



## Building Student Capacity to Lead Sustainability Transitions for Reducing Food Waste

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# Meeting the food waste challenge in the classroom and on campus

**FOOD WASTE DINING HALL STUDY &  
INTERVENTION**

**FOOD WASTE COMPOST PROJECT**

# Building student capacity to lead sustainability transitions through Authentic Research Modules in Sustainability Sciences

Undergraduate courses provide valuable opportunities to train and empower students with the knowledge, skills, and motivation to advance society in more sustainable directions.

ARMS are research-based experiential learning opportunities collaboratively designed with stakeholders through a community needs assessment on pressing food system issues.

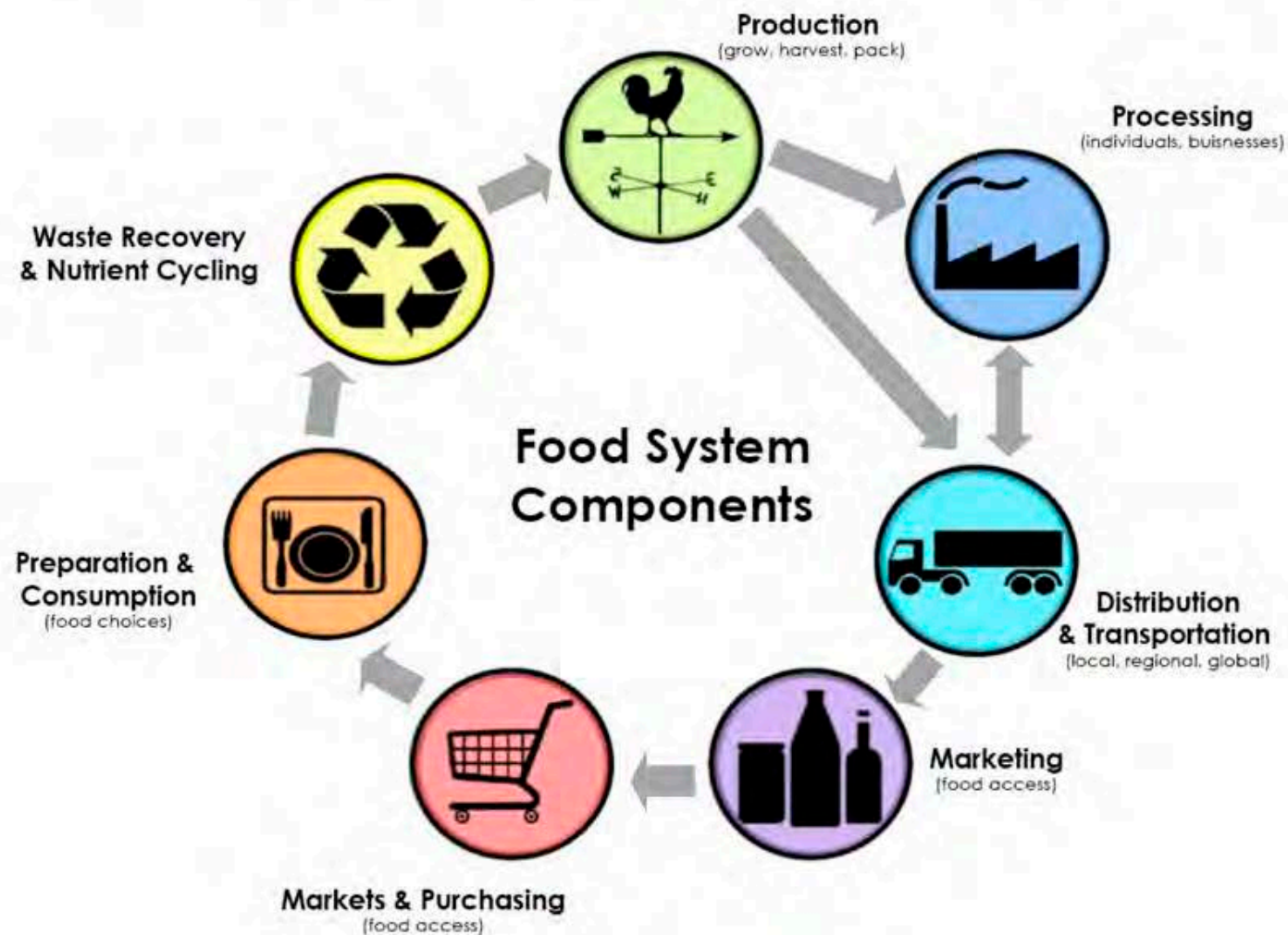
The objective of ARMS is for faculty and students to jointly identify evidence-based management solutions.

