

Meeting consumer demand for fruits and vegetables

Challenges and opportunities
from a food systems perspective

Zach Conrad, PhD, MPH

zach.conrad@ars.usda.gov



Outline

1. Why is increasing consumer demand for F&V an important goal?
2. What aspects of the F&V food system make it challenging to meet increased consumer demand?
3. Where is change in the F&V food system needed most?

Why focus on F&V?

To meet daily recommendations, Americans need to double their intake of F&V.



2.6 cups/day



5 cups/day

Only ~8% of Americans meet daily F&V recommendations.

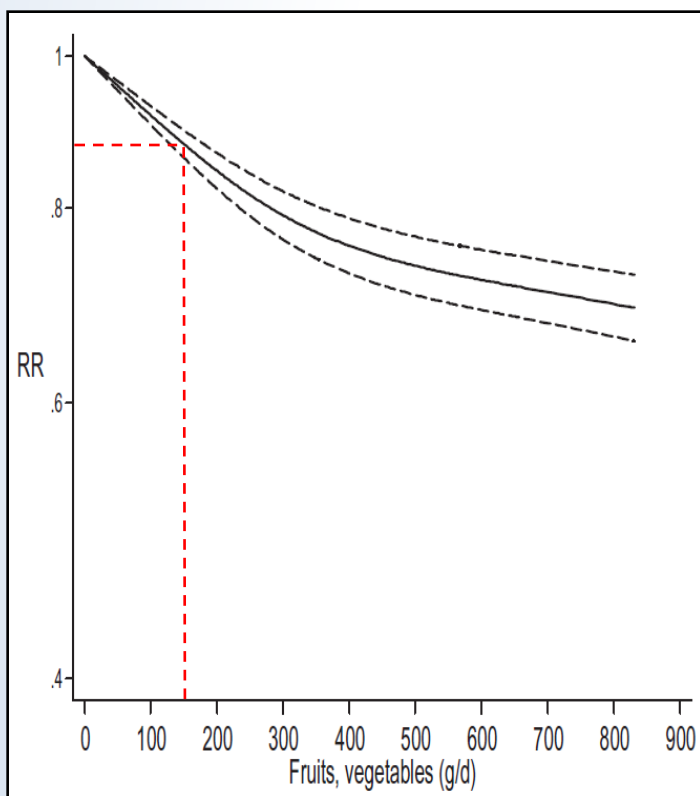
Conrad et al. Characterizing fruit and vegetable consumption in the US by self-report and by disappearance data, 2001-2014. (2017). *Public Health Nutrition*, 20: 3045-3050.

Rehm et al. (2016). Dietary intake among US adults, 1999-2012. *JAMA*, 315: 2542-2553.

Why focus on F&V?

Suboptimal F&V intake in the US accounts for 100 thousand deaths/yr (15% of total cardiometabolic mortality).

Every 150 g increase in F&V intake is associated with a 10% reduced risk of mortality.



150 g = about 1 banana



Micha, R. *et al.* (2017). Association between dietary factors and mortality from heart disease, stroke and type 2 diabetes in the United States. *JAMA* 317: 912-924.

Aune, D, *et al.* (2017). Fruit and vegetable intake and the risk of cardiovascular disease, total cancer and all-cause mortality-a systematic review and dose-response meta-analysis of prospective studies. *International Journal of Epidemiology*, 46: 1029-1056.

What aspects of the F&V food system make it challenging to meet increased consumer demand?

The F&V food system

All foods move through a food system comprised of 3 broad stages...



...but for F&V, the food system is characterized by a high degree of:

1. Specialization;
2. Complexity; and
3. Uncertainty...

...which pose challenges for meeting increased demand.

On the farm

F&V is a very broad category that represents hundreds of individual crops.

Each F&V has its own growing requirements (e.g. temperature, precipitation, soil type, nutrient needs, tolerable pest pressure, etc.).

Producers have to invest in highly specialized (and expensive) equipment that often cannot be repurposed for other crops.

And even with mechanization, manual labor needs are still high.

Very stringent marketing standards, so adequate handling requires skill.

