



Cornell University

# Quantifying the Economic Impacts of Local and Regional Food Systems

Becca Jablonski

PhD Candidate, Department of City and Regional Planning  
Cornell University

Presentation to the NYS Council on Food Policy

December 12, 2012

# Today's Presentation:

1. Why do we need to quantify the economic impacts of local food systems?
2. How do researchers conduct economic impact assessments?
  - What is a multiplier?
3. What has been done before?
  - Reading other studies critically
4. Challenges specific to conducting an economic impact assessment of local food systems
5. Current research at Cornell

# Motivation:

Demand for 'local' food is growing and communities want to capture *alleged* benefits

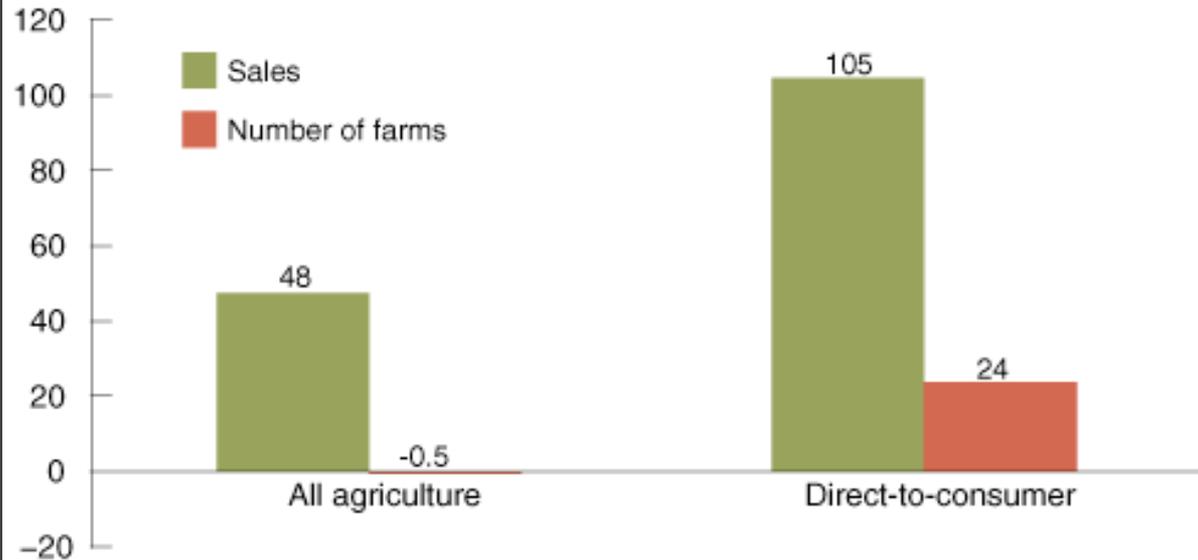
- community economic impacts
- farm profitability (particularly small and mid-scale)
- health/nutrition

However, re-localizing initiatives often require subsidies (policy support)

- Need to justify expenditures

Between 1997 and 2007, direct-to-consumer sales outpaced total agricultural sales

Percent change



Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, Census of Agriculture.