# Building student capacity to lead sustainability transitions through Authentic Research Modules in Sustainability Sciences

Responding to Student Needs

Responding to Stakeholder Needs

# Food waste is generated in every sector of the food system



Source: Shri, C 2014

# Food waste in the United States

1.3 billion tons annually

1/3 of all consumable food waste

30-40% of our plates ends in the landfill

#1 solid waste in the United States

# Food system implications of food waste

## NUTRITION and HEALTH

14 percent of the U.S. population and 13 percent of the global population is food insecure without access to adequate and nutritious food

## ENVIRONMENT

Food waste has a detrimental ecological footprint with negative impacts on water, land use, biodiversity, and climate

## ECONOMICALLY

Food waste represents a loss of approximately US\$161.6 billion annually

**How do we stop throwing away limited resources and nutrients for health?**





# How do we make food waste part of the solution for strengthening food systems?

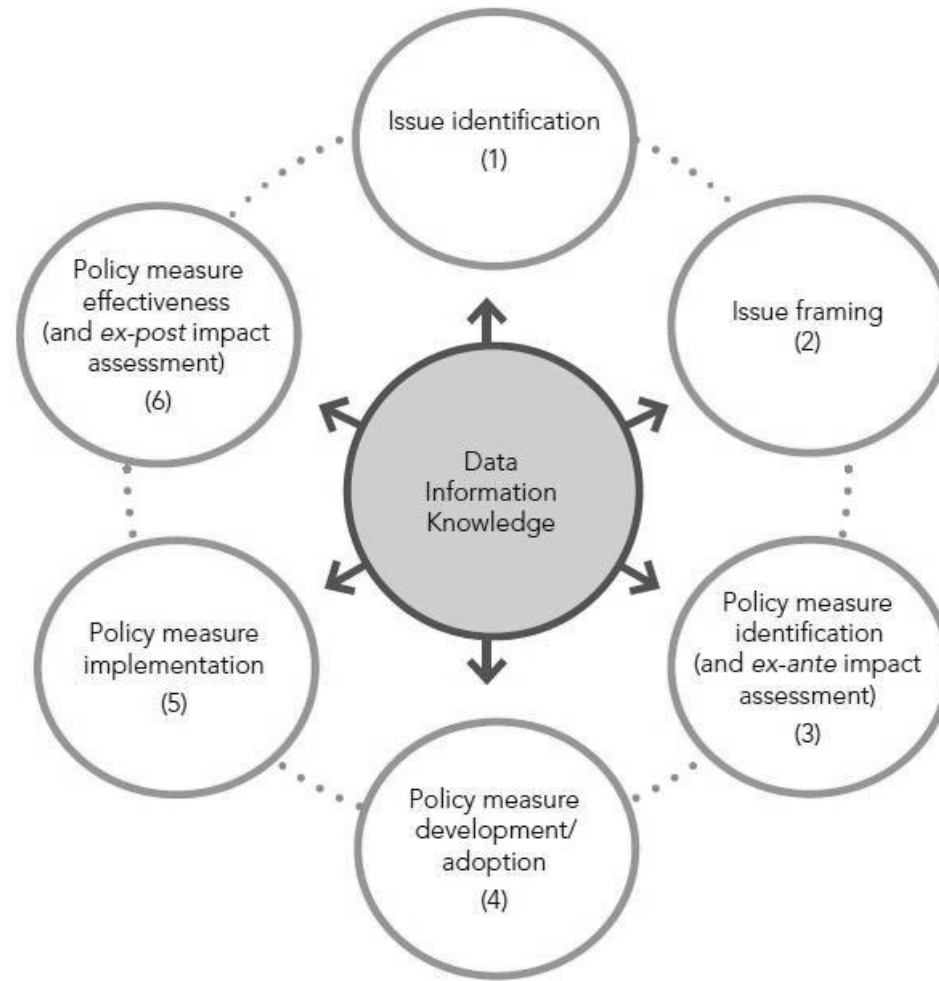
## MINDFUL ACTIONS

Food waste can be part of the solution in addressing food system challenges by encouraging consumers to make more mindful actions about food choices

## COMPOST

Food waste can be part of the solution in addressing food system challenges by using food waste compost to cultivate nutrient-dense edible plants

# Building student capacity to address food system issues



# Dining hall study and intervention

TRAINING STUDENTS TO IDENTIFY THE PROBLEM by  
MEASURING FOOD WASTE and STAKEHOLDER ENGAGEMENT  
If it is not measured, it may not be effectively managed

TRAINING STUDENTS TO DESIGN SOLUTIONS TO THE PROBLEM

TRAINING STUDENTS TO MEASURE THE EFFECTIVENESS OF  
SOLUTIONS

# Research Questions

How much food is wasted on campus? How much of different types of food is wasted?