Operations are highly dependent on immigrant labor that is inconsistent and expensive.



On the farm

Many individual F&V have distinct processing forms.



Fresh



Frozen



Canned



Dried



Juice

Different growing requirements, management, equipment, labor, etc.

Very different yields and financial returns.

For some F&V, there can be a lengthy delay (years) between planting and harvesting, which delays returns on investment.

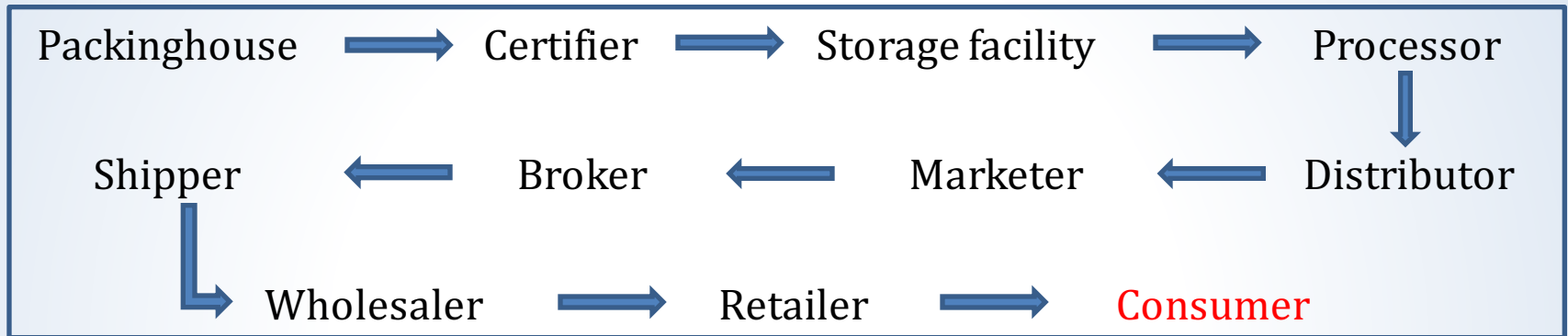
On the farm

This high degree of specialization, complexity, and uncertainty makes it challenging for:

1. New farmers to become established in the F&V sector, and
2. Existing farmers to transition to F&V production.

In the supply chain

Highly specialized infrastructure (some vertically integrated, some not)



Daily coordination among these entities is complex and essential.

Can be challenging because of the diversity of handling requirements and marketing standards across different types of F&V.

In many cases there are limitations on which F&V can be handled at the same time in the same facility (early ripening).

Knowledge and know-how of handlers to maintain market standards.



VS.



In the supply chain

This high degree of specialization, complexity, and uncertainty makes it challenging to:

1. Establish viable infrastructure in new locations, and
2. Expand infrastructure in existing locations.

At the consumer level

The primary challenges to increasing the consumption of F&V are:

1. Limited impact of behavioral interventions.

(Consumption has been consistent for a long time, despite ongoing efforts.)

2. High rate of food waste.

(40% of F&V wasted at the consumer level alone.)

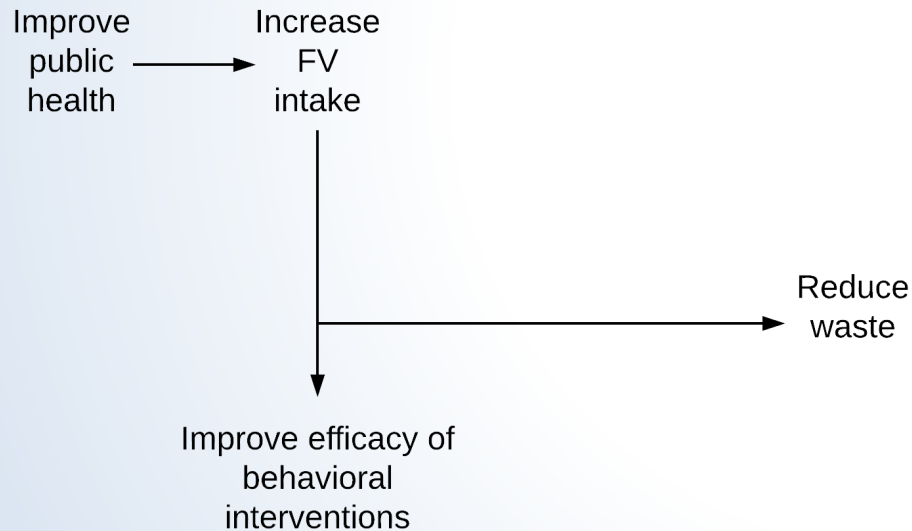
The F&V food system

Where is change needed most?



