

Module 5



ANALYZING THE LINKAGES AND CONTRIBUTION OF LOCAL FOODS TO LOCAL ECONOMIES THROUGH INPUT-OUTPUT ANALYSIS

Module 5 Overview



- The module provides a brief background on economic impact concepts including:
 - How to conceptualize the changes that may be occurring in your study area;
 - Basic community economics development concepts;
 - The basic terminology and uses of input-output models;
 - The content and definitions of industrial multipliers;
 - The limits to input-output analysis.

At this stage of the project, you have....



- Defined its scope, goals and objectives, timeframe, resources, and regional boundaries (module 1);
- Collected requisite primary and/or secondary data (module 2 and 3);
- Begun to examine, analyze, and discuss preliminary findings with your community (module 4);
- Involved a technical expert with advanced training on conducting an economic impact assessment.
 - Economic impact studies are complex, and expertise is a necessary component to obtain accurate results.

Complex Linkages in Food Systems



- A multitude of supply chain relationships that exist between food producers and consumers, as well as between producers and other sectors of the economy.
 - For example, local grain farmers sell their output to local livestock producers as animal feed, or local produce farmers may sell their merchandise to small-scale food processors
- Fortunately, we are able to measure the extent of complex intra-regional linkages using **input-output analysis** to generate **economic multipliers**
 - An economic multiplier is a single number that captures the economy-wide circulation of activity from an initial financial transaction.

Clarifying Economic Terms



- Discussing how local foods contribute to the economy, we use terms interchangeably: **impact**, **growth** and **development**.
 - For example, the promotion of local foods is said to have *a positive impact* on the local economy, or *stimulate economic growth*, or *foster economic development*.
- Within community economic development, these three words have very different and unique meanings
 - The tendency to use them interchangeably can lead to confusion and erroneous policy insights.

Growth and Development



- **Growth** is a dynamic concept that looks at *change over a period of time*
 - Growth is synonymous with expansion; for example, more jobs, more people, more businesses, or more income.
- In contrast, **development** is related to *improvement relative to some starting condition*, or sustained progress toward a particular goal.
 - This could be movement toward a more sustainable use of resources, or enhancing the quality of life in the community
- Growth is relatively easy to measure whereas development is a more nebulous concept

Impact Assessment



- **Impact** tends to be associated with a specific event or change in behavior and can be static or dynamic
 - In this Toolkit, and in the majority of models, we consider an event or change in behavior that is static in nature –
 - To model a dynamic activity necessitates a more complex model
- Consequently, **impact assessment** is comparing and contrasting what a community looks like before and after a particular event or change in behavior
 - Often referred to as a **shock**.
 - For example, a business within the community makes a major investment and hires 50 new workers, or the federal government provides a grant to incentivize the development of a food hub

What do you want to Measure?



- One might ask if the promotion of local foods and the institutions that support local foods, a development concept, better positions the community to grow and prosper than absent such support.
 - This is a different question than what the impact on the economy would be if residents shifted spending away from foods imported toward those produced in the community?
- Documenting “success” or “impact” is fairly straightforward when evaluating a single firm
 - While documenting the success or impact of building stronger networks and thereby enhancing collaborative activity is more challenging because the measurable impact is more subtle.

Challenges to Measure...



- Helping an existing community supported agriculture (CSA) business avoid bankruptcy;
- Forming a private-public partnerships to facilitate the opening of a food market site for multiple vendors;
 - Promoting better access to fresh vegetables as a means of improving public health standards.
- Building networks that are vital to facilitating local foods agglomerations (sometimes called clusters); or
- How does one best document the impact of these efforts on the local community for small enterprises where job growth may be slow and gradual?

Economic Impacts of Local Foods



- One way to frame the impact of local food growth is considering it **import substitution**.
 - By promoting the purchase and consumption of local foods we are, in one way, trying to substitute local food production for those imported from other parts of the U.S. or the world
- When locally produced foods are substituted for imported items, stronger regional linkages are forged
 - For food imports, the purchase of the commodity compensates the grocer, and perhaps a regional distributor before the bulk of that dollar exits the local economy to pay original producers.
 - With local foods purchase, a greater number of local supply chain participants benefit financially from the transaction.