Can food waste be reduced through an intervention targeted at students and dining service?

How much food can be composted? How much space do we need for a compost facility to process food waste?

What is the quality of compost from food waste?

# Measuring food waste

## Overall Dining Hall Waste Categories

Waste Stream	Definitions	Examples
Pre-consumer edible food waste	Leftover solid and liquid food waste served but not taken by diners	Soup, pasta, pizza, salads
Pre-consumer non-edible food waste	Kitchen scraps produced during food preparation	Eggs shells, fruit peels, bones, coffee grounds
Pre-consumer liquid waste	All liquid waste produced during food preparation	Water, broth, milk, ice
Pre-consumer non-food waste	Any non-food waste produced during the food preparation process	Gloves, food packaging materials
Post-consumer edible food waste (plate waste)	Solid food items left on diners' plates	Pasta, pizza, salads
Post-consumer non-food waste	Non-food items left on diners' plates	Napkins, wrappers, food packaging containers
Post-consumer liquid waste	Beverages and soups, including soups containing solids, left on diners' plates	Soda, water, coffee, milk, tomato soup, chicken noodle soup

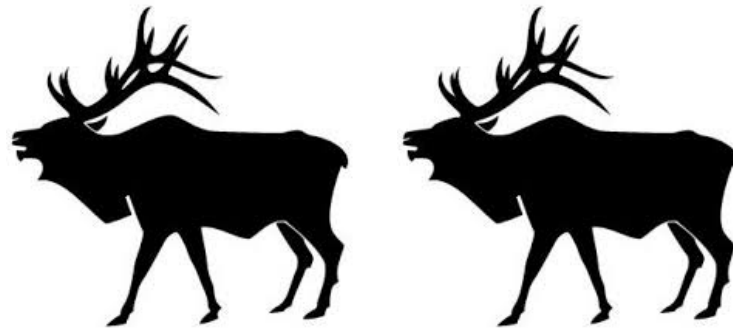
## Food Waste Categories

Fruit
Vegetables
Salad
Grains/Starches
Protein
Dairy
Mixed dishes
Condiments

# Design intervention to reduce food waste

SFBS 499 and NUTR 351  
Student Project on Food Waste

**Three Days of Student  
Food Waste =**

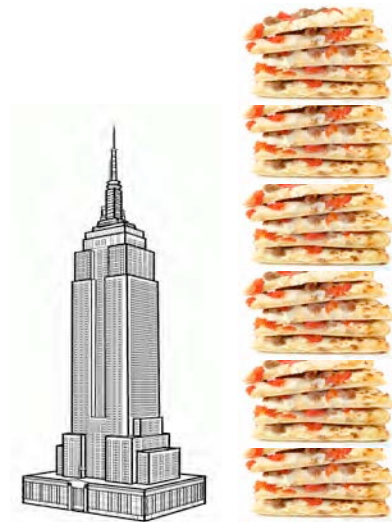


**Weight of 2 Adult Bull Elk  
Help Reduce Food  
Waste**

**TAKE WHAT YOU CAN EAT -  
GET SECONDS IF YOU WISH!**

SFBS 499 and NUTR 351 STUDENT PROJECT

Student Food Waste from  
Miller Dining Hall Amounts to



**60,000 lbs *per Semester***  
**= 30,000 Pizzas**

Stacking Taller than the Empire  
State Building!

