

# Modeling Capacity to Meet Food Needs through Local and Regional Production Systems

An Open Forum to Strengthen Collaborations between Research, Outreach, and Education for the Northeast Food System

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“Foodprints and Foodsheds: Tools for Evaluating the Sustainability of Dietary Patterns and the Geography of the Food System” W.K. Kellogg Foundation [Grant No. P3008987] , 1/1/2009 to 12/31/2013

## **Past funding**

“Mapping Local Food Systems Potential in New York State” USDA National Research Initiative [Grant No. 2005-55618-15640], 7/1/2005 to 6/30/2008

# Outline

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1. Introduction to modeling
2. Research on production capacity
  - a. Land requirements of diet
  - b. Potential foodsheds
  - c. Integrated modeling
3. Relevance to outreach and education

# A few words on modeling

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## What are models?

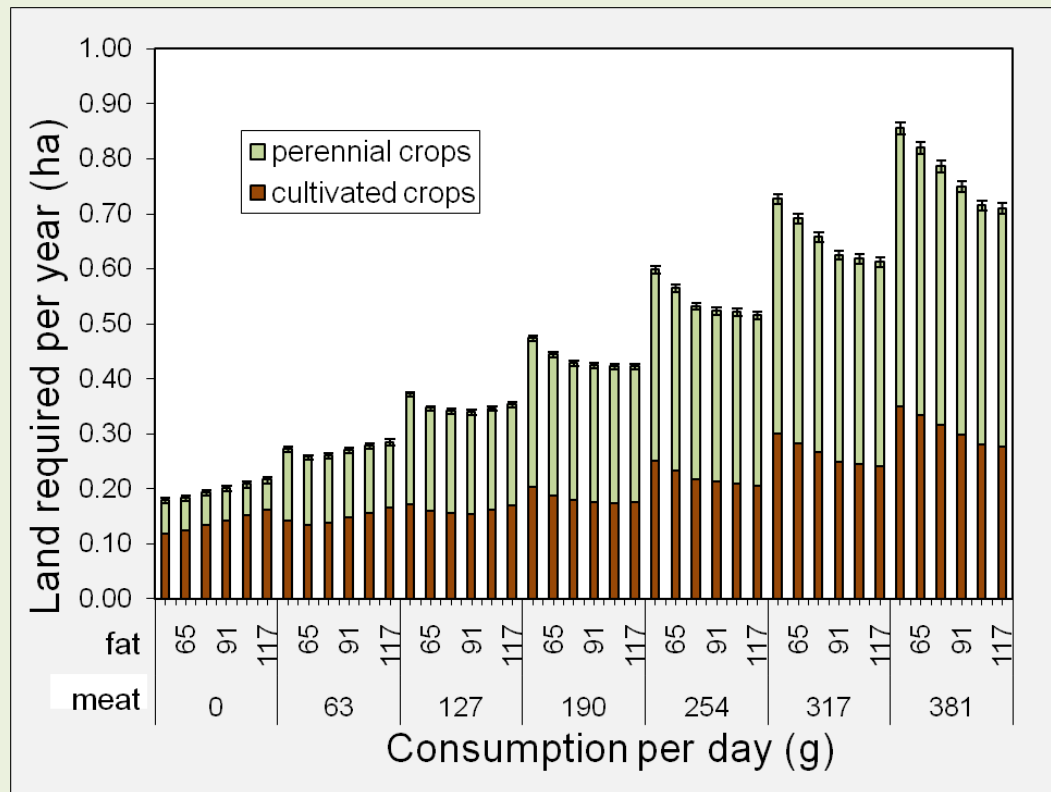
- Simplifications of reality
- Always wrong, sometimes useful
- Take many forms
  - Mental models
  - Statistical models
  - Computer models

## Why use models?

- Two major purposes
  - Making predictions
  - Understanding systems
- For food systems
  - Too big to experiment
  - Explore outside range of observed experience
  - Make “virtual” mistakes

# Foodprints and Foodsheds Project

## Land requirements of diet



Peters, C.J., J.L. Wilkins, and G.W. Fick. 2007. Testing a complete-diet model for estimating the land resource requirements of food consumption and agricultural carrying capacity: The New York State example. *Renewable Agriculture and Food Systems* 22(2): 145-153.

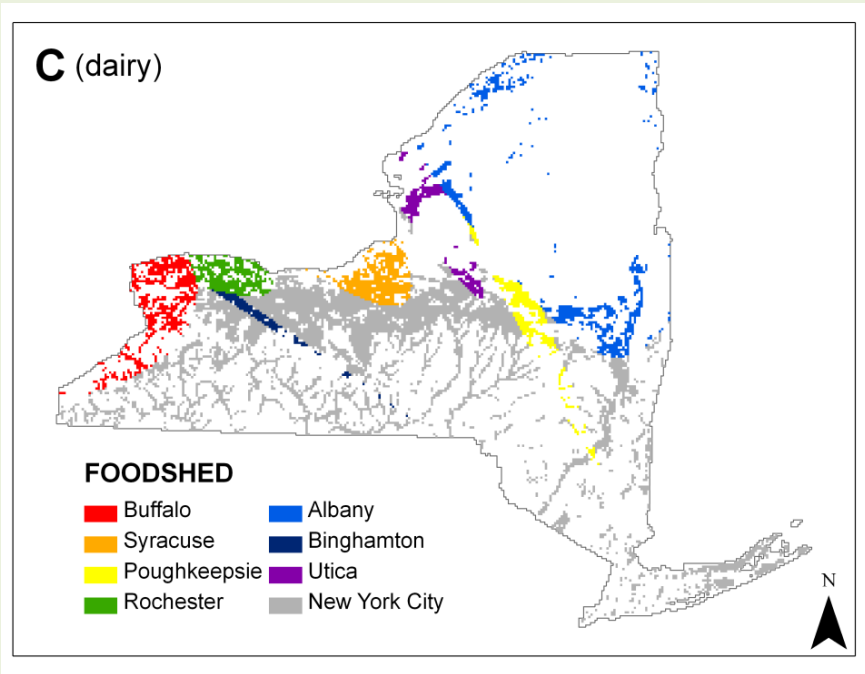
### FOODPRINT

- 1. Spreadsheet model**
  - Land requirements
  - Carrying capacity
- 2. Approach:**
  - Intake
  - Losses and conversions
  - Livestock feed
  - Crop yields
  - Land availability
- 3. Geography**
  - NY done
  - Conterminous U.S.
  - MI, MS, and NM