Import Substitution



- Import substitution based on the belief that creating stronger community food linkages has spillovers
 - Allied sectors such as manufacturing and business services may develop as well.
 - “Buy Oregon” and “Buy Chicago” and other “buy local” programs date back to the 1920s.
- If local foods production and consumption increase, there are economy-wide consequences.
 - Best-practice measurement of those consequences can help inform local producers, policymakers, and area consumers on the potential economic gains in a region from local and regional food system initiative or policy changes scenarios.

Linkages, Leakages and Multipliers



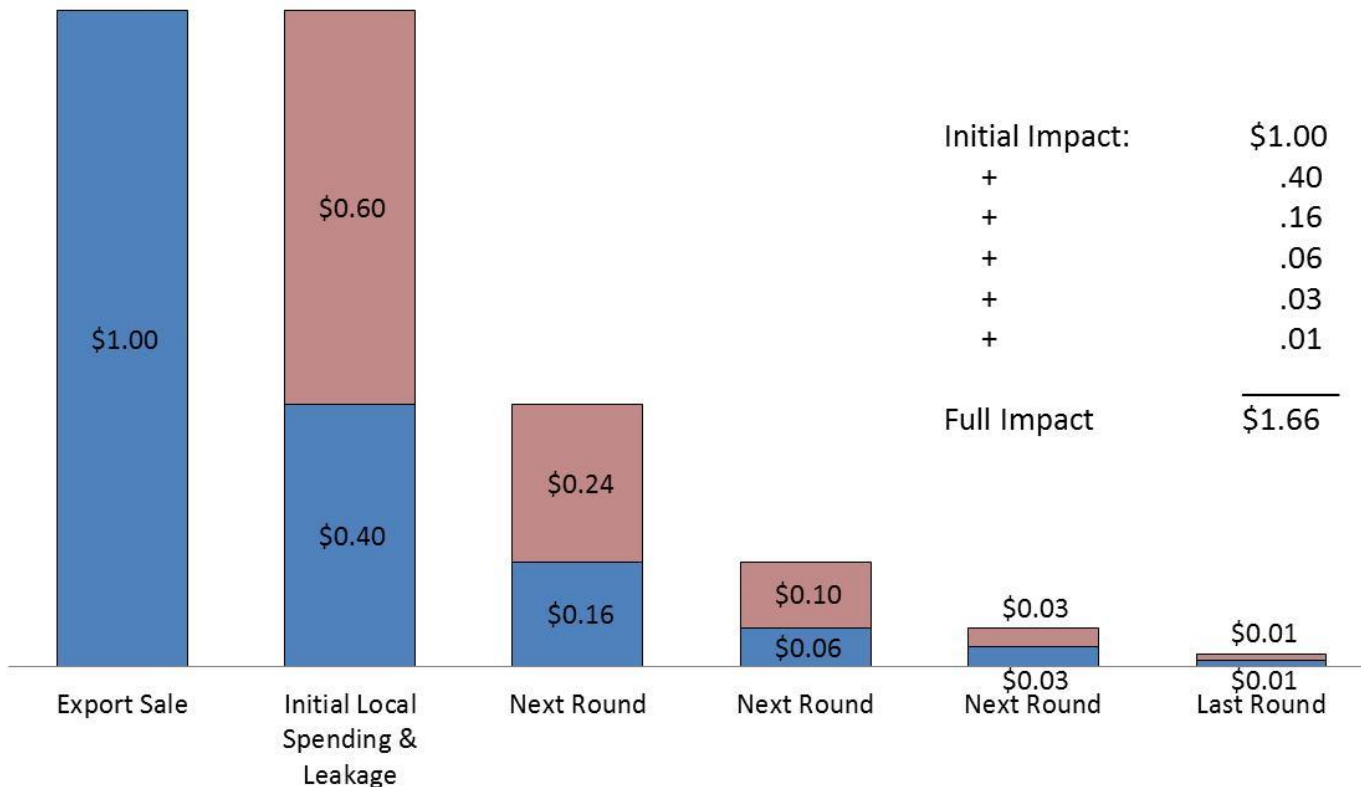
- Suppose there is a new dollar of local food sales.
 - A consumer electing to purchase local foods, a tourist buying at the local farmers' market, or a local farmer supplying goods to a farmers' market outside their own community.
 - That dollar of sales is money going to the farmer, also called the **direct impact** in the context of input-output modeling.
- That farmer elects to use some of that dollar to buy some additional equipment from a local retailer.
 - In reality, the retailer cannot keep that entire dollar of sales because he/she must pay to replace the inventory (inputs, feed, and equipment) that the farmer just purchased, also called **indirect impacts** in the context of input-output modeling.