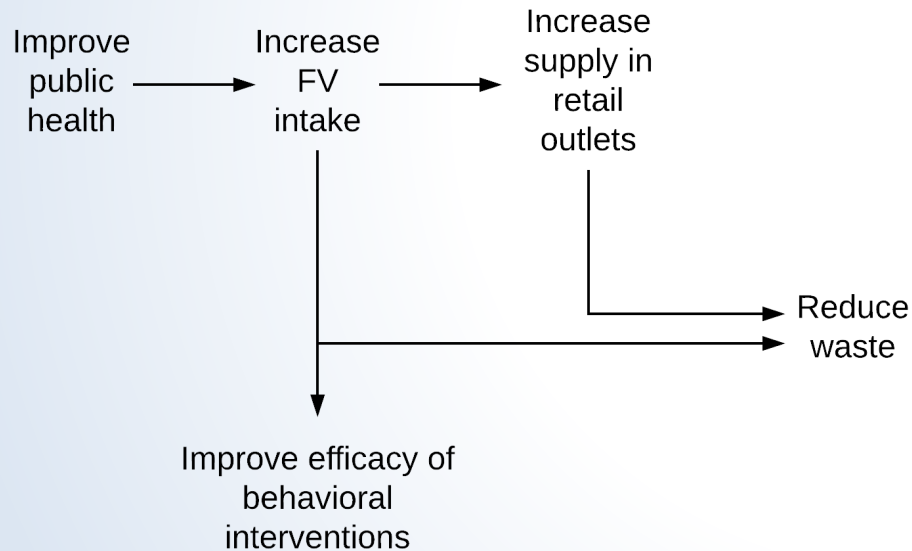
The F&V food system

Where is change needed most?



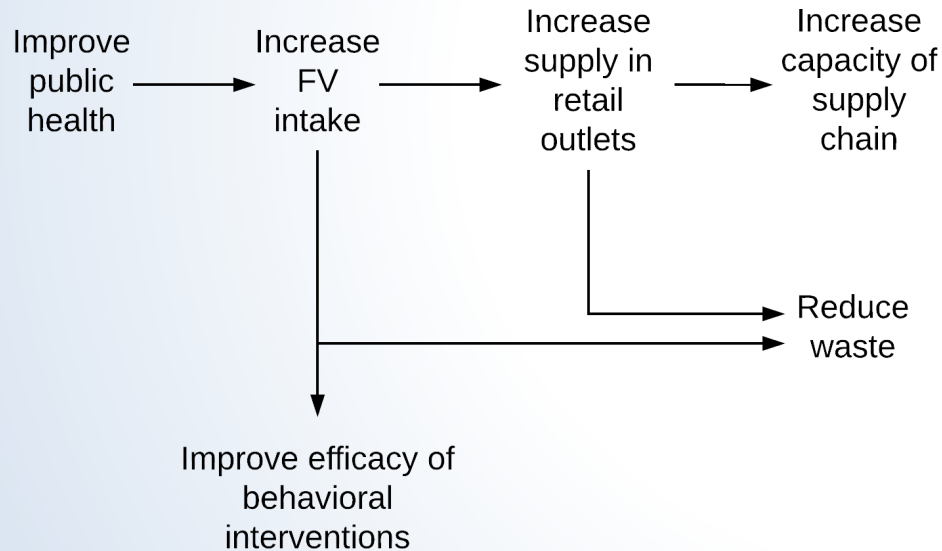
The F&V food system

Where is change needed most?