**You Can Help**

Take Only What You Think

You'll Eat

You Can Always Get Seconds

SFBS 499 and NUTR 351  
Student Project on Food Waste

## Take What You Can Eat ...



 **Not What It Can Hold!**  
**Help Reduce Food Waste**  
Take what you can eat- get  
seconds if you wish!

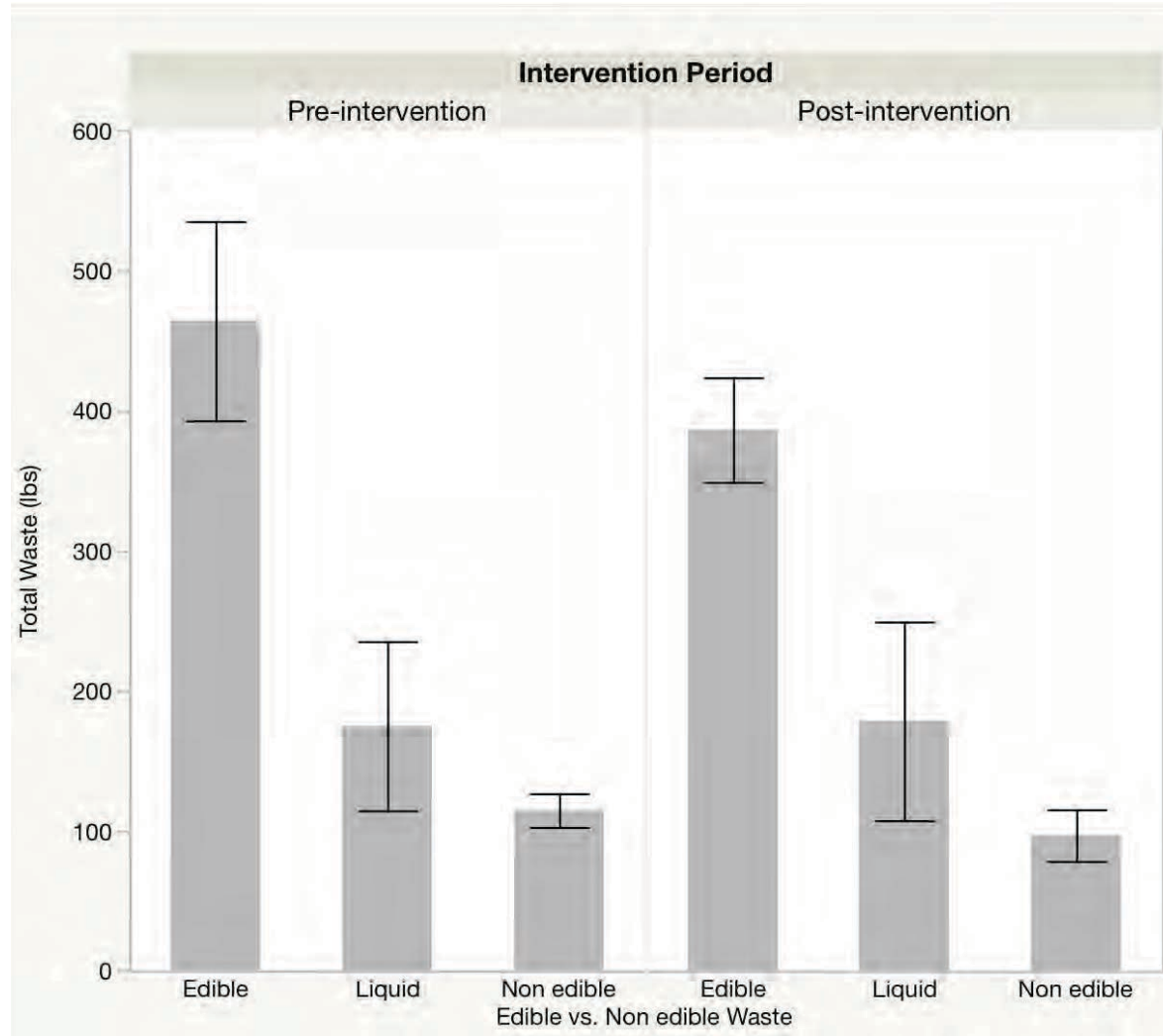


# Design intervention to reduce food waste

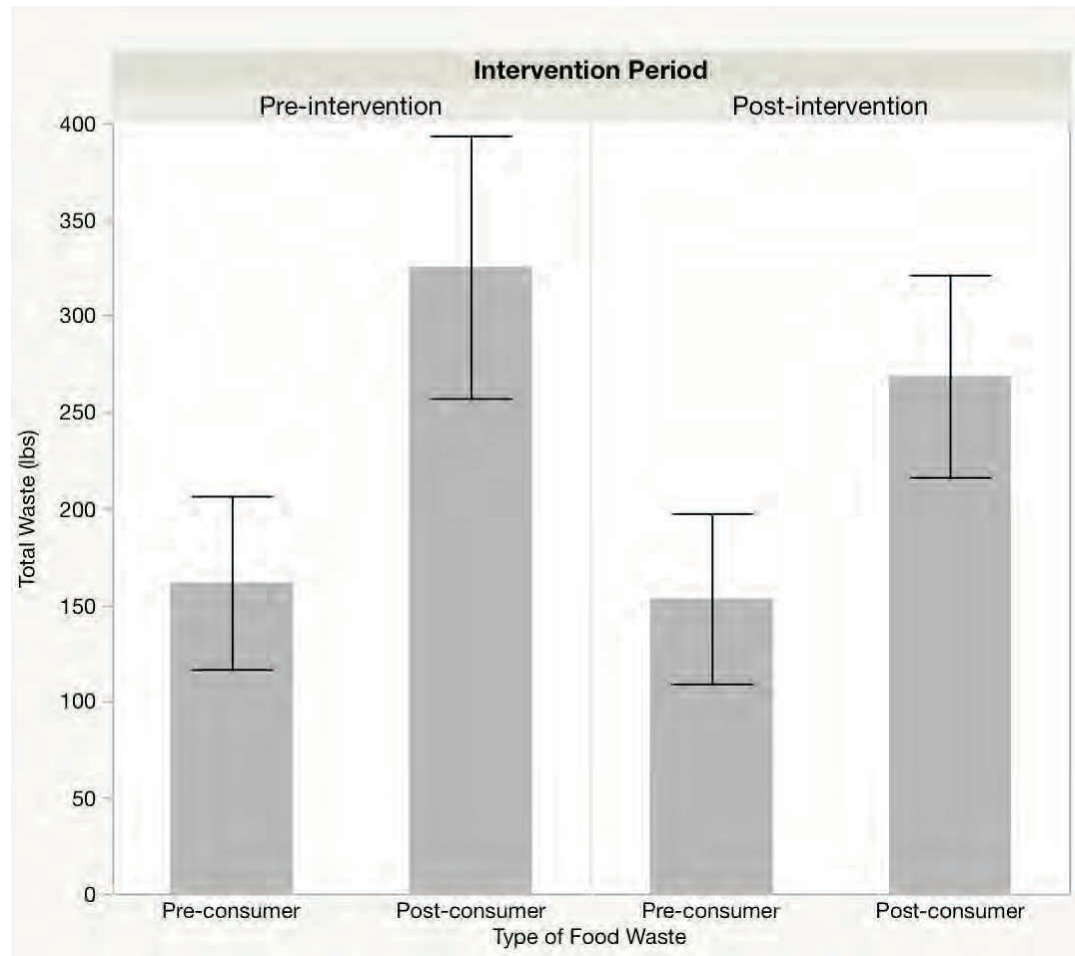
Reduced plate size, reduced portion size, reduced serving utensil size



