



2019

Chesapeake Foodshed Assessment

Acknowledgments:

THE CHESAPEAKE FOODSHED ASSESSMENT

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EXECUTIVE SUMMARY

The Chesapeake Foodshed Assessment study area is home to 14.2 million people, spans five states, includes 7 million farm acres, and encompasses a wide array of geographic, environmental, cultural, and socio-economic conditions. It is one of the most diverse and prolific agriculture economies in the United States, containing 78 percent of the population and 63 percent of the total agriculture in the Chesapeake Bay Watershed.

This assessment examines the current state of local foods in the Chesapeake region, suggests ways the system might be shifted to better serve communities, addresses specific socioeconomic objectives, and identifies strategies for improving the availability of local foods. The Chesapeake region is seeing a growing demand for local food, but the market has yet to respond. There are several contributing factors, including the global nature of the food system, current policy and regulations, and the existing logistics infrastructure. The purpose of this report is to understand the discrepancy between the slow growth of the local food sector in spite of strong consumer demand. Additionally, it provides recommendations that lay out a roadmap to reach an improved regional food system.

The existing supply chain feeds tens of millions of people in the Chesapeake Bay Watershed and beyond, while maintaining relatively low food costs. Unfortunately, the complicated interactions among the members of the supply chain prevent consumer feedback from effectively being transmitted through the market, which stymies response at the local level. Additionally, each level in the food chain operates with very narrow operating margins, leaving little profit with which an individual business can make changes or investments in response to consumer demand.

Developing a meaningful regional food system will require focus and collaboration at all levels of the supply chain to improve both the process and yield:

- Access for local growers, processors, and retailers to the mainstream supply chain
- Increased trust and transparency throughout the supply chain
- Expanded consumer knowledge of food and nutrition
- Increased economic opportunity
- Improved food security
- Increased farmer and retailer access to the overall supply chain
- Environmental sustainability

In order to develop a structure that enables such improvements, it is important to understand particular issues that affect the food chain from producer to consumer. Developed through research, interviews, and meetings with community members, this assessment lays out six themes that aid awareness of existing issues:

Relationships are built around food and influence the ways individuals, families, and communities interact.

Food plays a significant role in how individuals, families, and communities interrelate. These relationships are fundamental to the way people buy and prepare food, share their culture, support their communities, engage with the environment, and nurture health.

Mainstream food distribution networks are difficult to access for local and regional businesses.

Demand for local food should equate to billions of dollars in local revenue, but direct marketing channels and intermediaries working in the mainstream supply chain have proven inadequate to supply that market. Existing food hubs (built to increase access and

transparency) have, so far, proven less than effective at improving market access. They have, however, increased trade between farms that market directly, improving total product diversity.

A food system built on trust and transparency for the entire supply chain is a necessity. The current system makes it difficult for consumers to easily identify and validate the source of their food, a shortcoming that provides an opportunity for building a supply chain that ensures traceability, transparency, and accountability.

The future of the local food system is dependent on the people in it. Fewer and fewer people are considering farm ownership or choosing an agricultural career. Attracting entrepreneurs, managers, and workers requires improved opportunities, training, and professional support.

Entrepreneurs will drive change in the food system. Currently, multinational companies are the primary drivers of change in the food system. In the past, change was guided by small, agile companies that were responsive to market changes. Returning entrepreneurs to that role means creating a healthy culture that increases both profitability and competition.

Consumers embrace the notion of a Chesapeake Bay Foodshed. The Chesapeake Bay has a strong regional identity around which a regional food system can be built. Consumers relate strongly to their place in the watershed; a foodshed-wide certification system that champions bay health and produces diverse, healthy food options for the market place can take advantage of this connection.

The themes informed the following recommendations:

1. Strengthen community and culture around food. Reconnect people with positive experiences and improve knowledge about how to buy and prepare fresh foods and with farmers in their communities.
2. Promote networked solutions to regional food system development. Strengthen the ability of regional producers to satisfy wholesale, retail, institutional, and restaurant demand.
3. Create a Chesapeake Regional Food System “brand” and unified certification system. Foster transparency and trust to encourage environmentally-responsible practices and provide opportunities for informed choices throughout the supply chain.
4. Tailor agricultural education, workforce development, and farm transition programs to the future. Ensure that farms and food businesses have the human capital to grow.
5. Support an entrepreneurial and innovative culture in the supply chain. Encourage and enable ongoing, forward-looking improvement and adaptation of the food system.
6. Identify or create an entity to serve as a regional coordinator of local food system development projects. Network with stakeholders and build a recognizable brand for the Chesapeake Regional Food System.

HOW TO READ THIS REPORT

This report starts with the key findings and conclusions and then delves into recommendations. The data supporting the findings, conclusions, and recommendations can be found in the Appendices.

There are a few ways to read this report. Readers primarily interested in the results and actionable next-steps can focus on the Findings and Conclusions and the Recommendations sections. Those who want in-depth findings for specific topics can look further into relevant sections within Appendix B. This appendix is broken down into several sections:

- **Local and Regional Agriculture** – This section summarizes the key findings and current agriculture production trends. The data includes crop, livestock, seafood, and forestry production. It also discusses topics related to farm labor, agricultural education, farm transition, the dairy crisis, agricultural innovation, research and development, and agricultural support services.
- **Intermediate Supply Chain** – This section summarizes the key findings and trends that currently exist in the intermediate supply chains, which includes food and beverage processors, manufacturers, aggregators, distributors, and wholesalers. It discusses topics involving industry consolidation, small limited-resource businesses, shifting investments, and future opportunities.

- **Consumer-Facing Industries** – This section summarizes the key findings and trends that currently exist in consumer-facing industries such as groceries, restaurants, and other institutions (e.g., hospitals, schools, accommodations, etc.). It discusses topics including the retail apocalypse, industry consolidation, e-commerce, automation, last-mile delivery, farm to restaurant, and farm to institution.

- **Consumers** – This section summarizes the key findings and trends that currently exist among consumers in the study area. It examines demographics, consumption trends, food access issues, and shifting consumer behaviors involving food. Most importantly, this section includes the key findings from the focus groups held across Maryland.

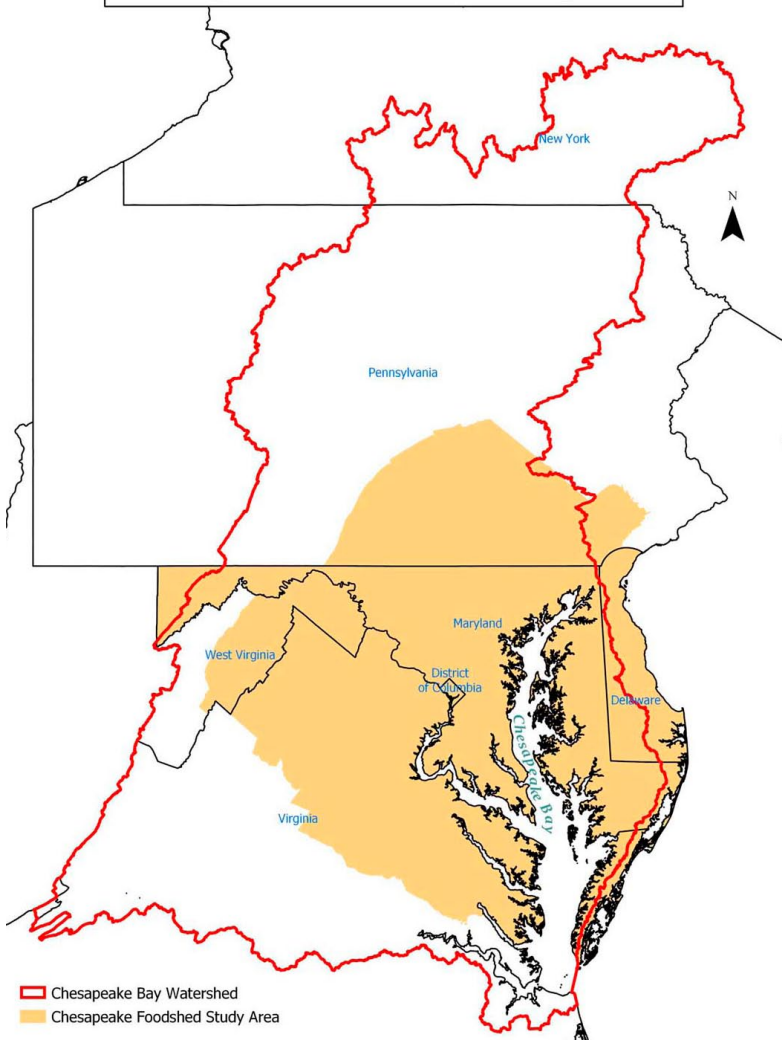
- **Constraints to Buying Local** – This section examines the discrepancy between demand for local food and the food system's ability to supply local needs from production, distribution, and consumer perspectives.

- **How Much Stays Local?** – This section presents data on how much food is purchased locally and why most of food comes from other regions.

- **Opportunities to Improve the Local/Regional Supply Chain** – This section identifies several opportunities for increasing local production, manufacturing, and distribution of various food product categories. It also suggests that there might be opportunities in food and beverage wholesale or retail.



Chesapeake Foodshed Study Area



PROJECT BACKGROUND

The Chesapeake Bay watershed supports one of the most diverse and prolific agricultural economies in the United States. Its highly productive soils, favorable climate, and large consumer markets provide significant agricultural opportunities for the region. With funding from the Town Creek Foundation, The Harry R. Hughes Center for Agro-Ecology engaged the project team to examine the current state of local foods in the Chesapeake region, determine how the system might be shifted to better serve communities, address specific socioeconomic objectives, and identify strategies to help accomplish those objectives.

The findings uncovered through research and interviews agree with a Federal Reserve Report that states “local food is no longer just for ‘foodies’ but has become a mainstream consumer preference.”¹ Despite the interest, supply chain dynamics and other market forces limit the availability of local food and consumers’ ability to purchase it. In fact, direct farm-to-consumer sales of local food in the study area declined by 50 percent from \$62.5 million in 2007 to \$31.5 million in 2012. In addition, most of the consumer dollars spent on food leave the Chesapeake region. Consumers within the region spent about \$57.3 billion on food annually, of which only about 35 percent went to local businesses. This assessment examines the current state of the food supply chain from producers to consumers in the Chesapeake region, why the demand for local food has recently diminished, and how the system might be shifted to better serve all our communities.²

1 Federal Reserve Bank of St. Louis and Board of Governors of the Federal Reserve System, “Harvesting Opportunity: The Power of Regional Food System Investments to Transform Communities.”

2 Federal Reserve Bank of St. Louis and Board of Governors of the Federal Reserve System, “Harvesting Opportunity: The Power of Regional Food System Investments to Transform Communities.”

Growing Demand for Local and Regional Food

Consumer interest in local food has been a major driver of this growth. The 2015 National Grocers Association-Supermarket Guru Consumer Survey Report indicates that:

- Nearly 75 percent of grocery shoppers consume local food at least once a month.
- The largest percentage of survey respondents consumes local foods three times per week.
- 87 percent of respondents said that the availability of local food is either very or somewhat important to them when choosing their primary supermarket.
- When dining out, two out of three people are more likely to visit a restaurant that offers locally sourced ingredients compared to one that does not.

Even restaurant owners at all levels said that they plan to add locally-sourced food to their menus.³ In short, the demand for local foods is increasing.

Lack of Market Response

Despite the growing interest in regional foods among consumers and food businesses, regional food's share of consumers' food dollars remains small. ERS reports that the rate of growth in the number of farms selling directly to consumers slowed from 17 percent (2002 to 2007) to 5.5 percent (2007 to 2012), while the rate of increase in total sales from these farms slowed even more (32 percent for 2002 to 2007, 0 percent from 2007 to 2012). Consumer interest in purchasing directly from farmers is flat, but sales of local food through intermediary supply chain participants, such as grocery stores, restaurants, and institutions has increased.

Nationally, consumers spent an estimated \$6.1 billion on local foods in 2012. The amount equates to about \$19.43 per capita. According to the American Community Survey (2009), consumers within the

Washington DC/Baltimore/Northern Virginia metropolitan statistical area alone now spend about \$26 billion on food annually, 0.1 percent of which (\$26,000,000) went to local foods.