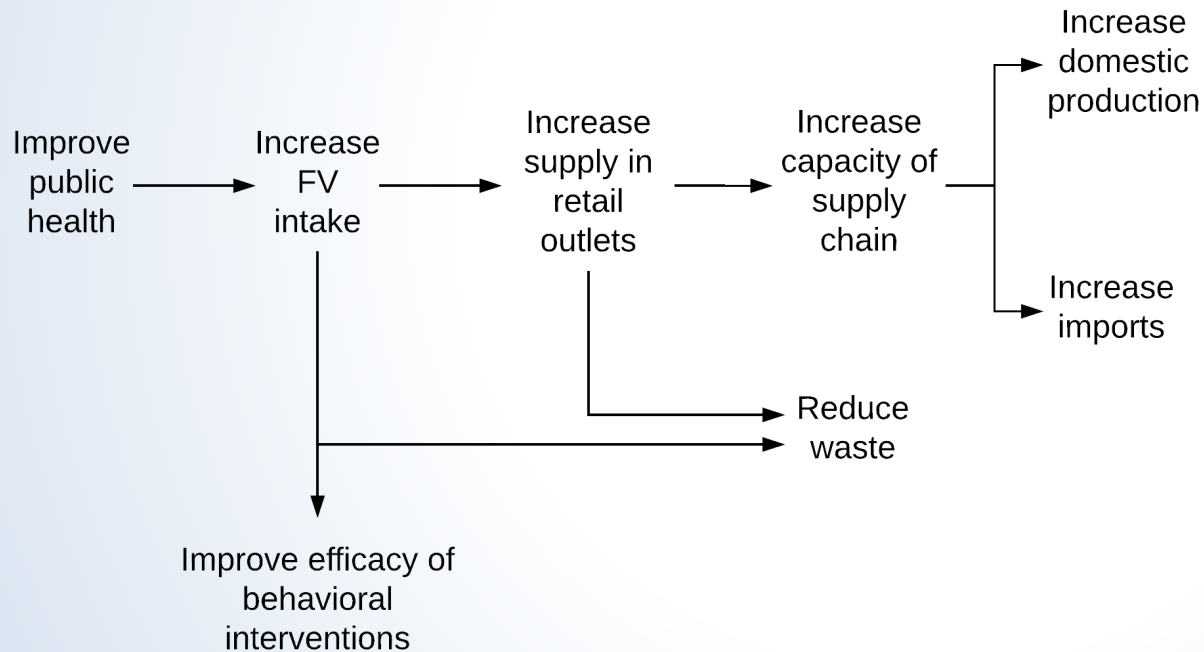
The F&V food system

Where is change needed most?