# Measuring the effectiveness of the intervention to reduce food waste



# Measuring the effectiveness of the intervention to reduce food waste



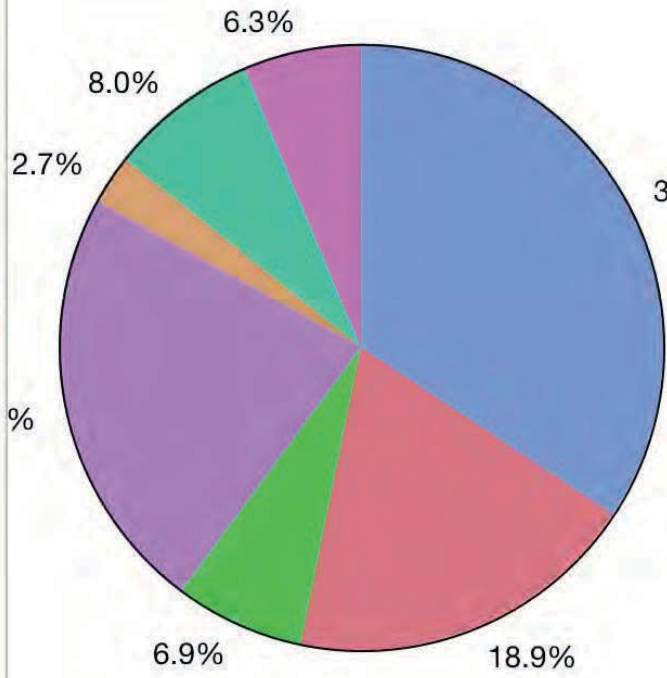
**Intervention Period**

Pre-intervention

Post-intervention

- Pre-consumer edible food waste
- Pre-consumer liquid
- Pre-consumer non-food waste
- Pre-consumer nonedible food waste
- Post-consumer edible food waste
- Post-consumer liquid
- Post-consumer non-food waste