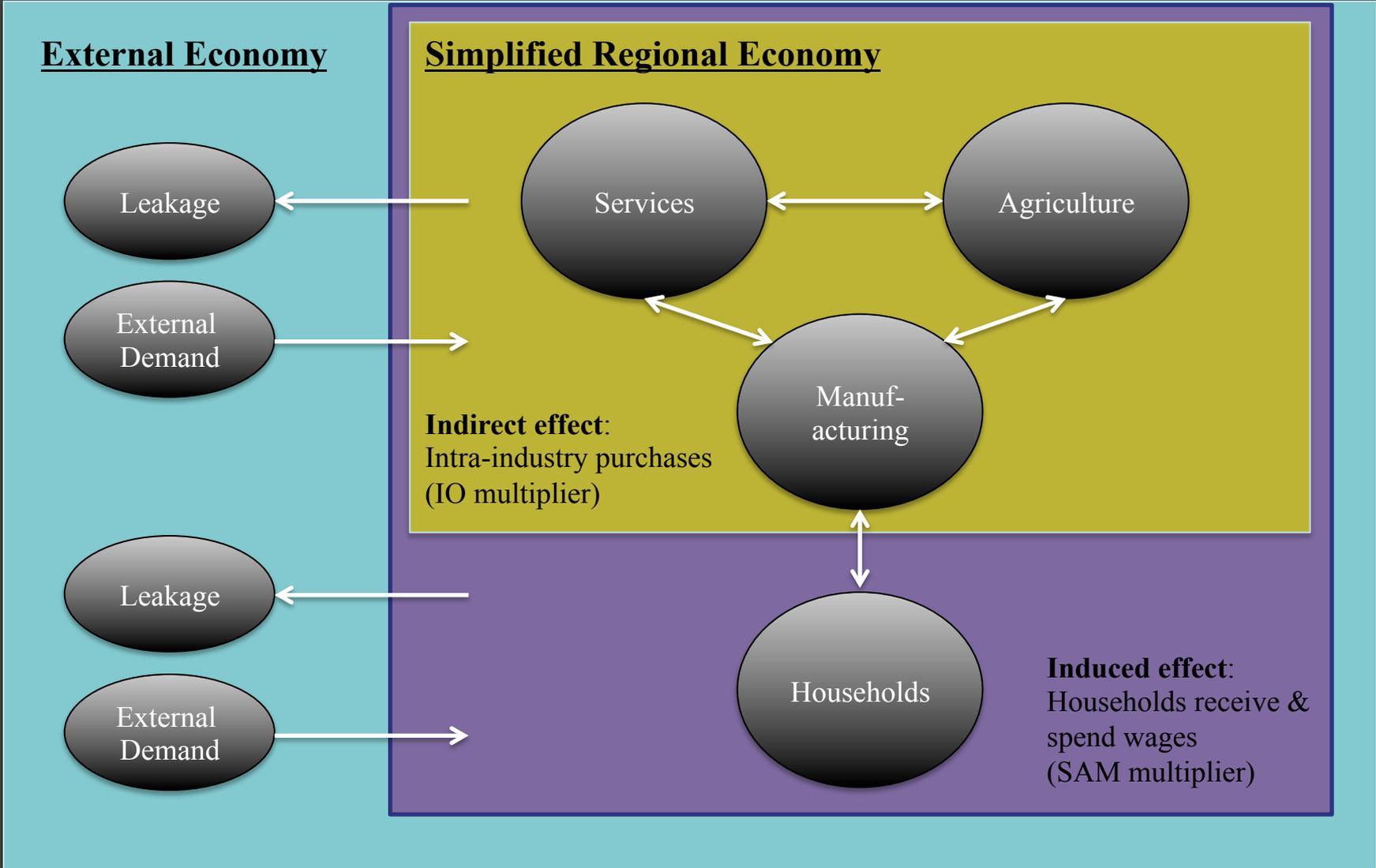
## Average operating profit margin by sales class, 2007

Sales class	Operating profit margin
	<i>Percent</i>
Less than \$10,000	-96.1
\$10,000 to \$49,999	-48.8
\$50,000 to \$99,999	-12.6
\$100,000 to \$174,999	1.2
\$175,000 to \$249,999	8.3
\$250,000 to \$499,999	16.5
\$500,000 to \$999,999	22.6
\$1,000,000 or more	26.8

Note: Operating profit margin =  $100 \times (\text{net farm income} + \text{interest paid} - \text{charges for unpaid operator and unpaid labor} - \text{charge for management}) / \text{gross farm income}$ .

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 2007 Agricultural Resource Management Survey.