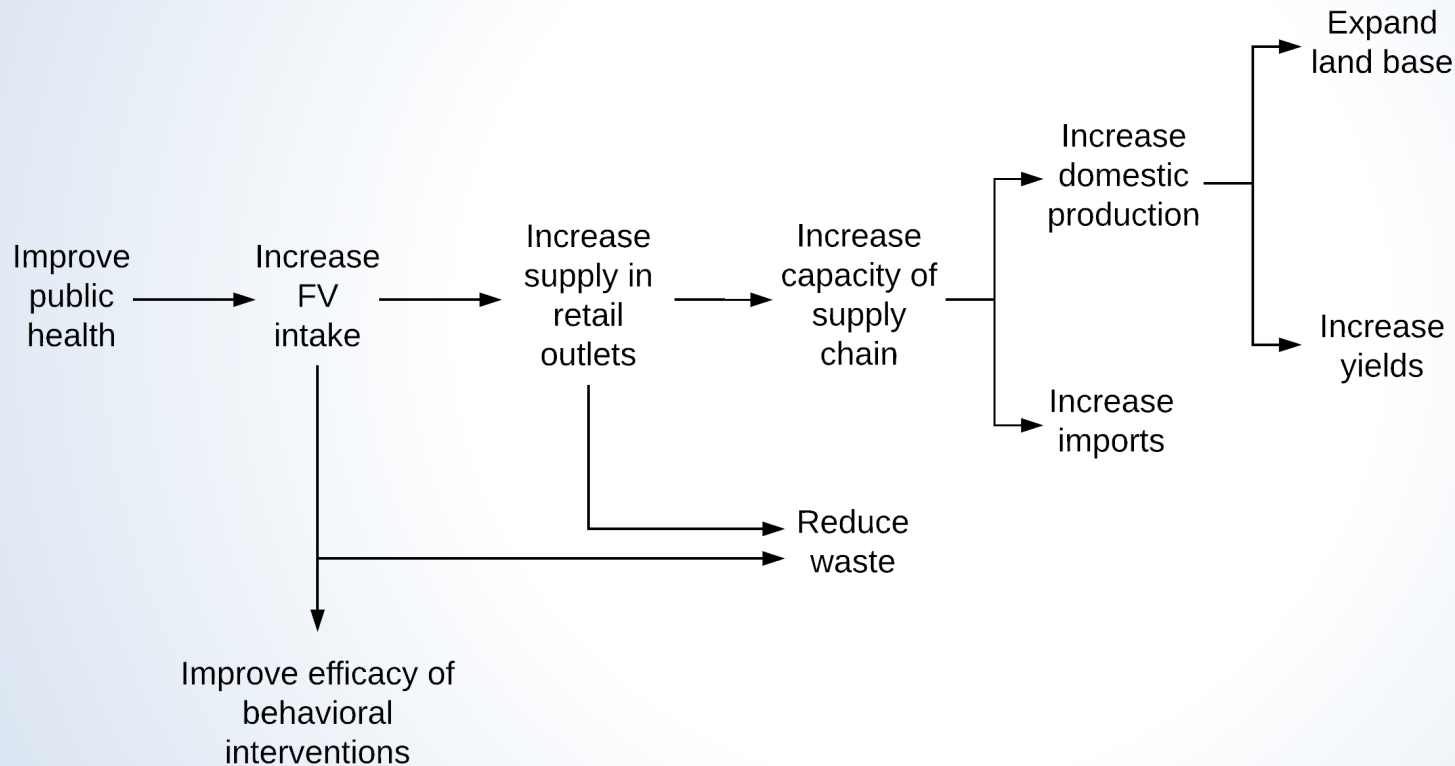
The F&V food system

Where is change needed most?