Total Waste (lbs)

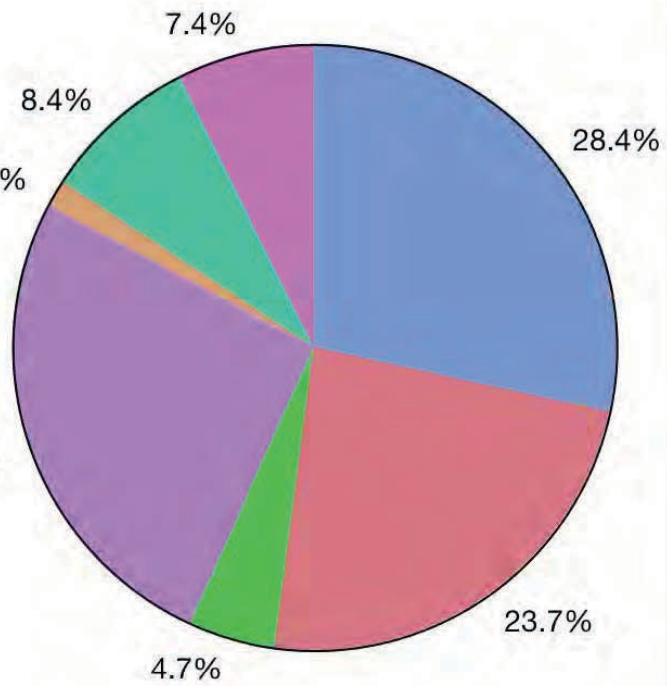


34.3%

15.0%

6.9%

Type of Waste



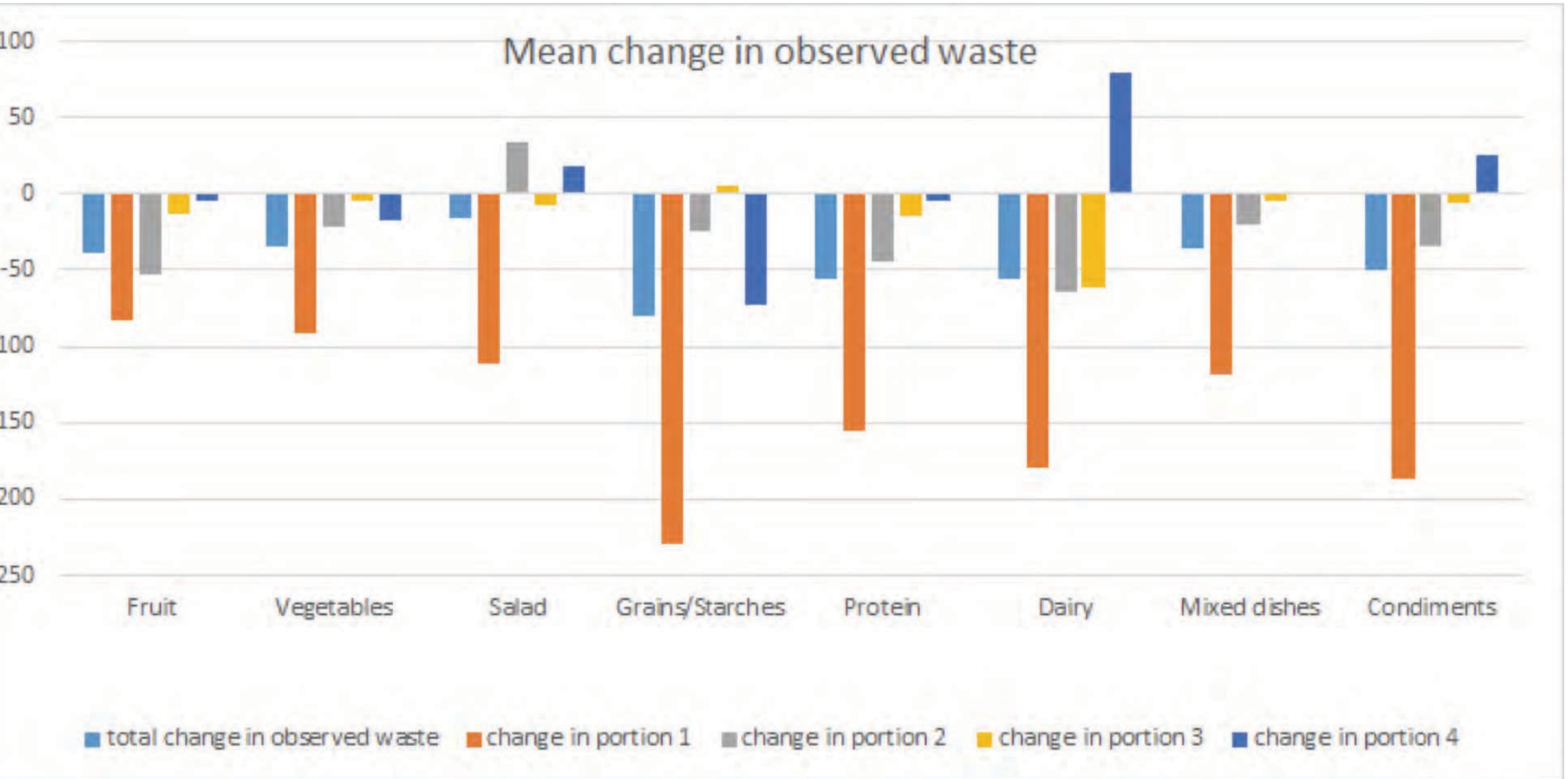
28.4%