A NOTE ON TERMINOLOGY AND GEOGRAPHY:

In this report, the "Chesapeake region" and "foodshed" refer to entire Chesapeake Watershed (see map on page 7). The study area is a subset of the region encompassing 82 counties and independent cities in Maryland, Virginia, West Virginia, Pennsylvania, and Delaware.

The terms "regional" and "local" refer to the source of the food, where it is grown, harvested or processed, "local" being a smaller area within the larger Chesapeake "region."



³ Federal Reserve Bank of St. Louis and Board of Governors of the Federal Reserve System.

Why the Discrepancy?

Health, Safety, and Welfare, A Report on the Factors that Favor or Hinder the Flow of Local Foods in the Chesapeake Bay Region, published by the Harry R. Hughes Center for Agro-Ecology in May 2017, identifies many reasons that local food's share of total food system dollars are low despite widespread market and supply chain interest.⁴ These factors include: government regulations and policies, market features, and existing relationships and inertia in the supply chain, all of which evolved together over the last one hundred years as agriculture and food changed from a local to a global business.

In today's economy, large companies are often multinational conglomerates. Their decisions aim at remaining competitive nationally and globally. To that end, consolidation is often used to improve efficiencies, reduce redundancies, and drive growth.

While such choices make economic and financial sense for a corporation, they are not likely to favor the growth of local and regional foods in the marketplace nor reflect the values and interests of communities and individuals in the region. In fact, a shift towards larger supply chains generally decreases regional brands and distribution centers. The imbalance in priorities and opportunities makes it difficult for regional products to compete with national brands that benefit from economies of scale.

This disconnect between consumer demand and supply options diminishes the ability of Chesapeake residents to talk with their purchasing dollars, which is one factor in the slow market-share growth of local and regional food. While there are additional reasons for the slow growth in market share, this report will focus on the relationship between the consumers and farmers.

FOOD HISTORY:

One hundred years ago, food was still quite local in the Chesapeake region and many other parts of the country. Canneries and methods of food preservation proliferated and evolved, along with land, air, and sea transportation systems. Agricultural production, processing, aggregation, and distribution advanced and scaled up, taking advantage of regional and international markets as they became more accessible. This is how the food market became global.



⁴ Tassone, Bowen, and Bowen, "Health, Safety, and Welfare, A Report on the Factors That Favor or Hinder the Flow of Local Foods in the Chesapeake Bay Region."

Project Purpose

The discrepancy between consumer demand and the slow growth of the local food supply demands a response. For this reason, the sponsors of this Chesapeake Foodshed Assessment asked ACDS and its partners to help:

- Increase understanding of the current state of regional foods in the Chesapeake food system
- Examine how a more robust, regionally-focused agricultural and food economy might better serve communities in the region
- Address specific socioeconomic objectives in the region
- Identify strategies to help accomplish those objectives.

This assessment lays out strategic recommendations, identifying possible steps that supply chain participants, policymakers, and food system advocates can take to shift the existing system to one that is more responsive to consumers. This report defines the current state of the food system (based on interviews, research, and analysis), and describes an attainable future state and suggestions on how to reach it.

For purposes of this project, the desired future state is a system that would better serve communities in the Chesapeake Bay region in the following ways:

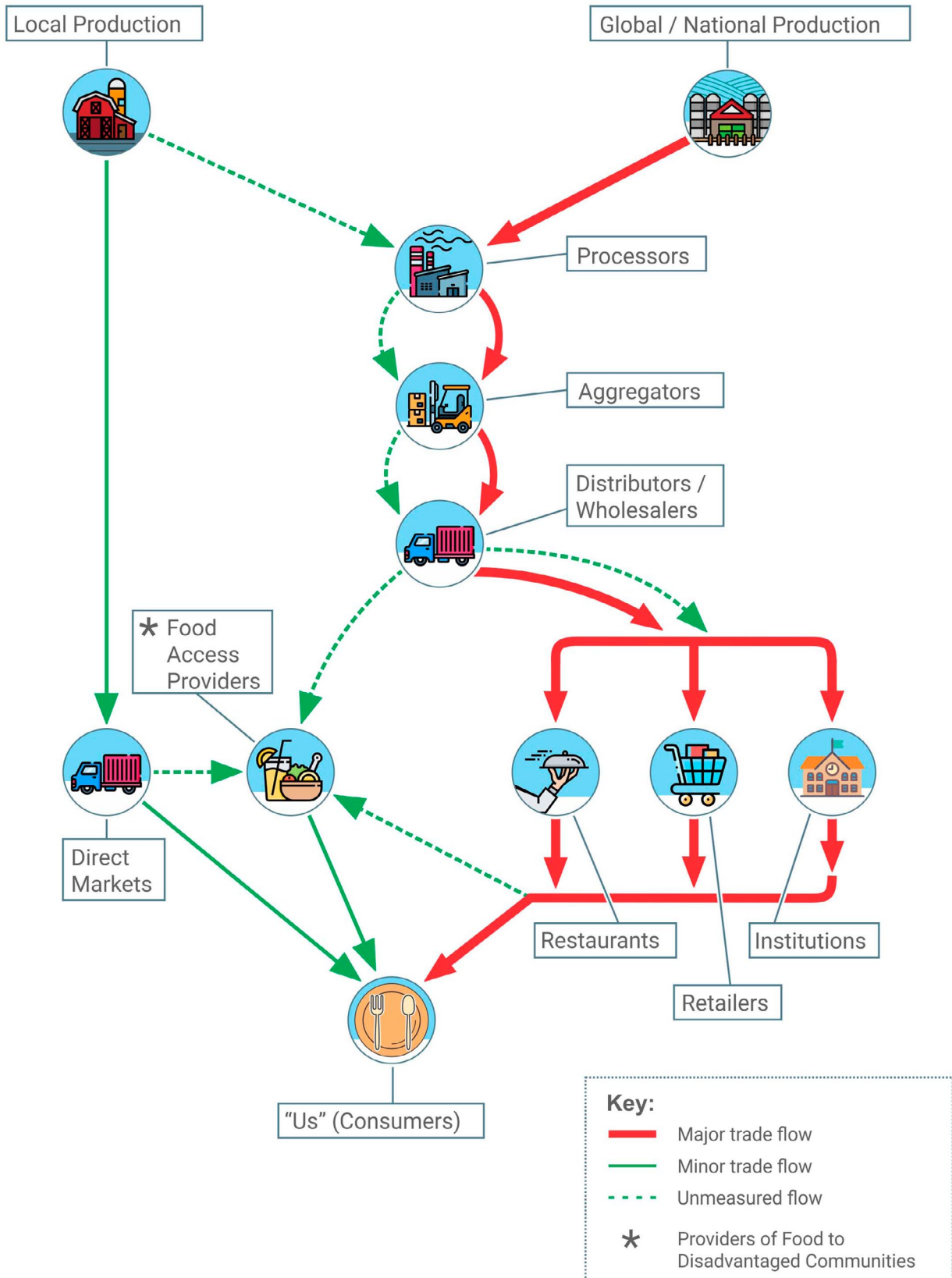
- Provide consumers with options they want for quality, value, convenience, trust, and transparency in their food supply.
- Improve economic development in the region by redirecting more food dollars spent within the region to local and regional businesses while creating jobs in production, processing, distribution, and marketing of locally sourced and value-added foods.
- Improve food security in the region by increasing availability and predictability of locally-sourced foods that are accessible through the region's supply chains.
- Support a robust, profitable supply chain for local production, processing, distribution, and marketing capable of making local and regional foods more readily available to both middle-class populations and disadvantaged communities through retailers, institutions, food access providers, and restaurants, which will be referred to as consumer-facing industries.
- Support environmentally sustainable food system practices by participants in the regional supply chain.

As characterized, the desired future state represents important health, social, economic, and environmental values that can be supported by more substantial availability of local foods in the Chesapeake Foodshed.



CURRENT STATE

FLOW OF FOODS AND BEVERAGES FROM FARM TO FORK



FINDINGS AND CONCLUSIONS

The supply chain that serves the Chesapeake Foodshed is made up of more than 70,000 businesses that span a wide range of functions, from growing food to stocking grocery store shelves. However, the food that flows through the region originates in many places around the globe; it makes its way to the end consumer through a highly-efficient supply chain that is not designed to meet the demand for local or regional food. Moving from this “big picture” system requires a more suitable approach for bridging the gap between local consumers and producers. Data, methods, and more detailed findings can be found in the appendix.

Where We Are Today

The current supply chain is a complex web of interrelated entities and processes. The system works because of the many specialized functions that ultimately link producers to consumers through retailers, restaurants, and institutions. Unless farmers and consumers meet directly through outlets like farmers’ markets, roadside stands, and community supported agriculture (CSA) operations, the connection between the two groups is, at best, remote.

When farmers and consumers are not directly connected, farmers naturally become more responsive to the demands of the intermediate supply chain than those of the downstream supply chain. As a result, the 54 percent of consumers who say they actively shop for local foods struggle to find them in stores.⁵ Consequently, much of the food produced by farmers in the Chesapeake Foodshed never ends up on the plates of residents, but instead finds its way into the homogenized supply chain through which all other food products move.

These relationships are illustrated in the food system diagram above, demonstrating the flow of foods through the supply chain. It is a vastly simplified approximation,

but even in this simplified form, it is easy to comprehend how consumer demands would be difficult to transmit through the system, given the number of links in the supply chain. It is also important to remember that each link serves a critical function, increasing the efficiency by ensuring the delivery of foods to the end consumer in a low-cost and timely manner. A consequence of this competitive system is that each link operates on razor-thin margins with little profit remaining for investment in infrastructure for local foods, which is sorely inadequate.

In short, it is difficult to envision a manner in which local foods can make meaningful headway in today’s intermediated system without clear benefits to the supply chain, such as increased efficiency, improved customer satisfaction, or notable marketing advantages. Despite this less-than-optimistic description of the current local food state, consumers and people involved in the food supply chain widely recognize the benefits of local food. They also share a surprisingly common set of concerns and desires.

Interviews with supply chain participants and consumers at community meetings indicate that growth in local foods is desirable but constrained by convenience, trust, affordability, profitability, and marketability. Challenges faced by mainstream agriculture in the region also compound those specific to local foods.

The good news is that there is considerable potential for increasing the amount of food produced, marketed, and consumed within the region, and recirculating more of our food dollars within the regional economy. However, substantial changes at all levels in the supply chain will have to occur in order to develop a meaningful and stable regional food system. It will require collaboration between suppliers and consumers, from the beginning to the end of the supply chain.

⁵ Birth, “Americans Split on Importance of Buying Local at the Grocery Store.”

- **Upstream:** Local producers must increase production and processing of foods that are market-ready.
- **Intermediaries:** Regional processors, aggregators, distributors, and wholesalers must incorporate substantially more regional products into their inventory.
- **Downstream:** This increased flow of regional product must be successfully marketed to and through retailers, institutions, restaurants, and direct-to-market opportunities.
- **All Levels:** Substantially more regional foods, including, but not limited to, otherwise-wasted food, must become accessible to Food Access Providers.
- **All Levels:** Participants attempting to move local foods through supply chains must recognize and work with non-conventional and emerging businesses like online retail, home delivery, meal kit assemblers, food hubs, and concierge services, which are a growing segment of the food supply chain.



Without these changes, local foods sold in the region will continue to be a small share of the overall food supply. For changes to occur, a collaboration between suppliers and consumers must become the norm. This idea means that:

The private sector must take the lead in making the necessary changes. Overcoming the challenges and creating more and better opportunities for profitability are the responsibility of those who work in the system. While substantial public policy changes are essential, changes at the federal, state, and local levels are difficult to make and are likely to be so until there is adequate demand from the private sector for change.

Strong supply chain relationships will be the key to increased local participation. Necessary changes will build new relationships and networks between supply chain participants. The adoption of systems and practices designed to explicitly and efficiently aggregate, handle, transport, and market regional products from producer to downstream participants and consumers will be required. This will serve the business purposes of supply chain participants who respond to consumer preferences. It will also make local products more readily accessible to disadvantaged communities and middle-class populations because there will be more product moving through supply chain channels, as illustrated in the food system diagram.