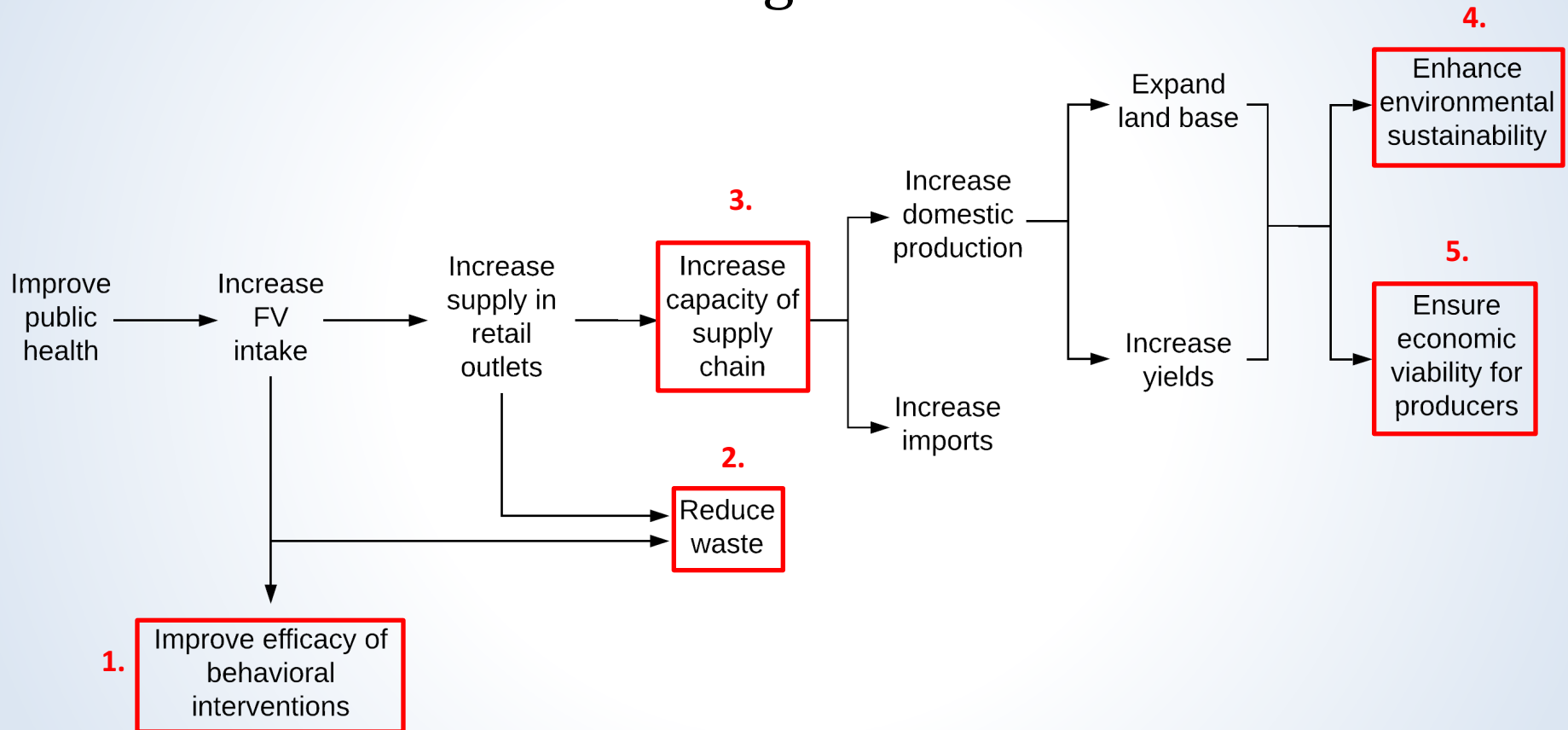
The F&V food system

Where is change needed most?



The F&V food system

Where is change needed most?



The F&V food system

Where is change needed most?

1. Behavioral interventions

- Population-level interventions may be most effective
 - Worksite wellness programs
 - Insurance-based wellness programs
 - School food procurement programs
- Public-private partnerships to enhance marketing of existing products and introduce new ones.
- Reducing cost, and improving convenience and taste, are paramount.

The F&V food system

Where is change needed most?

2. Food waste

- Research is needed on:
 - Cost of food waste, and
 - Environmental impacts of repurposing food waste.
- Industry innovation in packaging:
 - To delay spoilage, and
 - To alert consumer about spoilage.
- Standardization of date labels
 - Consumer confusion over “best by” vs. “use by” vs. “sell by”).

The F&V food system

Where is change needed most?

3. Increase capacity of supply chain

- Research is needed on:
 - Where is increased production most likely to occur?
(infrastructure co-locates with production)
 - What supply chain innovations are most cost-effective for industry and producers?

The F&V food system

Where is change needed most?

4. Enhance environmental sustainability

- How to increase F&V production while minimizing environmental impact?
- Research is needed on:
 - Estimating the relationship between incremental improvements in diet quality and robust measures of environmental sustainability.
 - Most have focused on meat intake, GHGs, and land use.
 - A sustainability index is needed.

The F&V food system

Where is change needed most?

5. Ensure economic viability for producers

- Beginning Farmer and Rancher Program
- Specialty Crop Multi-state Program
- Other loan-based and payment-deferment programs for:
 - Beginning farmers
 - Transitioning farmers

Summary

Increasing daily F&V intake is one of the most important public health priorities of our time.

However, the F&V food system is highly specialized, complex, and uncertain, which will make it challenging to meet increased consumer demand.

Change in the F&V food system is needed in 5 key areas:

1. Improve effectiveness of behavioral interventions;
2. Reduce waste;
3. Increase supply chain capacity and flexibility;
4. Minimize environmental impact; and
5. Increase support for new and transitioning producers.

Questions?

zach.conrad@ars.usda.gov