A Visual Representation



A Simple Multiplier Illustration

■ Local Spending ■ Leakage



Margins and mark-up



- Let's assume that a retailer marked up an item by 40%, so 60% of that dollar leaves the area
 - Goes to the manufacturer of that input or piece of equipment if it is not sourced from a local business.
- That represents a leakage of 60 cents per dollar
 - What will the retailer do with the 40 cents that is retained in the local economy? What if 40 cents pays the electric utility bill?
 - Those 40 cents now represent sales to the local electric utility company who must in turn pay for electricity from the grid.
 - In this example, the utility company pays 24 cents to companies outside the community that produce the electricity. This payment represents a leakage of 24 cents.

Induced Impacts



- If the utility company uses the remaining 16 cents to pay labor costs, referred to as **induced**
 - These 16 cents now represents income to utility company workers who, again, may elect to spend it in the local economy.
- Assume the utility worker spends 16 cents at a local movie theater and 10 cents goes to movie rental fees
 - A leakage of 10 cents out of the economy.
- This process of re-spending and leakages continues until that entire initial dollar of sales to the local farmer leaks out of the economy.

Multipliers



- The value of the **multiplier** in this example is 1.66
 - Direct + the indirect + the induced effects
 - For every dollar of new local food sales revenue earned by the farmer, the total impact on the local economy is estimated to be \$1.66, i.e., the initial \$1 expenditure and an additional 66 cents based on the calculated economic multiplier effect
- By re-localizing agricultural transactions and reinforcing local food supply chains and networks leakages of money from the local economy decline, thereby enhancing the impact of new food sales on the local economy.

Growth or Development?



- Not directly related to growth or development.
- Rather, it is aimed at assessing impact; the economy before and after the event or policy change
- One of the challenges in using multiplier analysis to examine the impact of a change in local foods activity is determining the value of the multiplier
 - The default multipliers in the modeling systems reflect the averages for the region so the resulting multipliers are reflective of the average farm in those categorizations.
 - Local foods producers are likely, however, to have very different supply chain linkages, so one has to modify modeling systems to more adequately convey the economic worth of local food

Reliable Local Foods Impact Estimates



- I-O models track the flow of transactions between local industries, sales by industries to households, and to other “final users” of goods or services,
 - Including regional exports (domestic and international).
 - I-O models also track industries’ uses of labor and capital inputs and of regional imports
 - One can generate economic multipliers to be applied to local foods production, processing, distribution, and sales.
- The lion’s share of analysts rely upon **IMPLAN** (IMPact Analysis for PLANning) because of its ease of operation

More on I-O Models



- I-O models are built around a complete table of industrial and other transactions in an economy
 - The buying and selling among industries, households, and the rest of the world.
 - I-O models allow analysts to produce tables of multipliers for all industries that are contained in the model
- I-O models are not just “impact” tools.
 - They provide a useful framework for understanding regional industrial structures, mutual linkages and inter-dependencies, and the overall nature of regional productivity.
 - Limited , as I-O models are fixed price models that assume perfectly elastic labor and commodity supplies