11.5%

4.7%

Type of Waste

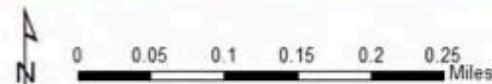
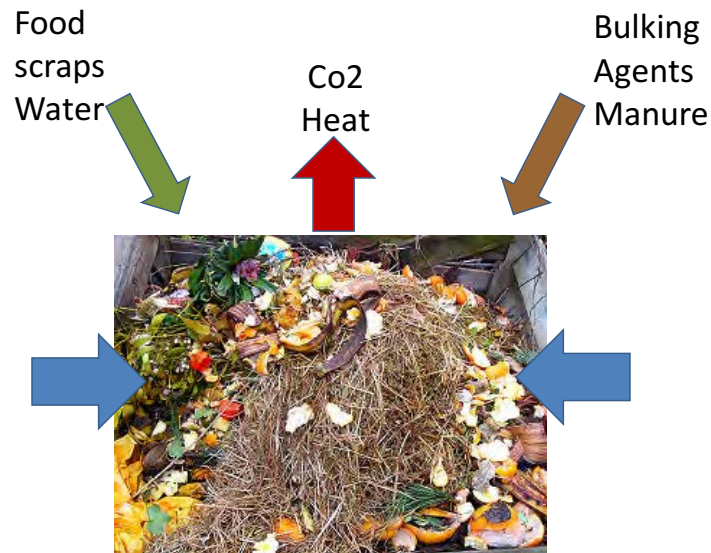
Mean change in observed waste