Consumers will need to be better educated about choices. Consumers demand information and a means by which to understand it. With the decrease in formal food and nutrition training in the school system and a decline in family meal preparation as a primary home activity, consumers feel lost, disconnected, and unsure of whom to trust. Fortunately, farmers rank among the most trusted businesses owners, making them a natural source of the information that consumers are seeking.⁶

⁶ Ries et al., "2018 Edelman Trust Barometer."

Where We Want to Go

The ideal future for the Chesapeake Foodshed is a thriving, interconnected, supply chain that incorporates a holistic approach to producing, processing, and distributing food efficiently and effectively. The food system will be community-centric, prioritizing producers and consumers equally to ensure that all needs are met. Agricultural producers of all sizes will have profitable operations and maintain livable wages for themselves and their employees. They will be environmental stewards and prioritize the health of the Chesapeake Bay in their production practices. Producers, processors, and distributors will be part of a transparent, trusted supply chain promoting aggregation and efficiency, as well as encouraging engaged, knowledgeable consumers.

Consumers in the Chesapeake Foodshed will take an active role in the food system. Consumers will be knowledgeable about nutrition, environmental stewardship, and community needs; they also must understand the seasonal limitations of their food system. All socio-economic groups, geographies, and ages will have access to nutrition education and fresh, healthful foods at appropriate price points. Because food will help unify people and communities, residents will be proud of the Chesapeake Foodshed and spend their dollars supporting businesses that are aligned with their values: social wellbeing, environmental stewardship, affordability, nutrition, convenience, and quality.

How We Get There

Achieving change throughout the supply chain and successfully transitioning to the future stated above is no small task. To facilitate transformation of the supply chain and the necessary collaboration between suppliers and consumers, our project team identified six key themes. They correlate with the recommendations in the next section of the report.

Relationships are built around food and influence the way individuals, families and communities interact.

Consumer outreach in Maryland confirmed that relationships built around food are a critically important influence on the way individuals, families, communities, and economic systems interact. These relationships go well beyond supporting basic needs for sustenance. They form the fundamental building blocks for how people acquire, prepare and eat food; share their culture; support their communities; engage in environmental conservation; and nurture health and wellness.

Community and culture built around food is an important foundation for growth of local foods and development of an actual regional food system. People's relationships with food—what they value, how they enjoy it, and if they know how to prepare it—are often derived from practices and customs of their families, friends, and communities. Community focus groups indicated that this important connection between food and communities of people is at risk of being lost. As people drift from this fundamental relationship, it affects the demand for food, the way the supply chain functions, and how the food system evolves.

Accordingly, cultivating community and cultural relationships around food is key for both individuals and the food supply chain itself. It helps consumers more readily access the benefits of healthy, diverse, and appealing foods. It is also important for expanding markets for local businesses while improving economic sustainability. Together, these efforts are important for reaching the desired future state of the food system, especially where the local food system provides benefits not available through the national/global chain. Namely, it nurtures the two-way relationship between communities of consumers and suppliers of food, which is critical to a well-balanced food system.

Community-building extends well beyond consumers and includes the relationships formed between the various levels of the supply chain. The project team conducted extensive interviews at all levels in the supply chain. Interviewees ranging from farmers to manufacturers to retailers all emphasized the power of these relationships in a properly functioning supply chain. (See Appendix B for more detail.)

Mainstream food distribution networks are difficult to access for local and regional businesses.

As discussed above, consumer demand for local foods is reportedly large. Given the size of the consumer markets in the Chesapeake Foodshed, this demand should equate to billions of dollars in demand for local and regional products.

Fulfilling this demand through direct marketing channels and intermediaries in the mainstream supply chain remains untenable, even as numerous private and public efforts have been undertaken to improve local food trade flows. Public programs like Maryland's Best and private efforts such as the Anabaptist auction markets in Pennsylvania have been very effective for small sets of producers. However, none have generated enough broad-based support for year-round wholesale activities or to make substantial inroads into the mainstream supply channels.

Food hubs (regional sites for food aggregation and distribution) have been identified as a potentially effective tool for increasing both efficiency and transparency in the system for small and mid-sized operations. Food hubs help defray individual costs and operation risk by aggregating services such as packing, grading, distribution, processing, food safety programming, and marketing services.

Within the project study area, approximately 25 food hubs are working to provide varying levels of service at different levels of the food supply chain. Most of the region's food hubs are mission-based organizations intent on improving market conditions for farmers and increasing access to local, healthy foods. Despite shared objectives, most food hubs do not currently cooperate to increase their overall reach and effectiveness. Coordination among food hubs could vastly improve performance by allowing for true scale efficiencies, greater specialization, and increased trade between farms, which would allow for greater diversity in their direct marketing efforts. Additionally, inter-hub trade expands products and seasonal offerings.

A food system built on trust and transparency of the entire supply chain is a necessity.

The rise of the local food movement reflects a desire to reestablish lost relationships with agricultural producers as supply chains became more national and global. However, buying local goes beyond a geographic preference. What consumers care about are trust and transparency, which means knowing where their food comes from, who the farmers and manufacturers are, and what practices and processes they use. Ultimately, it is about how consumers' food choices reflect their preferences and convictions about health, the environment, economy, and society.

Developing such a system could create trust, transparency, and accountability from farmer to consumer. The current food system lacks a platform to help consumers easily identify and validate the source and practices behind the foods they purchase. There is no unified way to ensure traceability and transparency from farm-to-fork on issues such as food safety, order fulfillment, and price. Opportunities to market regional food are lost without a platform on which to build relationships and share data, and without the technology to facilitate transactions among supply chain participants.

The future of the local food system is dependent on the people in it.

Like any other business, farms, food processors, and retailers require a knowledgeable, skilled, creative, and engaged workforce. Relatively low wages and negative perceptions of farm work as a viable career limit the industry's ability to attract the region's best and brightest minds into both labor and managerial positions. This difficulty is not just a problem for production; it plays out across all sectors, from processing to distribution, wholesaling, retailing, and restaurants. At the same time, many of the largest businesses are cutting labor utilization through automation while enhancing the value of remaining jobs to reduce risk and still attract the best-qualified workers available.

Beyond the current and future workforce, the industry has significant concerns about who the next generation of farm owners will be. Replacement rates for farmers are at all-time lows. The region expects almost 9,000 farmers to retire in the next fifteen years, with just one-third of that number entering the field. Recent [studies](#) in the [US](#) and [Europe](#) share common findings of the knowledge, skills, and resources new farmers will need. Among the most important is access to experienced assistance in financing, land, and markets.⁷ These reports also emphasize the need for long-term access to particular knowledge, including technological, business, entrepreneurial, networking, and financial, to maintain profitability. To be effective, such services must be targeted to the specific needs of the beginning farmer and offered on a real-time basis.

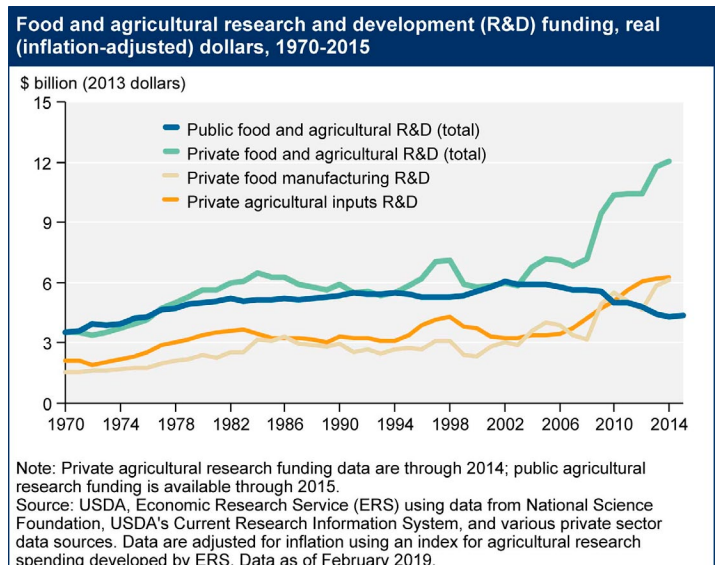
Entrepreneurs will drive change in the food system.

For a regional food system to thrive, it must embrace innovation and change. These are the primary forces currently influencing the direction of nearly every segment of both local and national supply chains. Disruptive technologies, advancements in last-mile delivery, the

introduction of engineered foods, labor shortages, and many other factors play a role in determining the nature and structure of the future supply chain.

Traditionally, the primary catalysts for change in the food industry were small, agile entrepreneurial companies that could identify and be responsive to changes in the market, economy, environment, culture, or regulatory framework. A shorter supply chain meant that farm and food entrepreneurs were close enough to the market to take advantage of these opportunities. The transparency of many traditional markets combined with high levels of public research and development (R&D) supported this trend in innovation and entrepreneurship.

However, over the last decade and a half, there has been a notable trend away from publicly-funded innovation and entrepreneurship in the mainstream food supply chain. Large private institutions and businesses have invested in research within their narrow commercial interests. As a result, large corporations have begun to supplant the traditional role of the land grant institutions and small food-system entrepreneurs. This change has caused a shift in the ability of communities to self-generate wealth, support job creation, and enhance the tax base as the benefits of innovation and entrepreneurship in the food supply chain aggregate in and around urban centers and large, vertically integrated corporations.



⁷ Ackoff, Bahrenburg, and Shute, "Building a Future with Farmers II: Results and Recommendations from the National Young Farmer Survey"; Freedgood and Dempsey, "Cultivating the Next Generation: Resources and Policies to Help Beginning Farmers Succeed in Agriculture"; Zondag et al., "Needs of Young Farmers."

Returning the edge to entrepreneurs interested in local and regional foods means creating a healthy entrepreneurial culture throughout the supply chain, with a focus on increasing the profitability and competitiveness of farmers and food processors. At the community level, both individuals and industries should be supported within the vertical and horizontal supply chain. Community leaders could look for areas where resources such as research and development facilities, human capital, intellectual property, financial capital, and real estate offer opportunities for shared development with other industries such as information technology, robotics, biotechnology, and forest products, and where spill-over effects may help small entrepreneurial companies support one another. Non-profit funders could find prospects for social investment in underrepresented minority and ethnic businesses to increase community wealth and equity. Businesses they support would reflect the diversity in the community while fulfilling a market need for culturally appropriate food. Finally, it also means that many rural communities must adapt their view of risk-taking and failure if entrepreneurship is to succeed.

Consumers embrace the notion of a Chesapeake Bay Foodshed

The project revealed a strong regional identity with the Chesapeake Bay among supply chain participants and consumers within the Chesapeake Bay region. The Chesapeake Bay is the fundamental aspect of regional identity, and interview and discussion participants indicated that its continued health transcends the issue of local food. Supporting local growers and food businesses as a means to help the bay thrive is an approach that supports both ecological and economic wellbeing. Rebalancing such an interconnected system necessitates changes at all levels.

These changes will also require coordinated progress in each of the preceding five key theme areas. Small scale, individual changes occurring incrementally have value but ultimately must occur throughout the larger geographic area, across many jurisdictional boundaries and involving numerous private sector organizations and governments. The foodshed covers over 64,000 square miles in six states and the District of Columbia.

In addition, the very nature of the food system business further complicates the picture. It is largely made up of small operators with limited resources to take a global view of system-wide development. Key stakeholders are justifiably too occupied with their individual roles in the supply chain to act as food system integrators. This problem extends throughout the supply chain, from farmers to consumers.

Getting products all the way to the consumer means that companies throughout the supply chain have effective marketing strategies to sell regional foods to consumers within the larger inventories of products sold and served by downstream players: institutions, restaurants, and retailers. Such strategies would have to sufficiently differentiate local foods from food produced elsewhere, at price points commensurate with their value to consumers, and with the ability of producers and the intermediate supply chain to deliver them. Because many individual farms have failed at attempts to coordinate and establish self-supporting local food systems, there may be understandable reluctance among prospective participants.

