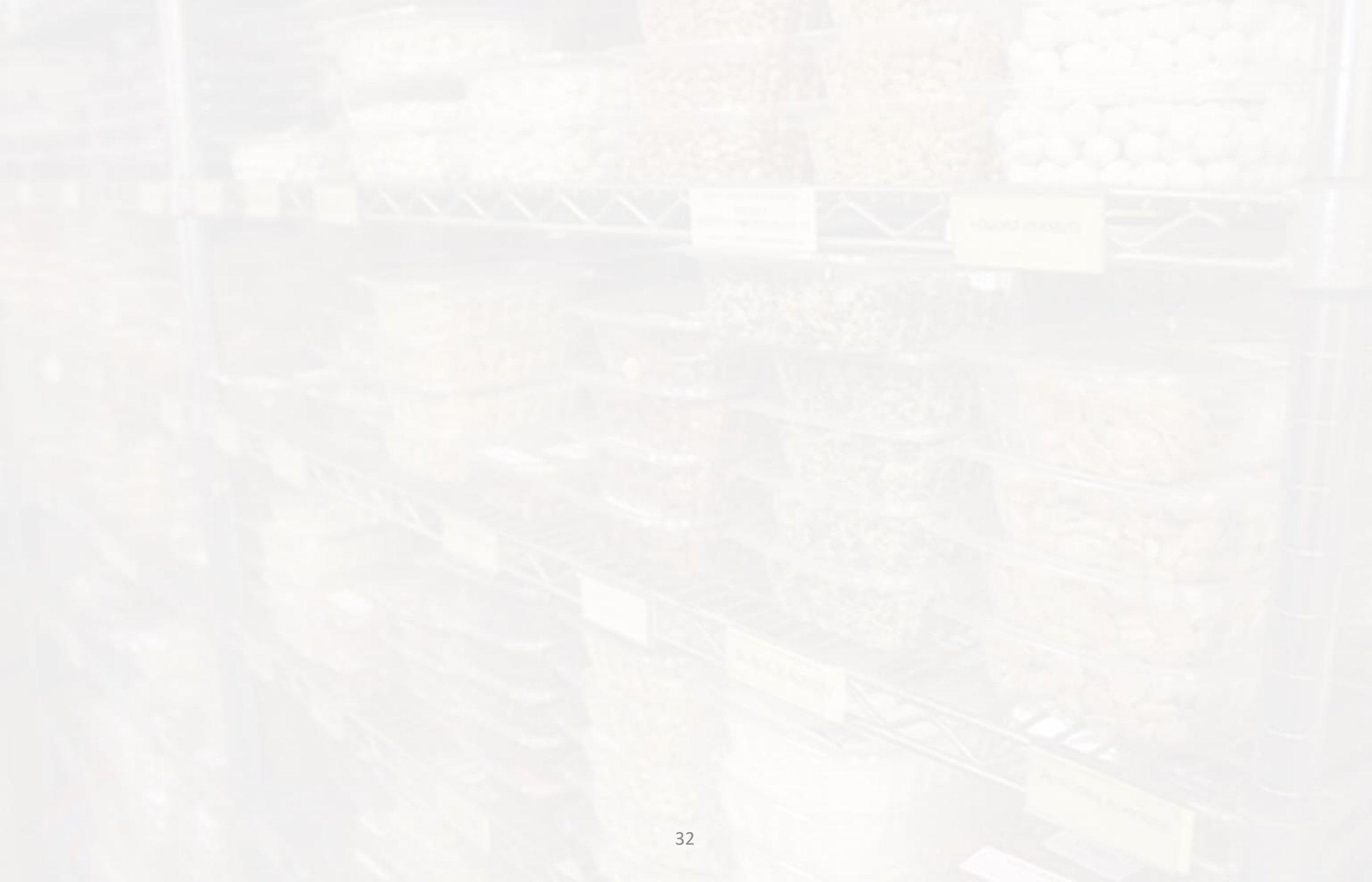


Relieve Stress from Lifting



# Targets

Function	Metric	Target
Carrying Capacity*	Pounds, <i>lb</i>	$50 \leq x$
Portion Size*		$1 \leq x \leq 4$
Tray Volume	Inches Cubed, <i>in.</i> <sup>3</sup>	$3520 \leq x$
Storage Volume		$7962 \geq x$
Tilt	Degrees, $x^{\circ}$	$0 \leq x \leq 21$
Pallet Bounds*	Height, <i>in.</i>	$11 \leq x \leq 60$
Spout Size	Diameter, <i>in.</i>	$2 \leq x \leq 4$
Lift Velocity	Meters per Second, $\frac{in}{s}$	$5 \leq x \leq 9$
Compatible Dried Goods	Listed Dried Goods	Red Beans
		Black Beans
		White Rice







# F.D Cross Reference Table

Food Distribution			
Function	System		
	Input	Monitoring	Output
Accepts	X		
Display's analog weight reading		X	
Pour	X		X
Raise	X		X
Lower	X		X
Package	X		X