**Economic Impact Assessment:** goal is to quantify inter-industry linkages: how much businesses buy and sell from each other within the local economy – including round by round impact – this economic activity is know as a **multiplier**



Source: Riberio and Warner (2004)

# Economic Impact Assessment:

## IO/SAM (method)

- Input-output (IO) models allow researchers to analyze the activities of industries that produce goods (outputs) and consume goods (inputs) from other industries
- Social Accounting Matrix (SAM) extends IO to include the impact of household spending

## IMPLAN (data & software)

- IMpact Analysis for PLANning is the dominant source of IO/SAM data and software
  - Data: BEA, Census, USDA
- Benefits:
  - Data includes complete model of economy (including local inter-industry transactions)
  - Data available by state, county and zip code
  - Data modifiable, allows user to build unique industry sectors

# Assumptions/limitations of IO/SAM/IMPLAN:

## General

- Constant prices – particularly problematic with agriculture given volatile prices
- Static framework (no economies of scale)
- Fixed-proportion production functions
- Demand driven (ignores supply constraint)
- Data limitations – need information on input expenditures and location
  - Mostly not collected on state level, therefore extrapolations

## Specific to 'local food'

- Data limitations
  - Ag data based on USDA NASS/Ag Census
    - Local/regional food system data is lacking
  - Business info for small/rural regions often undisclosed
- What is 'local' or 'regional'?
  - Geographic boundaries? Scale? Market (direct vs. commodity)?
  - Larger the geographic definition, larger the multiplier

# Previous Research:

## Two primary categories of impact analysis

### Substitution Impact

- Example Study:
  - What is the economic impact of Georgia residents increasing their consumption of locally-grown fruits and vegetables by 10%?
- Challenges:
  - Many studies ignore supply constraint
    - Can Georgia farmers grow enough product to make this substitution realistic? Is there enough available land?
  - Opportunity cost?
    - Will farmers grow less peanuts?
  - Price impacts?

### Contribution Analysis

- Example Study:
  - What is the economic contribution of farmers' markets to the local economy?
- Challenges:
  - Assumption that if farmers' markets disappeared from economy, all impact would disappear
    - In actuality, some may disappear, other sales would be diverted
    - Also, doesn't account for opportunity cost – farmers' market sales are not all new demand – some products bought there instead of grocery store

# Impacts of Local Food System Activities on a Regional Economy: A case study from upstate NY

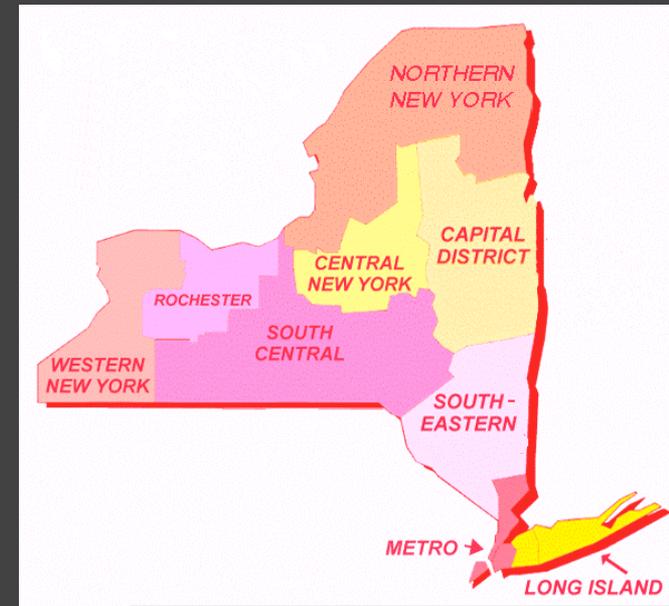
## Research Question:

- What are the differential economic impacts of small and mid-scale agricultural producers that dedicate a portion of their marketing through ‘local food’ channels compared to ‘commodity’ producers?
  - Hypothesis: small and mid-scale farmers have different purchasing patterns (i.e., input expenditure patterns) than commodity producers; we expect they purchase more inputs locally, and therefore have a larger multiplier impact on the local economy
  - Study is new/relevant as data on purchasing patterns of small and mid-scale producers is generally unavailable

# Current Project 1: Capital District

## Primary data collection:

- CCE educators in CD region provided lists of farms that marketed at least a portion of their output through local marketing channels (752 farms identified)
- Farms selected randomly by county based on the Census of Agriculture distribution of farms in region and survey target of 100
- 116 surveys collected in Summer 2011 via personal interviews, 97 with complete information, 82 with sales  $\leq$  \$500,000
- Detailed 2010 sales and expenditures data collected



Capital District Counties include:  
Albany, Columbia, Fulton,  
Greene, Montgomery,  
Rensselaer, Saratoga,  
Schenectady, Schoharie, Warren  
and Washington

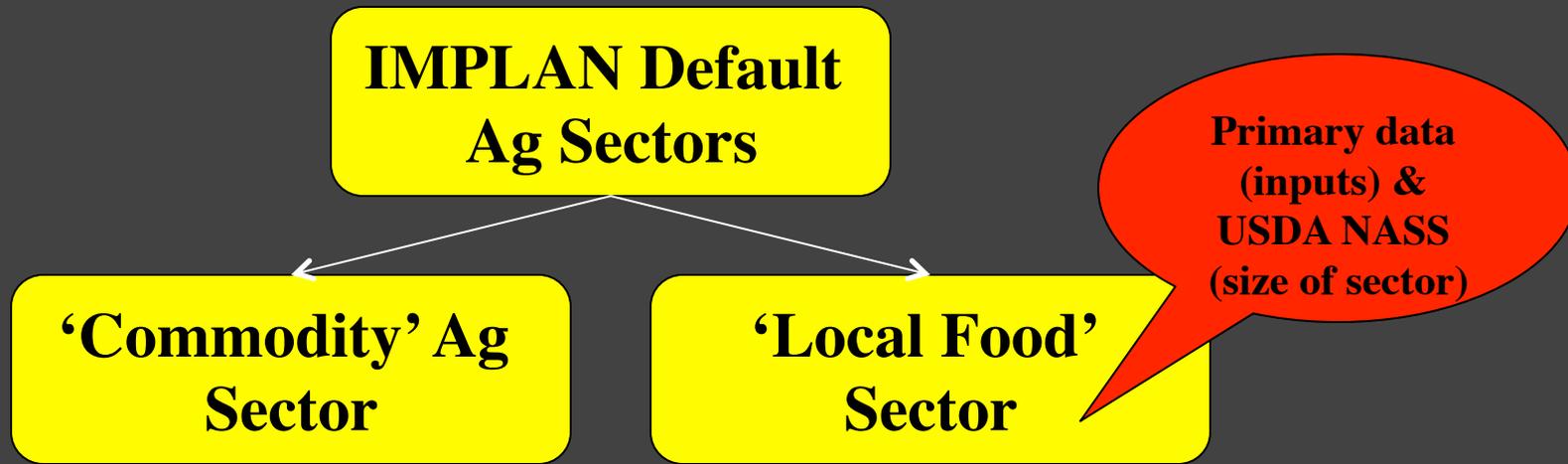
Major inputs and services	Percent of expenses	Percent of individual category purchases by location; i.e., where you bought it*			
		Within region only	Within NYS, outside region	Outside NYS	TOTAL
Hired labor					100%
Fuel, oil, grease					100%
Machinery, building repairs					100%
Machinery hire /commercial trucking					100%
Record keeping and analysis services					100%
Taxes					100%
Real estate rental/lease					100%
Insurance					100%
Utilities					100%
Livestock grain & concentrate					100%
Livestock forage and bedding					100%
Replacement livestock					100%
Veterinary & medicine					100%
Breeding					100%
Livestock professional services					100%
Other livestock expenses:					100%
Fertilizer & lime					100%
Seeds & plants					100%
Spray and other crop expenses					100%
Crop professional services					100%
Other crop expenses:					100%
All other operating expenses:					100%
<b>TOTAL</b>	<b>100%</b>				