Within many of the states and sub-regions represented in this report, organizations exist with missions compatible with the recommendations listed later in this report. The project team believes that the work of these organizations can be effectively leveraged and enhanced through

regional coordination and technical and professional support, involving multiple states and economic and community development organizations.

Within the northeastern United States, the [Hudson Valley Agribusiness Development Corporation \(www.hvadc.org\)](http://www.hvadc.org) and [Coastal Enterprises, Inc. \(www.ceimaine.org\)](http://www.ceimaine.org) are the only regional programs designed to provide community and business level support for planning, entrepreneurship support, and economic development efforts.

No matter how it is achieved, it will be necessary for one or more entities within the region to remain focused on the big picture and to facilitate its achievement through public and private partnerships. These partnerships must focus on the long-term benefits to the region for all in the supply chain and the communities they serve. Recommendation 6 covers ways in which this might be accomplished.



RECOMMENDATIONS

Coordinated action is necessary to advance the role of local foods in the existing supply chain. The Chesapeake region can be a consolidated market, but it faces challenges common to any region or food system. Due to the complexities of these systems and their shortcomings, it is necessary to approach this end-result holistically. The following recommendations will facilitate and support the long-term development of a regional supply chain and will result in the development of a formal Chesapeake Regional Food System that prioritizes local food.



The recommended strategies to develop a Chesapeake regional food system correlate with the six themes covered above.

- 1.** Strengthen community and culture around food. Reconnect people with experience and knowledge about how to buy and prepare fresh foods and with farmers in their local and regional communities.
- 2.** Promote networked solutions to regional food system development. Strengthen the ability of regional producers to satisfy wholesale, retail, institutional, and restaurant demand.
- 3.** Create a Chesapeake Regional Food System “brand” and unified certification system. Foster transparency and trust that improves business, encourages environmentally responsible practices, and provides opportunities for informed choices throughout the supply chain.

- 4.** Tailor agricultural education, workforce development, and farm transition programs to the future. Ensure that farms and food businesses have the human capital to grow.
- 5.** Support an entrepreneurial and innovation culture in the supply chain. Encourage and enable ongoing, forward-looking improvement and adaptation of the food system.
- 6.** Identify or create an entity to serve as a regional coordinator of local food system development projects. Network with stakeholders and build a recognizable Chesapeake Regional Food System.

Possible lead organizations and program partners for recommendations, as well as funding considerations, are found at the end of this section.

Recommendation 1: Strengthen Community and Culture around Food

Background

Relationships among families, communities, and individuals strongly influence their connections to food. These relationships also determine much about how people behave as consumers of food products. Cultivation of community around foods is, therefore, a key strategic element for growing local foods within our region.

Goals

To build and strengthen communities and markets for regionally produced, processed, and marketed foods.

Specific objectives include the following:

- Increase individuals' knowledge of, appreciation for, and facility with foods.
- Highlight the diversity and benefits of foods available through local and regional sources.
- Provide opportunities to share the experience of culture and community through the preparation and enjoyment of food with others.
- Help individuals and communities make informed choices about the foods they select.
- Shorten supply chains to make local and regional food accessible to all people.

Implementation Strategy

For those who support growth in local foods and a more regional food system, it is important to recognize that building community around food is part of public relations and marketing strategies. Implementation will be most effective if participants, including those traditionally underrepresented, support both the

community-based goals and the marketing interests of involved businesses. Collaborations among partners will facilitate effective outreach, help provide food and facilities necessary to stage events, and support direct marketing opportunities along the way, all while building desired relationships between communities of people and their suppliers of foods.

Ideally, implementation will take two mutually supportive forms: from institutions in the foodshed, and from communities and interested supply chain parties.

Engage consumers where they celebrate, shop, and eat.

An obvious place to expose people to foods, skills to prepare them, and ability to acquire them is through customer-facing businesses like farmers' markets, CSA-based venues, supermarkets, other retailers, and restaurants and institutions serving foods directly to their customers every day. Options for events include demonstrations on how to process and prepare local products, opportunities to participate in preparation and share in consumption of meals, and opportunities to simply sample local products, in both raw and prepared forms. Effective partnerships will involve various combinations of community organizations, producers, processors, wholesalers, and retailers.

The Maryland Agricultural Education Foundation's (MAEF) educational trailers provide a good model for delivering immersive encounters with food. Trailers take the food experience into the community in way that introduces the consumer to the nexus of agriculture, community, culture, environment, and culinary arts. This modular and mobile model can be customized to the scope and scale of the community, venue, and event.

Tell the story of the Chesapeake Foodshed.

Establishing a community built around food means sharing with consumers the story of food production and its journey through the economy. Such a story could be modeled on the work of the Maryland Department of Agriculture and Maryland Public Television who bring the story of Maryland agriculture to the public through the series [Maryland Farm and Harvest](#).

Consumers' interest in the story of food spans its production, how it gets to purveyors, chefs and cooks, how it is handled and prepared, and their own experience of the results. Farmers, customer-facing businesses, and all intermediaries in the supply chain can participate with community organizations to stage events and classes. They can help tell their part of the story of foods' origins and journeys through the supply chain, empower consumers with knowledge, and foster consumer trust in the system.

Developing effective messaging techniques and outreach methodologies will require an extension of current research by the Harry R. Hughes Center for Agro-Ecology and others, including understanding how various consumer segments receive trusted information about health, nutrition, food safety, culinary arts, economy, and community.

Build community capacity through institutions around food.

Communities rely on local institutions—schools, local businesses, churches, government agencies, colleges and universities, and non-profits, among others—to foster community values and culture, and sustain quality of life. These institutions can serve as effective platforms for building community around food. Many such organizations already do so through the food services they provide (schools, colleges, universities) or meal-centered

events, after religious and organizational services, or holiday gatherings. Organizers of such events can be encouraged to explicitly incorporate local and regional foods, in whatever forms are or would be most desirable and beneficial to their constituents, into their various platforms.

Schools are a particularly effective place to educate the younger members of the community about food. Family and Consumer Science (FACS) classes, traditionally called Home Economics, are an excellent conduit to instruct children in finding healthy ingredients, preparing meals, and understanding food safety. Unfortunately, such classes are not required or even available in every school. Expanding the availability of such courses should be encouraged. Community members could assist schools with the development of appropriate lesson plans that would fit within the existing curriculum.

Support emerging social entrepreneurs.

Individual entrepreneurial activities can promote positive community outcomes. Social and economic challenges in food access, loss of employment opportunities, declining investment, and the loss of sense of community were common themes in rural and urban areas studied. Local food provides a means for emerging social entrepreneurs to create jobs and support sustainable community development, local social justice, and increased equity. Support for entrepreneurs addressing these objectives should be an element of a regional agricultural economic development strategy for local foods, ranging from production to marketing, technology, nutrition, culinary arts, logistics, programming, automation, and information technology.

Recommendation 2: Promote Networked Solutions to Regional Food System Development

Background

As discussed elsewhere in this report, consumer demand for local foods is reportedly large. Yet, demand for direct marketing has plateaued in many instances, and inroads into the mainstream supply chain serving the vast majority of consumers have remained very limited. Food hubs, if they work together to provide aggregating services such as packing, grading, distribution, processing, food safety programming, and marketing services, have great potential to help increase local foods' share of the market. Cooperation among food hubs is key to increase their overall reach and effectiveness, extend seasonal availability of products in the region, meet requirements of supply chain participants for volume and reliability, and vastly improve performance by allowing greater specialization.

Goal

To strengthen the intermediate supply chain and improve its ability to support both its upstream and downstream partners. Specific objectives include the following:

- Improve the efficiency and effectiveness of existing local food distribution systems
- Integrate local foods into a regional food system
- Create a collaborative environment for systems planning, resource sharing, cross-marketing, and product development
- Identify producers, processors, and distributors within the existing supply chain who wish to use regional products to improve consumer choices, operational efficiency, and profitability

- Create an interconnected system of producers, processors, and distributors to deliver a diversity of products to consumers and extend seasonal availability of local products
- Enhance resiliency and food security in times of crisis or natural disasters.

Implementation Strategy

The following strategies highlight opportunities to increase the flow of local products into and through the existing supply chain by diversifying products, extending seasonality, improving information access, increasing efficiency, achieving transparency, and coordinating supply chain activities.

Increase the capacity and reach of the region's food hubs.

A coordinated supply system operated through one or more food hubs would provide centralized information exchange, aggregation services, and value-added facilities. These centralized hubs would streamline management and reduce operating costs by providing information technology systems and services for participating upstream and downstream supply chain elements, logistics support and management, risk management, food safety programming, quality control procedures and technology, and institutional contracting, processing, product balancing, production coordination, and supply chain verification.

Such services already exist for foods produced outside the region and sold within the foodshed. If implemented regionally, these services could increase the ability of existing food hubs to compete within their existing markets in several ways. First, they would extend the seasonal availability of offerings throughout the foodshed and expand the products lines available. With increased volume, centralized hubs could add fresh processing,

crop conditioning, and long-term storage for farmers and other networked food hubs. Eventually, this centralized system would become a driving force in a regional food system capable of supporting large wholesale and institutional contracts. Its development would send a clear message to regional producers of a market for increased production.

Support innovative models for consumer engagement in the local food system.

During the course of the study, the project team interviewed numerous consumer-driven retail start-up efforts in rural and urban communities that shared a common goal. They aim to improve access to healthy and nutritious foods that are value priced, and the foods are packaged in a marketable form for a narrowly targeted population or market. Most were also motivated by a desire to source directly from farmers whenever possible. Many efforts stalled in the developmental phase due to business development needs. Providing dedicated support to these efforts could greatly improve success rates using models like the [Appalachian Center for Economic Networks](#). Among the support services most needed are: market analysis, site location support, product development, floor planning, food safety, personnel development, and capital access.

Build a coordinated local transportation network that leverages existing transportation systems.

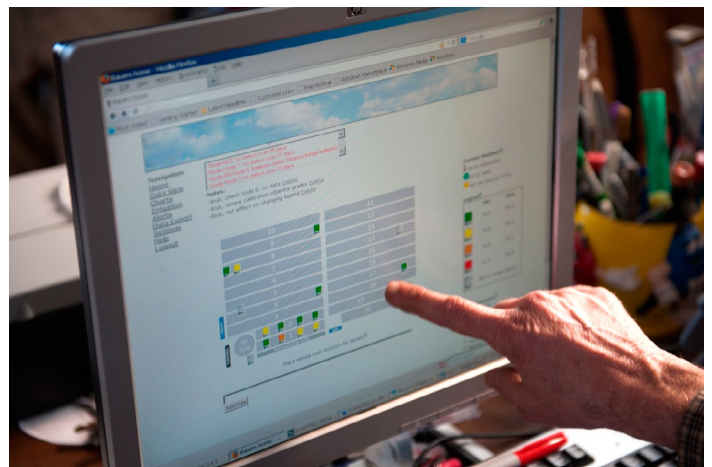
Efficient movement of small loads is often cited as a limiting factor to the growth of local foods. This condition exists even though the food transportation system suffers from an excessive number of unloaded miles associated with backhaul: driving empty trucks many miles back from destinations to origins.

This recommendation focuses on developing and adapting technologies to allow transportation companies, farmers, and fleet managers to share trucking resources and limit the number of unpaid, unloaded miles. Platforms like Canada's Backhaul.com provide a model for system design and include load identification, dispatching, and contract settlement functions.

Centralize market data to increase grower access to markets.

Farmers with available product often miss sales opportunities because they lack access to critical market data, including current market prices, delivery requirements, demand characteristics, and product volume and quality standards. Where such data does exist, it is difficult to find, dated, or hard to interpret.

The project team recommends that industry associations, food hubs, auction markets, and related marketing agencies collaborate to create a data interchange system that publishes local food pricing and availability data weekly through an internet-based application. The system would report local purchasing preferences and requirements as specified in food contracts, along with the associated contact information for the purchasing officers and food service providers. Publishing this information would add transparency and increase efficiency in the system.