Industry-Based Multipliers



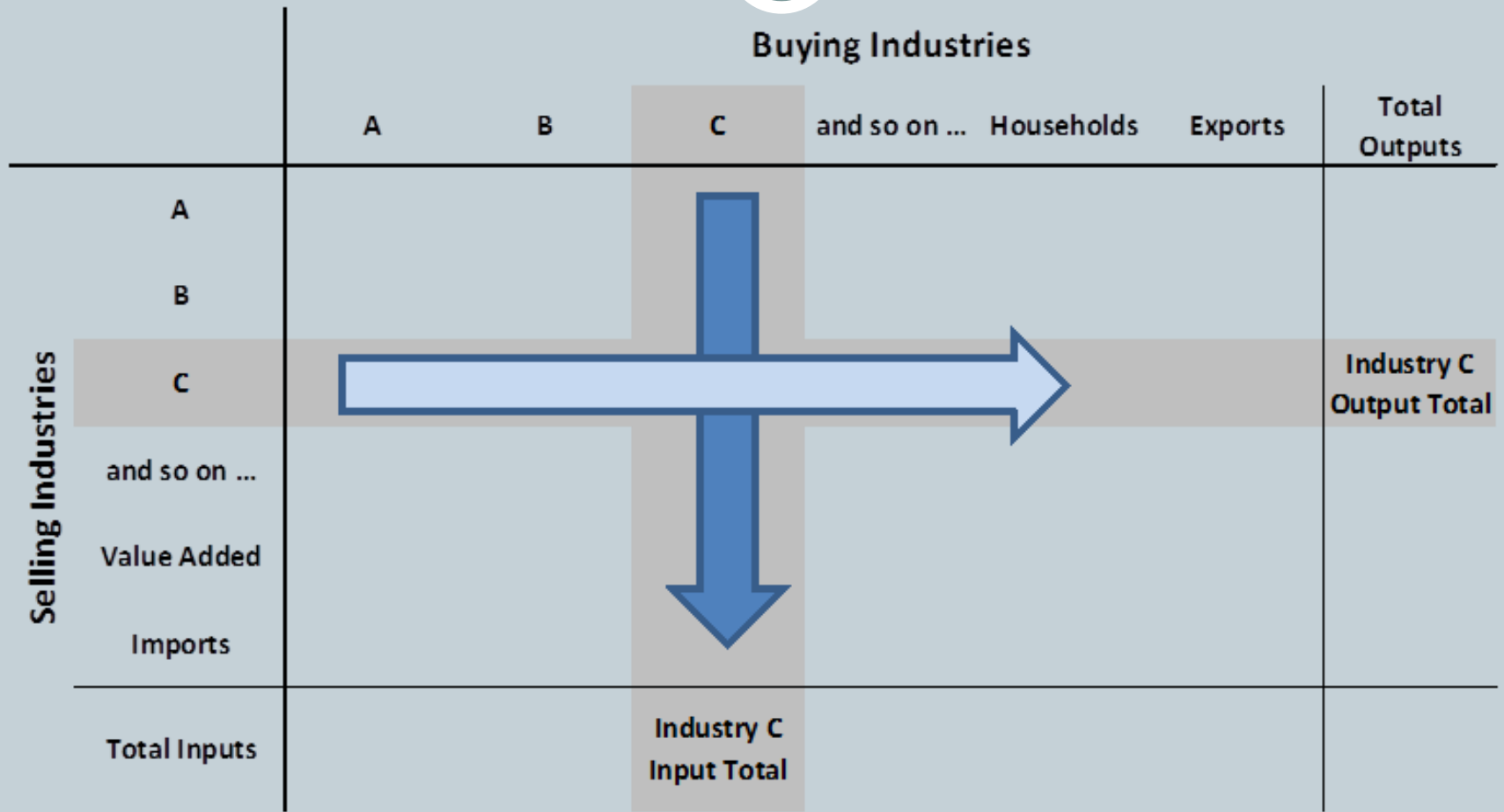
- Generated with the assumption that there is a constant or fixed relationship among industries
- If local foods production doubles in a region, so too will its demand for regionally supplied inputs.
 - This is a reasonable assumption for small changes in output, but might be harder to defend as changes become larger.
- One challenge is that as firms become large, they require a different mix of inputs to produce outputs.
 - I-O models would not capture these technical changes without modifications.
 - Additionally, price changes are not captured within I-O models

Characteristics of Fixed Price Models



- Fixed price models are a snapshot of the economy
 - Capture the flow of dollars among buyers (demand) and sellers (supply) within the economy.
 - Since supply equals demand, total revenues of agriculture must equal total expenditures.
- The condition of supply/demand equality is important because it allows us to track how changes in one part of the economy ripple throughout the economy.
 - These ripples constitute the *multiplier effect*
- The most important “impact” outcomes are the **total jobs** and the **total labor income** that are