Marketing channel, sales outlet	Percent of sales	Percent of individual category sales by location; i.e., where you sold it*			
		Within region only	Within NYS, outside region	Outside NYS	TOTAL
RETAIL SALES					
R1 – Farmers’ market					100%
R2 – Own site (farm stand, retail store)					100%
R3 – Pick your own (u-pick)					100%
R4 – Community Supported Agric.					100%
R5 – Internet/mail order					100%
R6 – Other:					100%
WHOLESALE SALES					100%
W1 – Restaurant					100%
W2 – Packer or Distributor					100%
W3 – Grocery, Specialty Store					100%
W4 – Food processor					100%
W5 – For resale to direct sales vendors					100%
W6 – Other:					100%
COMMODITY SALES					
C1 – Grain mill/elevator					100%
C2 – Livestock/produce auction/market					100%
C3 – Cooperative/Marketing Assoc.					100%
C3 – Other:					100%
TOTAL	100%				

## Current Project 1: Capital District

### IMPLAN:

- Built 11-county Capital District Region model in IMPLAN
- Supplement IMPLAN data with primary data we collected
- Used the data to create a disaggregated 'local food' sector
  - Disaggregated from 'commodity ag' sector
  - Used USDA NASS data to determine total size of 'local food' sector



### Run Model:

1. Impact of \$1 million policy stimulus into the 'local food' sector
  - Example scenario: NYS gives farm-to-school programs \$1 million. \$ can only be used to increase purchases from small/mid-scale farms
2. Impact of \$1 million policy stimulus into the 'commodity ag' sector
  - Example scenario: NYS gives Mott \$1 million to increase its purchases of locally-grown apples in NYS. They use money to purchase apples from large growers

## Results/Discussion:

- Compare results/multiplier:
  - Total overall (economy-wide) impact

Economy-Wide Impact: Multiplier for every \$1	
If \$ given to 'Commodity' Ag Sector	If \$ given to 'Local Food' Sector
1.81	2.04

# Current Project 1: Capital District

## Results Discussion:

- Also need to compare *distribution* of multipliers
  - If the goal of the policy is to support agriculture, then we care not just about the total multiplier, but about what kind of policy has the biggest impact on the agriculture sector

Selected Sectors	\$ given to 'Commodity' Ag Sector	\$ given to 'Local Food Sector'
Commodity Agriculture	\$52,843	\$7,564
Local Food	\$587	\$37,902
Support activities for ag & forestry	\$55,302	\$256,612
Households	\$518,556	\$620,975
Employee Compensation	\$348,434	\$480,579
Total Output Impact	\$1,809,423	\$2,039,986

**Total ag = \$53,420**

**Total ag = \$45,465**

### Conclusions:

- Need to consider goal(s) of policy
  - Subsidy to the local food sector has largest total multiplier, and largest impact on households and employee compensation
  - However, if goal is to support agriculture sector, subsidy to commodity ag sector has larger impact
- Snapshot versus long run impacts
  - The local ag sector's purchase of local inputs may inhibit their profitability (i.e., may be more profitable to purchase bulk inputs from non local source)
    - This type of model tells you nothing about profitability
  - Need to consider survivability of sector along with long run economic impact

## Current Project 2: Food Hubs

### Assessing the Economic Impacts of Regional Food Hubs:

#### Research Question:

- What is the economic impact of a policy that supports regional food hubs to the profitability of participating farm producers?