Recommendation 3: Create a Chesapeake Food System Brand and Unified Certification System

Background

Information gathered from community members, consumers, and supply chain participants suggests that the ideal food system is one built on trust and transparency, from the farmer through the supply chain to the consumer. This means consumers can reliably determine where food comes from, who the farmers and manufacturers are, and what practices and processes were used. This knowledge then allows consumers to make purchases based on their preferences and convictions about health, food safety, the environment, economy, and society.

Small local and regional producers experience difficulty navigating processes and systems used to address consumer concerns, limiting market access possibilities. A regional food system would be ideally positioned to use relationships, data, and technology among supply chain participants to create trust, transparency, and accountability from farmer to consumer while working toward the ideal future state envisioned by many stakeholders.

Goals

Our goal would be to establish a viable foodshed-wide brand and certification system adopted at all levels of the supply chain. Specific objectives include:

- Create transparency along the supply chain from farmer to consumer
- Improve efficiency for supply chain participants
- Improve food safety and traceability
- Reduce the costs of meeting food safety and other certification standards
- Encourage environmentally responsible practices and choices throughout the supply chain

Implementation Strategy

The project team recommends a four-pronged approach to deliver on these goals by creating a Chesapeake Foodshed Brand, a unified certification system, a GroupGAP program, and a blockchain system. All of these strategies are intended to work together, with each component reinforcing the others.

Create a Chesapeake Foodshed brand.

Many communities in the region can easily identify with the cultural and environmental values associated with the Chesapeake Bay. Using this as the basis for a brand reflects local and regional sourcing and allows consumers to identify products that support farmers and fishermen within the region. It also supports economies of scale to compete with national brands for shelf space. Most importantly, such a brand conveys certain values that resonate with consumers. These are values related to the local economy, agricultural practices, labor, and others. To help consumers easily access this information, a unified certification system and blockchain technology, explained in more detail below, will be used.

Develop a unified certification system.

To develop and maintain the standing of a regional brand and maintain accountability among participants, the brand will be coupled with a unified certification program. This program will aggregate current food safety regulations, environmental standards, animal husbandry practices, and other best practices under one overarching certification program that improves transparency and streamlines regulatory compliance. Such a system can be based on current auditing processes and standards, such as Primus, USDA Organic, and GAP (Good Agricultural Practices) certification. Also, a classification system can be developed to help consumers quickly identify which items from which sources meet their specific preferences, possibly through a QR code that they can scan via smartphone.

Create a regional GroupGAP program.

A food safety component, in the form of GroupGAP certification, will help farmers meet food safety regulations necessary to sell to wholesalers and institutions. Good Agricultural Practices (GAP) is a food safety certification for fruit and vegetable production. GroupGAP enables multiple producers to obtain GAP certification on the same products using the same growing practices, which lowers individual producers' associated costs. In the program design, Maryland GAP, Global GAP, Primus, or other relevant certifications required for growers to qualify under the unified certification system could substitute for GroupGAP certification.

Use blockchain technology for supply chain transparency.

The regional brand should start with a pilot program using blockchain technology—an encrypted, decentralized, digital ledger that records all transactions—to create a more transparent system that benefits all participants. Blockchain technology is used by companies that already recognize the importance of supply chain transparency. Cargill, for example, has created a blockchain-based turkey traceability program that allows customers to identify specific farms from which a turkey comes. Last year, the South Korean government announced a partnership between government agencies to track beef through the supply chain. For the Chesapeake region, poultry and dairy are good candidates for this technology. Ultimately, QR codes or other applications can use blockchain data to help consumers identify the source of products, the Chesapeake Foodshed Certification Level, associated certifications, and other product details relevant to their concerns (e.g., nutrition information and ingredients).



Recommendation 4: Tailor Agricultural Education, Workforce Development, and Farm Transition Programs to Support Local Foods

Background

The continued work of agriculture depends on improving access to education, skills training, and technical assistance to all members of the food supply chain. Major concerns for the future of production agriculture include the shortage of a qualified workforce, a lack of sufficiently targeted education and training programs, and an insufficient number of younger farmers to take the reins from those retiring.

Other sectors in the supply chain are also experiencing problems securing qualified employees. Numerous studies have found that businesses owners need to grow their skills in finance, technology, business, entrepreneurship, and networking. New farmers in particular require education and training services specifically targeted to the needs of the beginning producer that are offered on a real-time basis.

Goals

Our goal would be to support the continuation of agriculture and growth of local foods in the Chesapeake Bay region. Specific objectives include:

- Improve agricultural education, both formally and informally
- Promote workforce development for a better-prepared labor force to support agriculture and its relevant sectors
- Maintain agricultural enterprises in operation by supporting farm transitions through farmer training programs
- Encourage cross-industry support for agriculture.

Implementation Strategy

The future of agriculture, including local production and regional marketing, relies on three foundational concepts: agricultural education, workforce development, and farm transitions. A competent, knowledgeable workforce is required to support continued production, and strong leaders, entrepreneurs, and managers are necessary to replace aging farmers and sustain and grow agricultural operations in the region.

Improve and expand beginning farmer development programs.

The project team recommends significant changes in the training and education opportunities available to young and beginning farmers; these should reflect the true face of agriculture in the Chesapeake region. Many beginning farmers in the region are entering the industry as a second career, making the average age of a new farmer 49.5 years. These new farmers generally start their agribusiness in livestock, poultry, grain, or horticulture, choices that largely reflect the primary agricultural industries in the study region. However, most beginning farmer training programs currently available in the region are short-term academies and internships that are primarily focused on fruit, vegetable, and horticulture production. Consequently, many beginning farmers are left to learn on their own. Academic research and interviews with beginning farmers provide strong evidence that successful development requires a long-term program commitment that offers a suite of graduated services.

To effect positive change in beginning farmer development, organizations in the region should invest heavily in professionalized, long-term, broad-based programs that cut across all agricultural industries and demographic groups, requiring training and technical support. This process would begin by developing a catalog of existing programs, their market coverage, and areas of specialization. Then needs assessment would be

conducted with support from industry associations, educators, trainers, and agribusinesses. The assessment would focus on future industry needs to ensure long term relevance and recognize the need to develop consistency in professional program delivery, certification of trainers, and the creation of value-added services.

Incorporate food-system needs into the existing workforce development program.

Agricultural and food system workforce members need to be integrated into existing workforce training programs. Workforce development programs are widely available in rural and urban areas. These programs often teach and certify the basic workplace skills requirements that are required by major employers in the region. Many of these skills are embedded in WorkKeys programs that match the proficiencies and deficiencies of potential members of the workforce with the skills desired by employers.

Following the WorkKeys model, employers in all elements of the supply chain should work through representative organizations to identify the critical skills required in particular fields. They can then work with educators and workforce development boards to ensure that these needs are incorporated into formal training protocols at all levels of the local supply chain. As with work skills, there were consistent issues with lack of timeliness, inability to focus, poor teamwork, and temper management. Adoption of a "WorkEthic Certification" program modeled after WorkKeys would have additional value to employers.

Encourage regional collaboration and standardization among farm transition programs.

The project team recommends that programs designed to support farm transition offer more unified access to technical and professional support. With an estimated 9,000 farmers facing retirement in the next 15 years, it is imperative that organizations in the region prepare to support farm transition. These service demands are currently being met by a wide range of uncoordinated private and public services.

Organizing service providers in a professional network to assist growing demand is the first and most important need. Offering training to service providers to improve service provision in the complex issues of estate planning, business valuation, family relations, business management, debt workouts, land preservation, and many other issues is essential to ensuring that professional advice is fully informed and up to date.



Recommendation 5: Support an Entrepreneurial and Innovative Culture in the Supply Chain

Background

Innovation and change have been fundamental in the evolution of agriculture and our food system for well over a hundred years. However, in recent decades, as publicly funded research and development (R&D) has decreased and large private institutions and businesses have assumed R&D responsibilities, the role of the small food system entrepreneur has declined, and with it the ability of smaller rural communities to generate wealth, support job creation, and enhance the tax base. Reviving a healthy entrepreneurial culture within a regional supply chain is an essential part of a strategy designed to move from the current state of the region's food system closer to the desired future state.

Goals

Our goal is to drive innovation in the supply chain through entrepreneurship at the business and community levels. Specific objectives include:

- Increase the future competitiveness of the region's farms through the development of regionally appropriate R&D
- Increase private and public funding of regionally appropriate R&D
- Improve regional investments in agricultural and food-related technology
- Encourage youth participation in the supply chain, from production to retailing
- Increase business start-up activity in rural areas
- Improve retention of entrepreneurial food supply chain businesses in the region

- Increase the interaction between food, forestry, and fisheries (F3) businesses
- Diversify rural economies to increase opportunities for underrepresented groups.

Implementation Strategy

Create a youth entrepreneurship academy.

To encourage participation in agriculture and food by a younger cohort, organizations could create a curriculum for a youth entrepreneurship academy that extends the STEM curriculum into the area of food-system entrepreneurship. It could be adopted as an approved curriculum at any secondary school in the Chesapeake Foodshed. The academy should be integrated within the general agricultural education and business curriculum to include opportunities for internships, externships, and executive shadowing. Principles of entrepreneurship should be taught in situ using youth lead micro-enterprises such as on-premise greenhouse production, marketing of produce and horticultural crops, and food preparation, processing, or retailing. Upon graduation from the academy, participants would have the opportunity to submit their business plan to a regional competition. Cash awards could be offered for winning submissions that demonstrate a high potential for success in an agriculture or food business that positively impacts Chesapeake Bay health, their community, or the food system at-large.

Develop an applied food system research & development challenge grant.

The project team recommends the creation of a challenge grant program to encourage applied research and development and technology adoption in F3 industries and related sectors. Of specific interest at program initiation will be projects focused on improving crop and livestock yields, environmental monitoring, implementation of science-based management

practices, integration of labor replacement technologies (e.g., robotics), new product development, and similar projects. The focus should be assisting businesses in the value chain with the adaptation and adoption of modern technology and management practices. Such a program is intended to encourage co-investment of public and private capital resources by leveraging both cash and in-kind contributions of R&D partners. It would be modeled after similar, successful programs such as [Ontario's Collaboration Voucher Program](#), which allows companies and institutions within certain Centers of Excellence to access additional funds for supporting applied technology commercialization and adoption.

Support expansion of regional angel investor networks.

The project team recommends leveraging the strength of the Mid-Atlantic region's many notable angel investment groups by encouraging them to expand their investor training as well as investment activities into F3 fields. The first step in this process is to develop training protocols that increase investor understanding in both the business fundamentals and markets associated with F3 industries. The program would be modelled after the [Angel Investor Bootcamp](#) run by the World Business Angels Investment Forum. This effort will also seek to integrate this investment network within the traditional funding sources for F3 businesses to encourage the types of capital access innovations that have been seen in the technology industries, such as venture banking.

Coordinate and support regional agribusiness incubation and acceleration activities.

The project team recommends taking a watershed-wide view of agribusiness development. This would encourage both new and innovative entrepreneurial activities as well as entrepreneurship that supports the rejuvenation of rural communities, improvement of supply chain conditions, and the enhancement of bay health. Conceptually, this program would support existing incubation and acceleration programs. It would do so by expanding the technical and professional resources, while encouraging greater resource sharing and providing program training. These actions would ensure the services available give entrepreneurs the best chance for success by focusing on the adoption of "Best Practices" in the manner of the former California Goldstrike Partnership.



Recommendation 6: Identify or Create Regionwide Coordinator of Local Food System Development

Background

The inherent inertia in the existing system is a key reason for the lack of regional food's prominence in the supply chain. Key stakeholders, like farmers, processors, and retailers, are engaged in fulfilling their individual roles in the system. Such businesses have little time or extra financial means to begin to address or coordinate a response to gain access to the mainstream marketing channels. Most efforts undertaken are small in scale or marginal in effect. To overcome the obstacles presented by the inherent issues in the market, an organization will need to be identified or created to coordinate and implement suggested changes among all supply chain participants.