# Redirecting lost nutrients from food waste to create compost and grow nutrient-dense vegetables

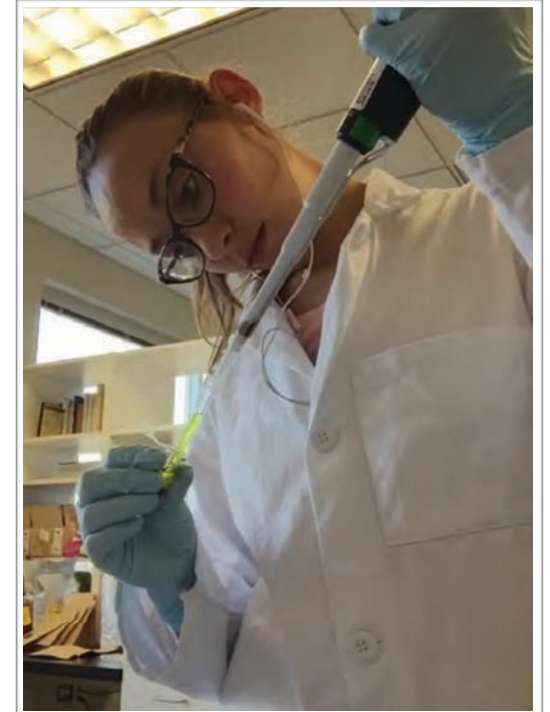
## APPLYING FOOD WASTE DATA TO DESIGN COMPOST INITIATIVE

### The Composting Process:

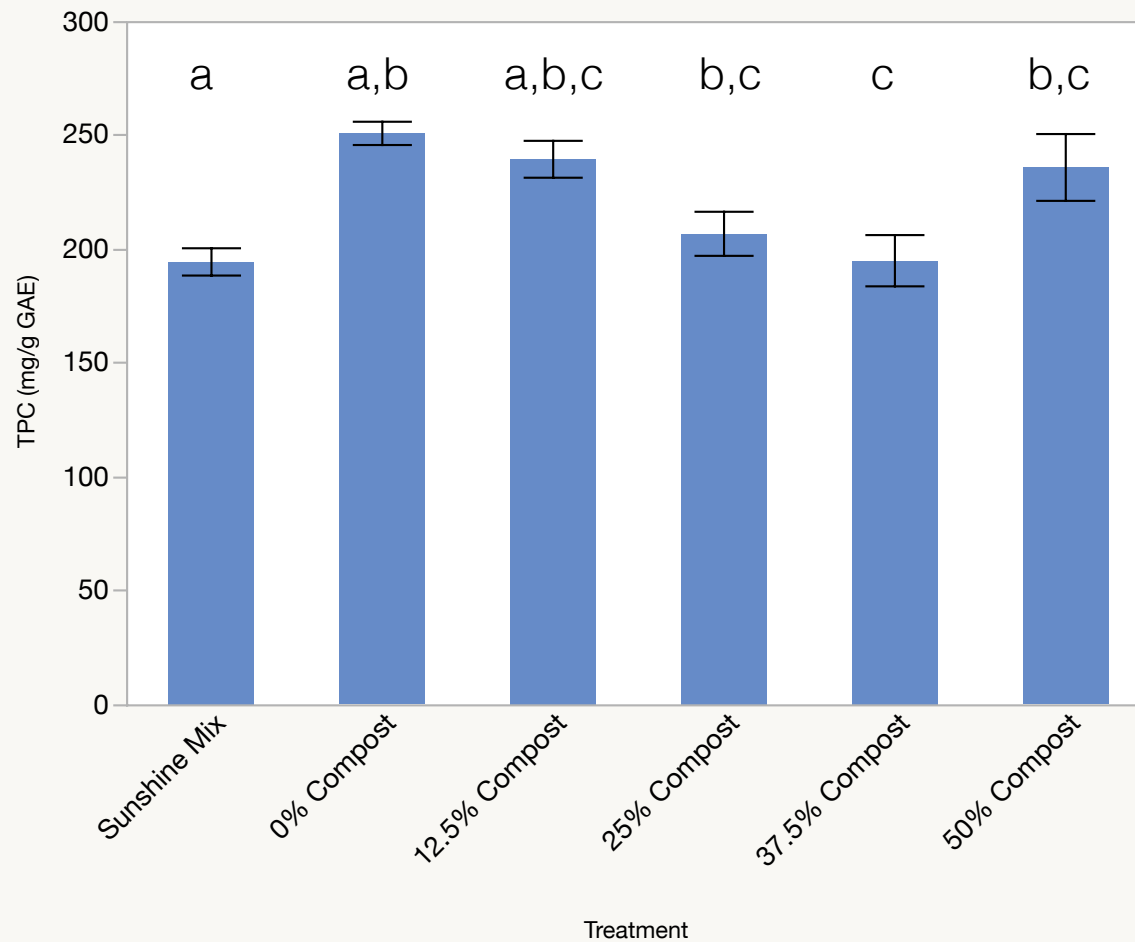


Data: National Hydrography Database (date unknown)  
and USDAFSA Aerial Photographs (2011)  
Author: Thomas M. Bass  
Date: 17 Oct 2014

# Redirecting lost nutrients from food waste to create compost and grow nutrient-dense vegetables



# Effects of Compost Amendments on Total Phenolic Concentrations of Tomatoes



$p < 0.0003^*$



# Integrating science to promote mindful actions for improved nutrition



**“Time for a Change”  
by Madeline Kelly**

<https://drive.google.com/file/d/0BwEMPxSjtvEMzV5bmxERXVqdmM/view>