Spreadsheet Version of Fixed Price Model



I-O Modeling Structure



- If we return to the multiplier figure, we can see the impact of the multiplier effect within the structure
 - In that scenario, there was more demand (sales) for local foods.
 - In order to produce additional output to meet that change in demand, the farmer had to increase production, which in turn required the farmer to purchase additional inputs.
 - In our example, the farmer purchased additional equipment from a local retailer. This represented an increase in demand or sales for the retailer, who must order new inventory
- The visual depiction of the simple multiplier in our spreadsheet illustrates how the change in sales (demand) for farmers triggers ripple effects

Specifying the Study Area



- The first step in conducting economic impact assessments is to define the appropriate study area –
 - boundaries of the "local" or regional economy
- Determining what constitutes local can have a decisive impact on the results: the larger the definition of local, the more inter-industry linkages exist,
 - And the larger the economic multiplier effect of a given change in the demand for local goods and services.
- To isolate the effects of an impact, create as small a study area as possible, while including the areas necessary to capture all of the important effects.

Defining the Study Area



- Consider the availability of secondary data for your region, as described in module 1 of this Toolkit.
 - Secondary data available from the IMPLAN Group, LLC. (IMPLAN), which is available by zip code, congressional district, county and state.
 - IMPLAN's functionality allows researchers to easily develop multiple county or state-based models.
- Regional scientists advise using the concept of a **functional economic area**
 - Semi self-sufficient economic unit including the places where people live, work, and shop, and can sometimes be identified by physical or other characteristics.

Bigger Study Area is not always Better



- It is tempting to assume a statewide impact
 - However, using a larger geographic region as the basis of your analysis will ultimately inflate and exaggerate your impact results
 - Furthermore, the impact results will be less reflective of the actual economic activity occurring in the primary location .
- A good rule of thumb is that a study territory should encompass the geography from which the majority of the assessment team members hail.
 - Or consider your target audience if the initiative is funded by a county, then county borders may be appropriate definition.
 - Also need to keep in mind the residential location of the labor force, as their spending patterns are important to your study

Colorado Farm to School

Scenario Map for Economic Impact Assessment of Farm-to-School Programming in Colorado

#1: Local impact assuming all new demand
(No modifications, gross impacts)

#2: Regional impact assuming all new demand
(No modifications, gross impacts)

#3: Regional impact assuming demand shifts from wholesaler to producer
(No modifications, net impacts)

#4: Regional impact assuming demand shifts from wholesaler to producer
(Customized farm to school sectors, net impacts)