Goal

Our goal is to build the institutional framework to support growth and investment in the local supply chain while improving access to training, education, and research and development activities. Specific objectives include:

- Network with and enable and facilitate connections among supply chain participants, food system advocates, and government programs to support and advance the features of the desired future state
- Help participants build a recognizable Chesapeake Regional Food System that is appreciated and supported by the consumer market, the supply chain, government, and the food access community
- Identify and facilitate strategic, incremental steps toward the development and realization of the system

- Assume and execute responsibilities accordingly to develop physical community assets, assist agricultural businesses with technical and financial services, and build agribusiness capacities and relationships, among many other possibilities
- Amplify role of existing networks such as the Maryland and Virginia Agricultural Marketing Professionals (AMP).

Implementation Strategy

An effective integrator will help individuals and organizations make sustainable connections, which will act as catalysts for changes by other supply chain participants.

Identify or create an entity to oversee food system development.

Implementation of recommendations under themes 1-5 will be most effective if carried out in a coordinated fashion across the entire watershed. If an existing organized, interjurisdictional effort that covers the Chesapeake Watershed cannot be identified, the creation of an entity with sufficient authority, funding, and regional support to implement the strategies contained in this report may be required.

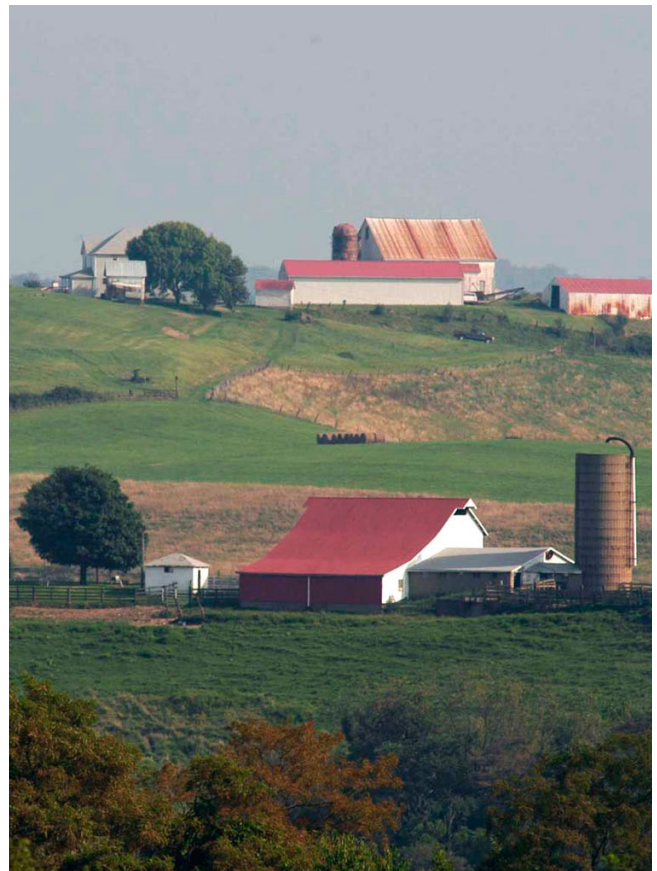
The food system integrator should be formed and commissioned to facilitate a transition to the desired future state or some variation of it determined by forming partners. Per the design of many Community Development Corporations, the organization should have broad private and public sector participation in both its funding efforts and board participation. Creation of a suitable entity will require the support of a core group of committed organizations that understand the long development horizons—typically 10 to 20 years—required to achieve substantial results in enterprises of this type.

Whatever entity is chosen or created, its general charge would be to develop and implement strategies related to the recommendations in this report as well as to:

- Enable vertical integration between producers and consumer markets in a regional supply chain
- Collaborate with supportive food system advocates and stakeholders wherever possible
- Address the priorities and interests of involved participants, focused through the lens of the system's purpose and the desired objectives for the future state
- Develop and deploy marketing strategies in collaboration with wholesale, retail, institutional, and restaurant markets
- Support a trained workforce tailored to changing needs throughout the supply chain
- Emphasize profitability, stewardship, and social equity at each step of the supply chain that becomes part of the system
- Facilitate collaboration between supply chain participants and food access providers to maximize food supplied to disadvantaged communities
- Coordinate with interested local governments to plan, develop, and manage land to connect people to local foods better and support the desired future state
- Work with stakeholders to create a Chesapeake Regional Food System "brand" that epitomizes the objectives of the desired future state
- Work with supply chains to develop online applications for consumers in the region to help them efficiently find and access local/regional foods with attributes they desire and help the supply chain market its products.

The first and most important step is building a business plan to create this organization. This step will move the entire suite of recommendations forward, using successful models, such as the Hudson Valley Agribusiness Development Corporation, Coastal Enterprises, Inc., and TeamPA, as guides. This comprehensive business development strategy should be created with the following minimum elements:

- Supply Chain Development Mission and Vision
- Products and Services Outline
- Role in Supporting Existing Local Supply Chain Development Projects
- Organizational Management Strategy
- Market Analysis
- Fundraising Strategy
- Marketing Strategy
- Financial Projections



RECOMMENDATION MATRIX

The Recommendations Matrix suggests possible lead organizations and program partners for recommendations under each theme.

RECOMMENDATION	POSSIBLE LEAD ORGANIZATIONS AND PROGRAM PARTNERS	FUNDING CONSIDERATIONS
<p>(1) Strengthen community and culture around food</p>	<p>Food & food policy councils; community, neighborhood, & civic organizations; retailers, restaurants, institutions, state departments of agriculture; school districts; food & food policy councils; schools; religious institutions; local businesses, non-profits, & other community-based establishments; restaurants; institutes of higher education; recreation centers; Chesapeake food system integrator (rec. 6), food access & assistance providers; home economics instructors; Farm Bureau.</p>	<p>Funding for these initiatives will largely be supported by private, philanthropic organizations concerned with health, nutrition, food access, and community development. Various federal and state grant programs related to food access, poverty alleviation, and food system development may also prove useful. Social investment networks may also become involved at the project level.</p>
<p>(2) Promote networked solutions to regional food system development</p>	<p>Maryland Food Center Authority; existing food system integrators and hubs (e.g., Chesapeake Harvest, Union Market, 4P Foods, Tuscarora Organic Growers Coop), producer cooperatives, Farm Bureau, food industry associations, grower/ shipper alliances, processors, aggregators, distributors, wholesalers, retailers, institutions, restaurants, food access & assistance providers, food hubs, Chesapeake food system integrator (rec. 6).</p>	<p>Federal funding for economic and market development projects will serve as the primary sources of leverage for private funds. Foundations and philanthropies engaged in food and agriculture are also viable sources of funding. USDA grants involving cooperative development and local agricultural marketing may be useful for developing localized programmatic activities.</p>
<p>(3) Create a Chesapeake Regional Food System “brand” and unified certification system</p>	<p>Chesapeake food system integrator (rec. 6), existing food system integrators and hubs (e.g., Chesapeake Harvest, 4P Foods, Union Market, Tuscarora Organic Growers Coop), Livestock, vegetable, and fruit producers and industry associations; state departments of agriculture, food access, and social justice organizations; Farm Bureau.</p>	<p>Direct private investment using existing federal and state incentives will provide a large portion of the business funding envisioned in this recommendation. Federal and state funding will support market development, technology adoption, and certification programs such as Group-GAP programs as well as pilots for branding and certification. Lastly, blockchain programs can be built and funded through the support of universities, the private sector, and AgriTech investors.</p>

RECOMMENDATION	POSSIBLE LEAD ORGANIZATIONS AND PROGRAM PARTNERS	FUNDING CONSIDERATIONS
<p>(4) Tailor agricultural education, workforce development, and farm transition programs to the future</p>	<p>Cooperative Extension Services, industry groups and consortiums (production, supply chain technology, finance); educational institutions (Maryland Agricultural Education Foundation); youth organizations (Future Farmers of America); Farm Bureau, state departments of agriculture; networking, educational, and advocacy organizations (MD and VA AMPs, Pennsylvania Association for Sustainable Agriculture); land grant institutions, vocational and technical schools, and community colleges.</p>	<p>Federal and state funding resources are likely to provide the majority of funding for these efforts, through both education and job development funding programs. Also, foundations and philanthropies engaged in entrepreneurship, transitional workforce training, upskilling, youth development, and skills certification, as well as food and agriculture, are viable sources of funding.</p>
<p>(5) Support an entrepreneurial and innovation culture in the supply chain</p>	<p>Land grant universities, related industries and supply chain participants (agriculture, processing, distribution, logistics); vocational and technical schools; food hubs; Farm Bureau.</p>	<p>Funding the development of an entrepreneurial culture requires a long-term investment of community resources, not the least of which is financial resources. These resources may come from a range of sources to include, but not be limited to local communities, state economic development organizations, federal agencies, private investors, and program-related investments by philanthropies.</p>
<p>(6) Identify or create an entity to serve as a regional coordinator of local food system development projects</p>	<p>A Community Development Corporation (CDC) formed for this purpose; aforementioned lead organizations of food system integrators (e.g., Chesapeake Harvest, 4P Foods, Tuscarora Organic Growers Cooperative), Aforementioned organizations.</p>	<p>Institutional funding will be necessary to encourage the formation of a new entity and to encourage existing entities to engage in building this new business enterprise. A projected annual budget to develop and build a Chesapeake regional food system development corporation as envisioned could initially range from \$800,000 to \$1,000,000. Most of the funding would ultimately flow to stakeholders for implementation projects.</p>

APPENDICES: CURRENT STATE OF THE SUPPLY CHAIN

A: Data and Methods

Data Sources

This study uses several data sources to examine the agricultural supply chain, human capital capacity, economy, consumer spending and demand, and population demographics. These include:

- Government sources: Census Business Patterns, USDA NASS Census of Agriculture, USDA ERS Food Availability Data System
- Proprietary sources: ESRI Business Analyst, Dun & Bradstreet Hoovers, IMPLAN
- Existing research and literature related to the food system
- Interviews and community discussions

Scope of Study

The study examines a subdivision of the Chesapeake Watershed (the watershed is referred to as the Chesapeake Foodshed or Chesapeake region in the report) and serves as a proxy for assessing the demographic, human capital, agricultural, and supply chain dynamics for the larger geography. This study area consists of 82 counties and independent cities in Maryland, Virginia, West Virginia, Pennsylvania, and Delaware; that is about 40 percent of the 206 counties and independent cities in the entire foodshed. It also includes four major metropolitan statistical areas and represents 78 percent of the population in the foodshed. Lastly, it represents about 63 percent of the 11.2 million acres of agricultural land in the foodshed and covers a diversity of soil types, hardiness zones, and production types. It includes key production and infrastructure clusters for livestock, poultry, dairy, fruits, vegetables, and other specialty crops. This also extends to supply chains for baked goods, snack foods, and other manufactured food and beverage products.

Analysis

The project team used GAP (Good Average Poor) Analysis as a framework to examine ways to shift the existing food system toward a desired future state. GAP Analysis is a process of analyzing a current situation and identifying potential ways to reach a desired outcome. It involves three key components: (1) a thorough understanding of the current state, (2) a clear vision of the future state, and (3) a list of actions needed to reach the future state. These recommendations are the result of comparing actual performance against potential or desired performance on various metrics that are ranked as Good, Average, or Poor. Ultimately, this analysis guides future development activities or policy actions by clarifying measurable goals and actions to bridge the gaps and reach the best potential outcome.

To understand the current state, the project team evaluated the value chain at three levels of the food system: (1) consumer, (2) intermediary supply chain, and (3) agricultural production. The team established consumer demand profiles, assessed production and human capital capacity, used input/output analysis to examine inter-relationships in the supply chain, and used insights from interviews to validate information from the data analysis.

Interviews and community discussion were especially important for helping frame the future state and developing the recommendations. The project team interviewed over 150 people at farms, processing businesses, food and beverage businesses, industry associations, university extension offices, agricultural marketing offices, and other members of the supply chain. Since GAP Analysis requires a strong view of the future, the team focused heavily on identifying trends, and interviewing younger producers and entrepreneurs who have longer-term investment objectives. Together, the data analysis and interviews helped uncover obstacles for building a regional food system, identify gaps in the market that can be reasonably filled by farmers in the market area, and discover feasible opportunities for improving the supply chain.