*A regional food hub is “a business or organization that actively manages the aggregation, distribution, and marketing of source-identified food products primarily from local and regional producers to strengthen their ability to satisfy wholesale, retail, and institutional demand”*

*(Barham et al. 2012, 4)*

## Current Project 2: Food Hubs

# Food hub sector does not exist within IMPLAN

Defining it requires that we determine:

- What the food hub purchases (i.e., the commodity sectors/ industries that provide inputs to a food hub)
  - For example: Apples
- How much the food hub purchases
  - For example: 500 lbs @ \$1/lb = \$500
- The location(s) of those purchases (i.e., how much of the purchases occur within the region – defined as NYS – versus outside of the region)
  - For example: 250 lbs from Washington State @ \$1/lb and 250 lbs from NYS @ \$1/lb

## Current Project 2: Food Hubs

**Is there a difference between business that sell products to food hubs and those who sell to other markets?**

### Model 1:

- P&L data from participating food hub
  - Used with default IMPLAN data to determine share of sectors represented by food hubs

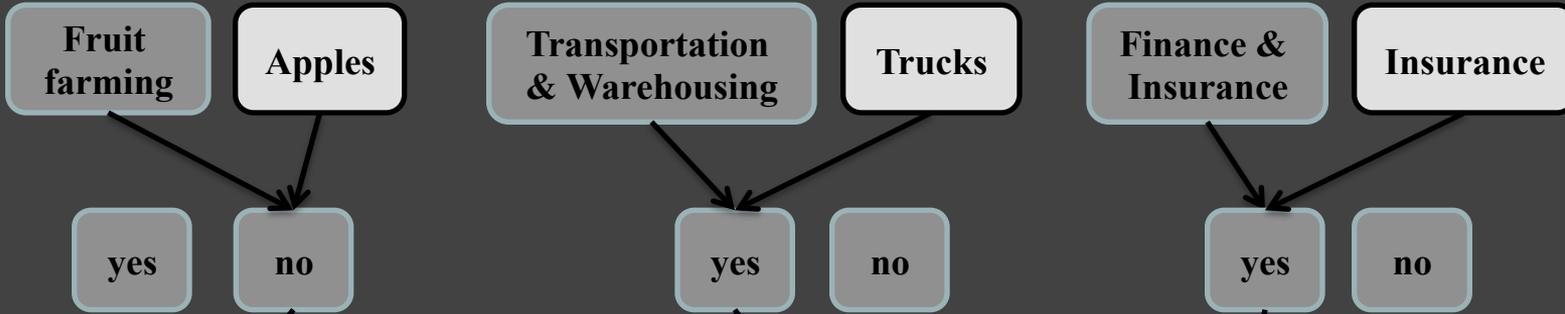
### Model 2:

- Farmer vendor surveys
  - Used to separate farm vendor sectors from ag sectors – modified production functions
    - Are RA vendors different from the default?
- NonFarmer vendor surveys

# Identifying the Food Hub Sector within IMPLAN

 = food hub input  
 = default IMPLAN commodity sector

**Similar Production Functions?**



**Split default IMPLAN sector into two sectors based on survey data**

**Fruit farming**



**Modify production function & assign portion to food hub sector**

**Assign portion of default IMPLAN sector to food hub**

**Other Market Sector**

**Food Hub Sector**

**Other Market Sector**

# Assessing Overall Impact:

- Customer surveys
  - Goals to determine:
    - Scalability of food hub sector
    - Extent to which food hub increases final demand vs. shifting purchases (opportunity cost)



Cornell University

Thank you!

For more information, please contact:

Becca Jablonski  
314 W Sibley Hall  
Cornell University  
Ithaca, NY 14853-8701  
215-817-2566 (c)  
rb223@cornell.edu

Todd M. Schmit  
437 Warren Hall  
Cornell University  
Ithaca, NY 14853-7801  
607-255-3015  
tms1@cornell.edu  
<http://agribusiness.dyson.cornell.edu>

Project funding provided by:

USDA AMS Cooperative Agreement  
USDA AFRI NIFA Fellowship Grant  
NESARE Graduate Student Grant