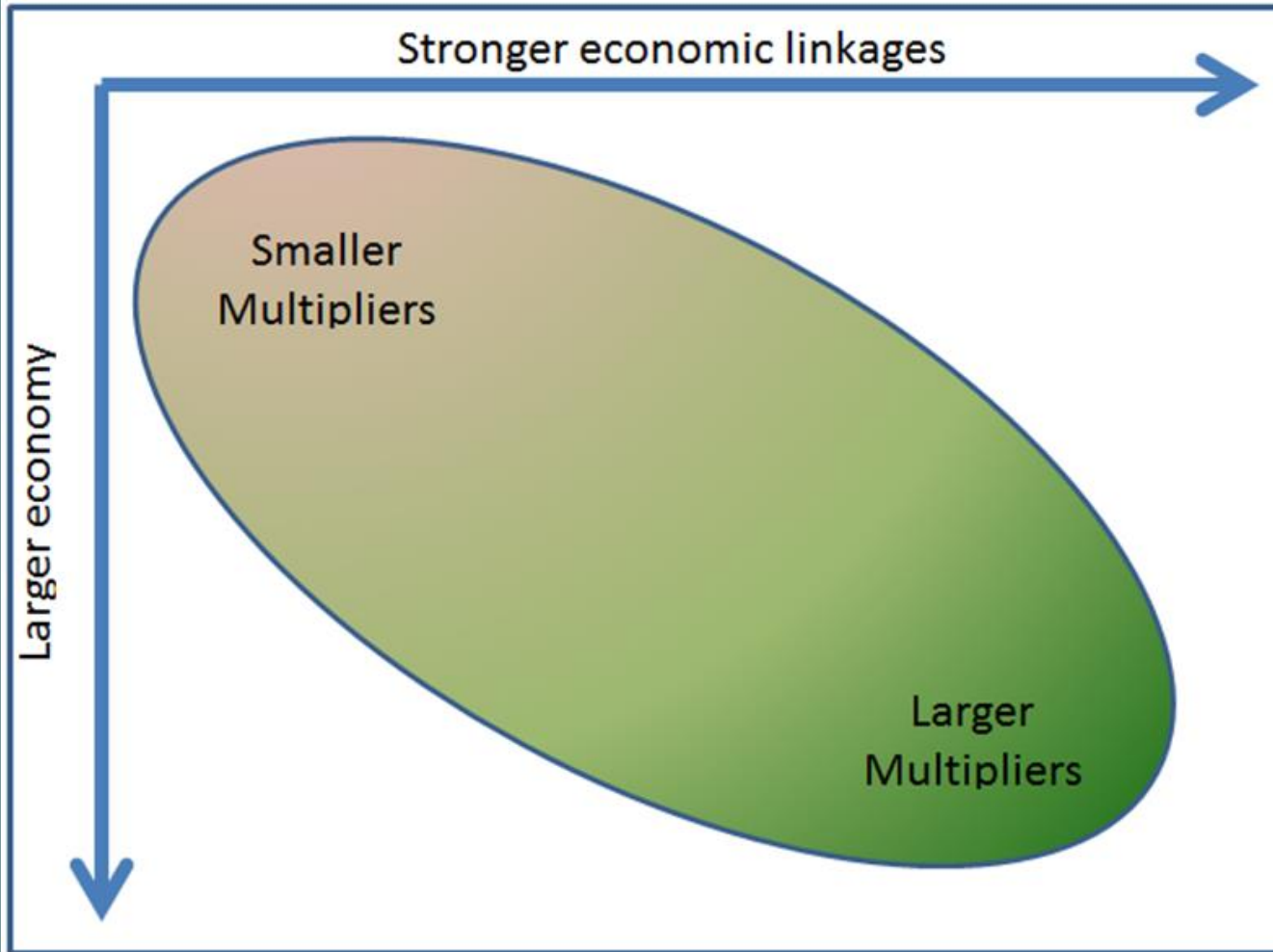
For more information, see: Gunter, A., and D. Thilmany McFadden. May 2012. Economic Implications of Farm to School for a Rural, Colorado Community. Rural Connections: 13-16.

Reasonable Size of Multipliers



- May be tempted to use the largest multiplier possible to build support for their position.
- Researchers typically use multipliers less than 2.0
 - With multipliers for smaller rural areas close to 1.3 and for larger more urban areas closer to 1.9.
 - Based on estimates from rigorous academic assessments does over several decades.
- There are generally two things that drive the size of the multiplier:
 - (1) the level of inter-industry linkages (i.e., imports or leakages); and
 - (2) the size of the economy being examined

Understanding Scope and Scale



Smaller economies (e.g., rural communities) have limited local linkages leading to small multipliers

Whereas larger economies (e.g., large metropolitan areas or a state) may have stronger industry linkages and larger multipliers.

Reasonable Scenarios



- Complicated for local foods because the promotion of local foods often involves a shift in the allocation of consumer food dollars.
 - Expanded demand for local foods is commonly treated as “new spending,” which is incorrect.
 - It is unlikely that most consumers will double their food purchases based on the availability of a farmers’ market.
- If the household elects to purchase locally-sourced food, there is a shift away from traditional sources
 - The net impact hinges on the linkages of locally-sourced food purchased at a farmers’ market compared to the linkages of non-local food purchased at a grocery store.

Limits of I-O Analysis



- Important to understand the built-in limits of I-O.
 - As with any economic modeling technique some simplifying assumptions about the structure of the economy must be made to allow the modeling process to move forward.
- Most important limitations of I-O models—or the data generated from them—can be classified as:
 - Feasibility and return on investment issues;
 - Understanding employment impacts;
 - Impacts on existing activity and current residents;
 - Consequences for local governments and service provision.

Module 5 Takeaway Messages



- Community development analysis is complicated. Those using I-O models need to be mindful of :
 - Understanding the structure and logic of input-output modeling systems; There are limits to I-O models;
 - The region of scrutiny should match the economic activity being evaluated;
 - The scenarios of analysis should be well developed and realistic;
 - Analysts must be mindful of off-setting consequences that are part of their scenarios or policy prospects; and
 - The assumptions that the modeler makes when using IMPLAN should be made transparent in whatever report the person conducting the study provides to the team.