Concurrently, the team conducted seven community discussions throughout Maryland (Salisbury, Elkton, Baltimore, Silver Spring, Frederick, Charlotte Hall, and McHenry). Over eighty community representatives attended these meetings. Participants included residents, advocacy organizations, producers, food councils, and local officials. Together, these conversations helped the project team understand what consumers want in their food system, what they are currently getting, what they think is driving the current state of the system, and what they think has to change for the system to better serve them and their communities.

B: Detailed Findings

While the interviews and community meetings helped the project team develop a vision for the future, it is also important to have a thorough understanding of the present. Developing an accurate picture of the current state requires detailed research into agriculture production, how that production moves through the

existing supply chain, how it reaches consumers and how consumers then utilize the food they purchase. The following lays out the detail on which the “Findings” section at the beginning of this document is based.

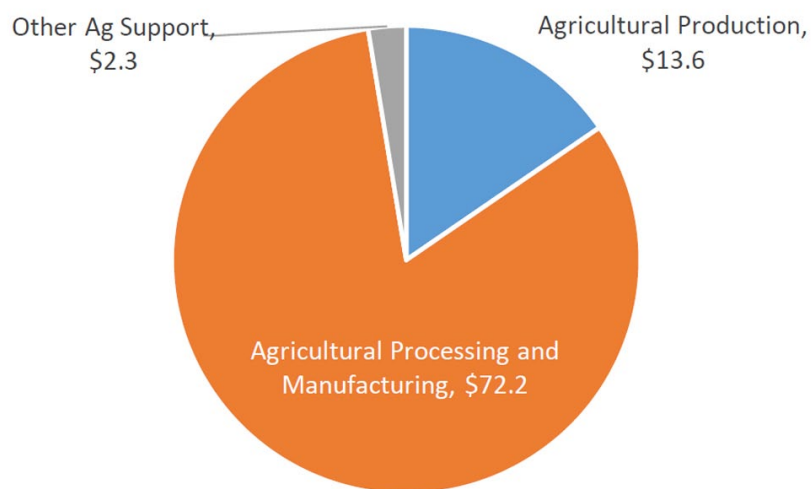
Local and Regional Agriculture

This section summarizes the key findings and trends that currently exist in the agricultural production sector. The data includes crop, livestock, seafood, and forestry production.

Economic Contribution of Agriculture

In 2016, the total contribution of the agricultural economy (including production and processing for forestry and seafood) was \$88.1 billion. The entire forestry industry contributed \$17.7 billion, and the seafood and aquaculture industry contributed \$1.1 billion. The agricultural economy directly employed about 205,697 full-time positions. That is about 2.3 percent of the region’s total employment.

Agricultural Contribution (billion dollars)



Source: IMPLAN, 2016

Table 1. Crop Acreage Harvested				
CROP	2002	2007	2012	% CHANGE
Vegetables (excludes melons)	98,520	100,709	91,586	-7%
Fruits⁸	59,033	49,936	45,518	-23%
Grains and soybeans	2,686,337	2,752,035	2,366,611	-12%

Source: USDA NASS Census of Agriculture

Table 2. Livestock Inventory				
LIVESTOCK	2002	2007	2012	% CHANGE
Broilers	127,169,178	157,904,558	146,957,594	16%
Layers	18,105,335	13,445,054	18,101,479	0%
Turkeys	4,297,151	4,931,133	2,978,988	-31%
Cattle & Calves	1,291,429	1,239,565	1,267,504	-2%
Hogs	815,426	766,313	721,991	-11%
Ducks	106,885	170,782	281,787	164%
Sheep & Lamb	71,103	70,735	63,976	-10%

Source: USDA NASS Census of Agriculture

⁸ Includes melons, fruit trees, citrus, vineyards, nut trees, berries, and melons.

Key Production Industries

Poultry, dairy, horticultural, and grain production are the key production industries in the study area. These contribute \$6.1 billion in revenues and 31,698 jobs, both full and part-time. The region also has many diversified operations engaged in vegetable, fruit, and livestock production. Crop acreage and livestock inventory data also reveal the importance of poultry, dairy and beef cattle, grains, and soybeans to the region. In 2012, 2.4 million acres of grains and soybeans were harvested and there were 168 million meat chickens, laying hens, and turkeys.



Top 5 Industries by Output

1. Poultry and egg production
2. Dairy and milk production
3. Greenhouse, nursery, and floriculture production
4. Grain farming
5. Support activities for agriculture and forestry

Top 5 Industries by Employment

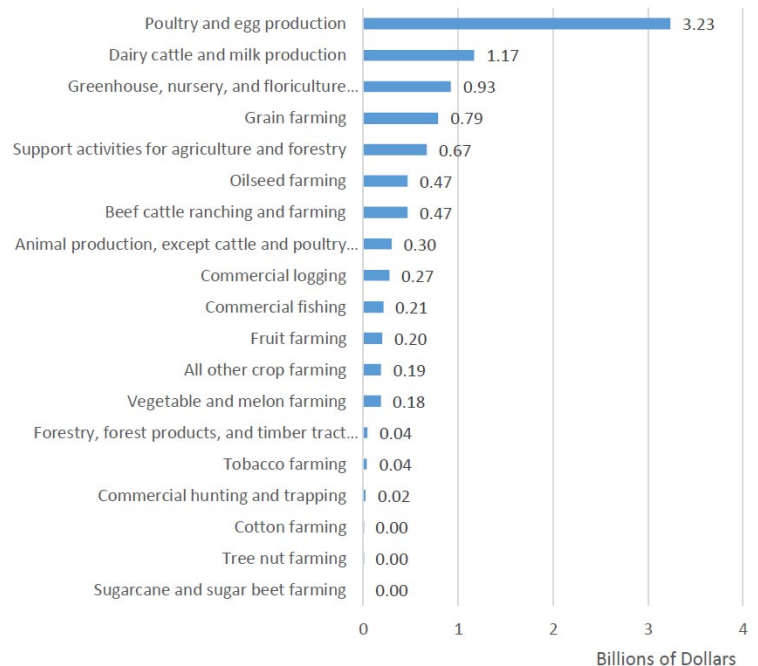
1. Support activities for agriculture and forestry
2. Greenhouse, nursery, and floriculture production
3. Poultry and egg production
4. All other crop farming⁹
5. Beef cattle ranching and farming

Top 5 Industries by Output per Worker

1. Poultry and egg production
2. Oilseed farming
3. Dairy cattle and milk production
4. Grain farming
5. Forestry, forest products, and timber tract production

Source: IMPLAN, 2016

Agricultural Production Output

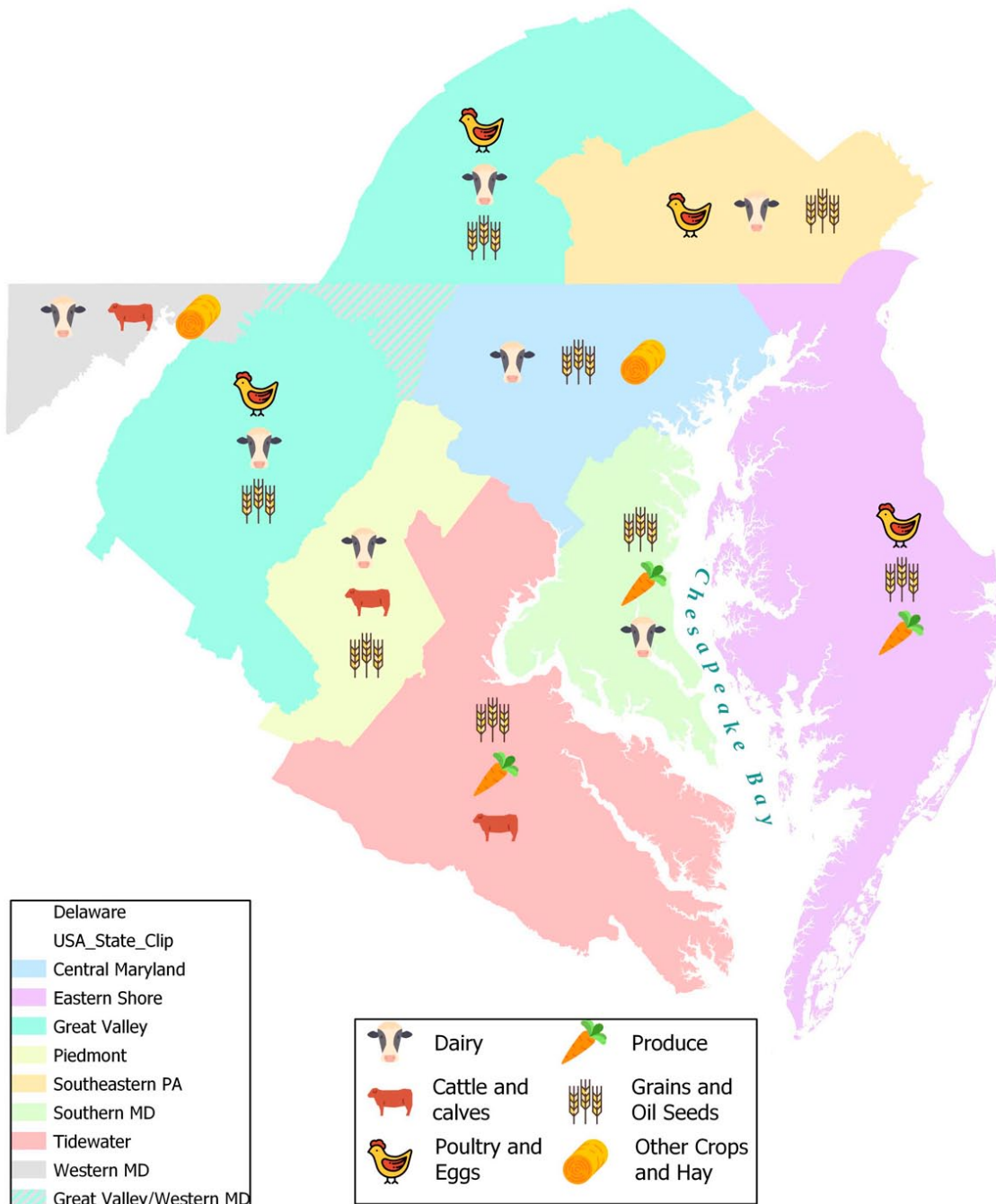


Source: IMPLAN, 2016

⁹ Includes NAICS 111998 and 111940. Products include: tea, cover crops, grasses, hay, maple syrup, herbs, hops, mint, and peanuts.

Key industries by sub-region differ, due to variations in soils, climate, historical patterns, and other characteristics. The following map highlights the diversity across the study area.

Top Three Production Clusters by Sub-Region



Declining Local Production

While the industry contributes billions of dollars to the local economy, the region is struggling with dropping food production across major agricultural commodities. This decrease is partly a result of rapid urbanization, declines in farms and farmland over the last several decades, a weakening farm labor force, industry trends, and other market forces. Between 2002 and 2012, there was a very slight increase in the number of farms from 45,845 to 45,991, which reflects a slowing rate of decline compared to past decades. Still, the number of acres of farmland continued to decline from 7.04 million acres to 6.87 million acres during the same period.

With shrinking farm numbers, there has been a loss of mid-sized operations. Even as many farms are consolidating, farms in the region tend to be smaller. Average farm sizes declined slightly by 1 percent from 188 acres to 186 acres between 2002 and 2012. Median farm acreage also declined 15 percent from 68 acres to 58 acres.

This decrease is driven by an increase in farms that are 1 to 49 acres and a decline in farms that are 180 to 999 acres. The decline in mid-sized farms can be problematic since these operations are at a scale that is well-suited for servicing local and regional supply chains. Also, small farms tend to be retirement farms or small-scale diversified operations that do not contribute significantly to the total sales of agricultural products. Ultimately, current farm trends do not support strengthening access to regional wholesale markets.

Who Grows Our Food?

In 2012, there were 72,274 farmers (all operators), a number that has plateaued in recent decades. Although, this was a slight increase between 2002 and 2012. This growth can be attributed to greater gender diversity among farmers. During this period, there was a 16 percent increase in women farmers, which offset slight declines among male farmers. Lastly, most farmers in the study area are predominantly white, and racial diversity has not increased during the period.