# Foodprints and Foodsheds Project

## Mapping potential foodsheds

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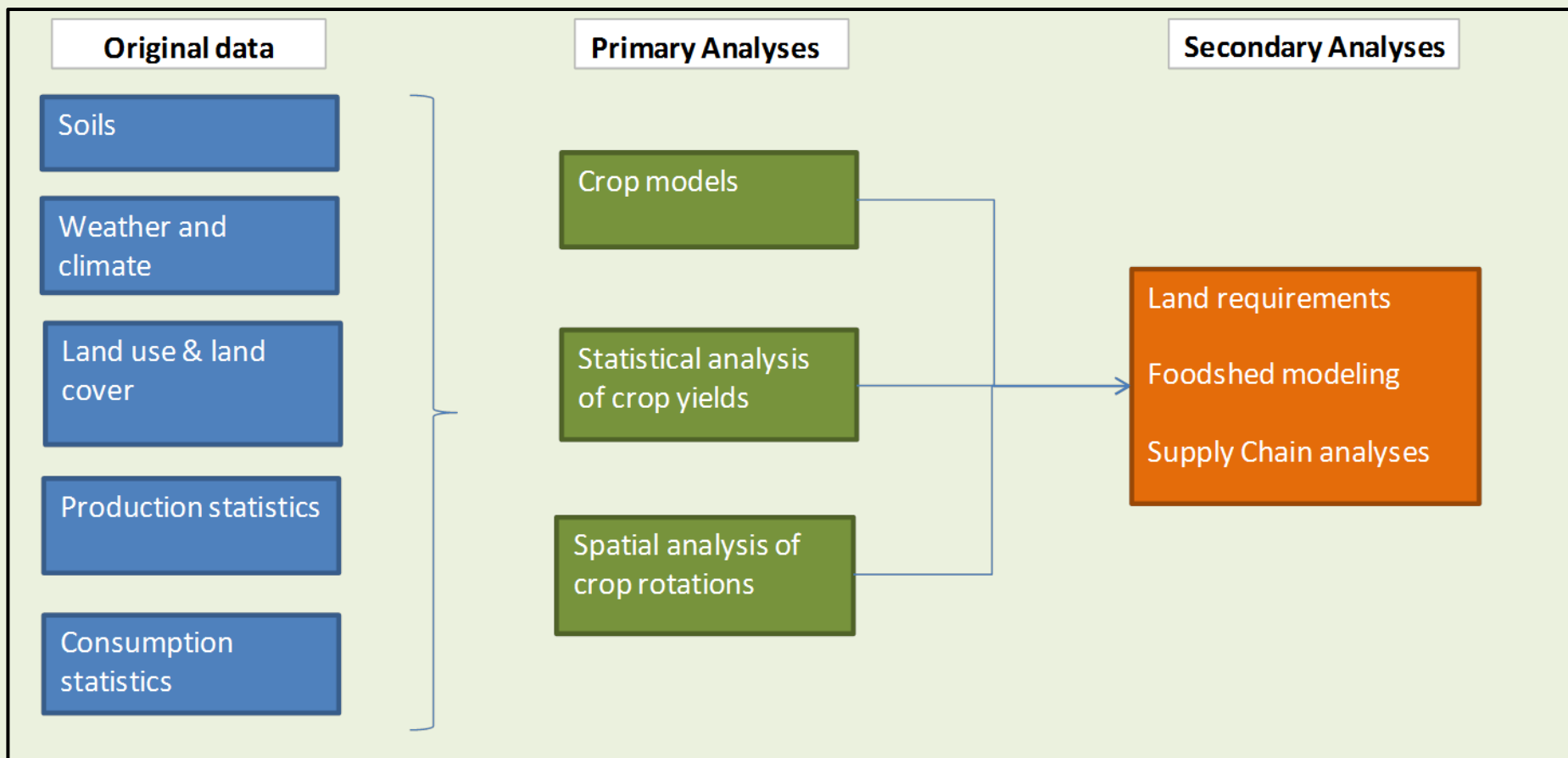
### FOODSHED

- 1. Hybrid model**
  - Spatial modeling
  - Optimization
- 2. Output:**
  - Potential local foodsheds
  - Food distance
- 3. Geography**
  - NY done
  - Conterminous U.S.
  - MI, MS, and NM

Peters, C.J., Bills, N.L., Lembo, A.J., Wilkins, J.L., and Fick, G.W.  
2012. Mapping potential foodsheds in New York State by food group:  
An approach for prioritizing which foods to grow locally. *Renewable  
Agriculture and Food Systems* 27(2): 125-137.

# EFSNE Project

## Integrated modeling framework



SOURCE: *unpublished* data from Production Team of “Enhancing Food Security with Sustainable Regional Food Systems” Project [Grant No. 2011-68004-30057]

# Relevance to outreach and education

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## Outreach

- Workshops with stakeholders
- Multiple locations (NY, MI, NM, MS)
- Topical working groups in Northeast

## Education

- Used in classroom
- Interface to enter user-defined diets