Table 3. Gender Diversity			
	2002	2007	2012
Farmers	69,223	72,967	72,274
Female	29%	31%	33%
Male	71%	69%	67%

Source: USDA NASS Census of Agriculture

Table 4. Racial Diversity			
Race	2002	2007	2012
White	97.8%	97.6%	97.9%
Black or African American	1.3%	1.1%	0.9%
Asian	0.2%	0.4%	0.6%
American Indian or Alaska Native	0.3%	0.4%	0.3%
Native Hawaiian or Pacific Islander	0.0%	0.0%	0.0%
More than one race	0.3%	0.5%	0.3%
Other Races (non-white)	2.2%	2.4%	2.1%

Source: USDA NASS Census of Agriculture

Who Will Grow Our Food?

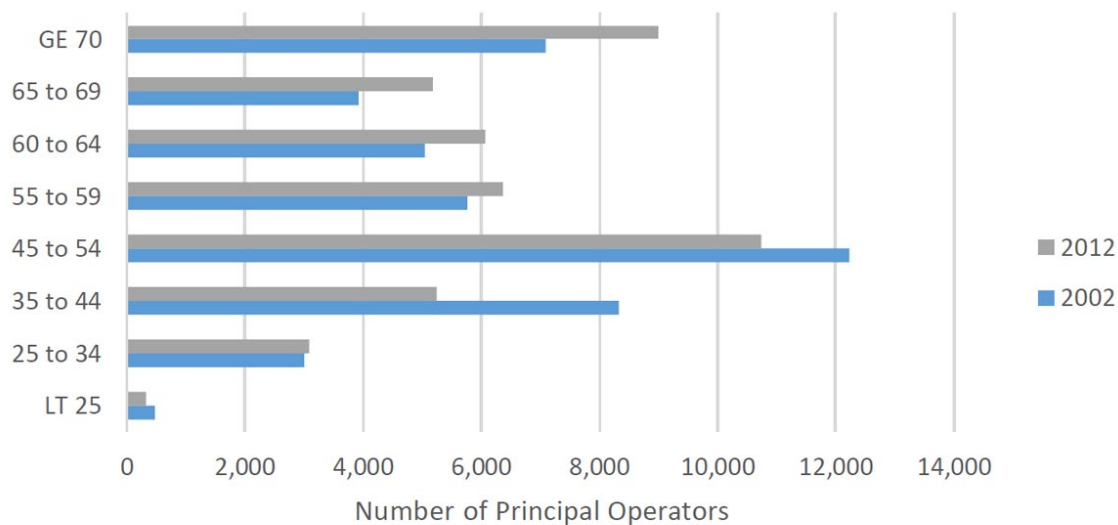
Low replacement rates for retiring farmers is one of the greatest areas of concern related to the future of our food system. The challenge of farm transition is systemic and arises from myriad issues, including low-profitability, demographic shifts, land access, complicated regulatory structures, and poor access to training and education. As in the rest of the country, the farm population in the region is aging. There is a declining number of younger farmers and a growing number of older farmers. The average age of farmers in the study area is 59, and 42 percent of farmers are below the age of 55. More significantly, the age breakdown reveals that 20 percent of the principal operators are older than 70 years of age, and 7 percent are under the age of 35. Trends also suggest that the younger cohorts are declining, while the older cohorts are increasing.

Beginning farmers, those that have fewer than ten years of on-farm experience, only represent 22 percent of principal operators, and that percentage is on a downward trend. At the same time, more farmers are looking for

work elsewhere. These farm transition indicators reveal a weakening farm labor force, potential loss of institutional farming knowledge, and difficulties retaining land in farms. These problems are not unique to farming and represent a larger national trend across many industries. In the next five to ten years, many farmers will be retiring. Replacing these farmers requires a group of young people who are interested in agriculture and willing to take a risk on farm ownership. However, the pool is small. Graduates with college degrees in agricultural production will not be enough, and well-designed on-farm apprenticeships or alternative training opportunities will be critical.

Furthermore, low or modest farm income make it difficult for farmers to hire farm help, which dampens interest in agriculture as a career. Within the study area, farm profitability has been low and stagnant between 2002 and 2012, and over half of the farms had losses. For beginning farmers, low income is confounded by other issues such as student loan debt and healthcare costs.

Principal Operators by Age Group, 2002 & 2012



Source: USDA NASS Census of Agriculture

Agricultural Education and Labor

Besides the declining number of farmers, there is a declining pool of skilled agricultural labor. Currently, agricultural education and workforce development for both managerial and operational aspects of agricultural production is lagging in the study area. Over the last couple of decades, many agricultural programs were phased out of public schools in the region, leading to fewer agricultural programs, FFA chapters, and the number agricultural teachers. The loss of earmarked funding for agricultural education has been a key factor in this decline.

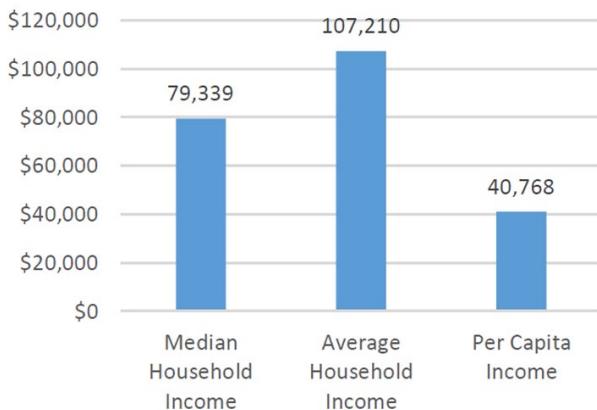
STATE	MS AG PROGRAM	HS AG PROGRAMS	STUDENTS ENROLLED	FFA Chapters	FFA Students	Ag Teachers
Maryland	2	48	5,200	50	2,382	70
Delaware	13	27	8,703	43	3,688	76
Pennsylvania	2	185	7,154	185	13,000	255
Virginia	81	233	34,758	197	8,400	359

Source: MAEF, 2018

In addition, there is insufficient vocational training involving agriculture. Many farm operators indicated a lack of available labor with electrical, plumbing, mechanical, and basic engineering skills. These are critical skills that are required on farms that are increasingly mechanized. In the future, there will be even greater emphasis on workers having fundamental engineering, computer, and programming knowledge. At the same time, there should be opportunities to build entrepreneurial, business, and management skills to aid in career advancement and farm transition.

Another limiting factor for improving the agricultural labor pool involves the demographics of the region and the industry's average pay. The region is highly-educated, with 67 percent working a white-collar job. Only about 0.4 percent of the population works in farming, forestry, or fishing. In 2018, the average household income was \$107,210, the median household income was \$79,339, and per capita income was \$40,768.

2018 Income Characteristics



Source: ESRI Business Analyst, 2018

WHITE COLLAR	66.7%
Management/Business/Financial	18.3%
Professional	26.6%
Sales	9.0%
Administrative Support	12.8%
BLUE COLLAR	16.5%
Farming/Forestry/Fishing	0.4%
Construction/Extraction	4.3%
Installation/Maintenance/Repair	3.0%
Production	3.5%
Transportation/Material Moving	5.3%
SERVICES	16.8%

Source: ESRI Business Analyst, 2018

In comparison, the average income per worker in the study area for agricultural production sectors was about \$32,210 in 2016. Income per worker was highest for those in the oilseed farming, timber tract, or commercial logging sectors. It was the lowest for those in commercial fishing, beef cattle ranching, or farms focused on growing a variety of specialty crops.

Job opportunities in the region favor white collar and high-tech jobs. Agricultural work needs to be compelling to attract educated labor. While some people will achieve managerial positions in agriculture, those positions will be limited. Many others will have to accept a less than average pay or start their own agricultural businesses. More than likely, those who get paid well in agriculture will have a high-tech job linked to biotechnology, data science, research, product development, engineering, robotics, or artificial intelligence.

Beginning Farmer Training

Robust on-farm training is one of the most important tools for preparing young and beginning farmers to establish successful farming enterprises. This understanding has led to the development of Beginning Farmer Training Programs.

Many universities and extension offices already provide resources and programs to educate people interested in agriculture as a career (e.g., [UMD Extension's Beginning Farmer Success Program](#); [VA Beginning Farmers & Rancher Coalition](#)). However, few programs prepare people through long-term training on the farm.

Currently, there are six year-long or multi-year programs in the region:

- [Future Harvest CASA BFTP](#)
- [Eco City Farm's Growing Urban Farms and Farmers Program](#)
- [Arcadia Veteran Farmer Program](#)
- [Tricycle Urban Agriculture Fellowship Program](#)
- [PASA Diversified Vegetable Apprenticeship](#)
- [PASA Dairy Grazing Apprenticeship](#)

Most of these programs are focused on small-scale or diversified vegetable operations that primarily sell direct-to-consumer. There are not many programs dedicated to livestock, poultry, grain, or large-scale crop production. A few factors may drive this deficiency, including a lack of mentors or declining labor needs for certain operations. For instance, large-scale grain operations require few workers, and operators may expect the workers to have certain skills already. It appears that new program structures should be designed for other types of farm operations.

The Dairy Crisis

The dairy sector is under crisis, and it illustrates many of the key topics previously discussed issues regarding production agriculture, from declining production, labor issues, industry challenges, and shifting consumer preferences. Dairy farmers contributing to the commodity market are dealing with a combination of volatile feed prices, growing operating costs, poor forage availability, trust and transparency concerns, and marketing challenges. As a result, the number of dairy farms and dairy cows has been declining over the last two decades.

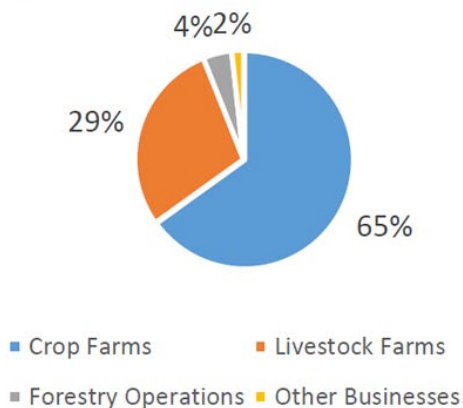
Within the study area, most dairy farms have small herd sizes. The average dairy herd size is between 70–75 cows with 48 percent of farms having fewer than 50 cows. Nationally, the industry is consolidating and favors large scale production. Dairies with smaller herds are at risk because they do not have the leverage to secure contracts with cooperatives and dairy processors, obtain higher payments of large-scale herds, or have the extra capital to develop value-added products.

Industry professionals predict losses of up to a third of production in the study area. Such declines could directly eliminate 1,390 full time and part time jobs and reduce the output of dairy products in the study area by \$346.5 million. The ultimate economic impact, including support industries, would be a loss of \$641.1 million to the economy and about 3,300 jobs. As a result, wholesale distributors could lose \$43.9 million and animal feed manufacturers about \$38.3 million. Despite its smaller magnitude, the potential loss of \$21.5 million to agricultural support services in the region poses perhaps the

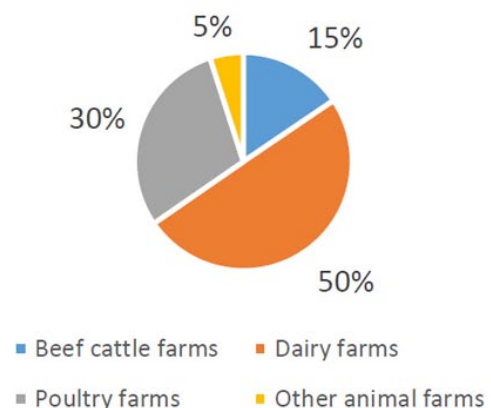
largest threat to agriculture. The support sector generates about \$657.5 million in economic output, with about 29 percent of coming from livestock services and half of which involves supporting dairy production.

Over the last decade, livestock support service industries have been in decline in rural counties where dairy is concentrated. These industries typically work across livestock types. They serve not only operations concerned with dairy, but also those concerned with beef, hogs, and chickens, national commodity markets, and local and regional markets. If support service providers continue to decline with dairy production, this will impact all livestock operations in the region that rely on their services. Ultimately, the result is a weakened local supply chain, potentially lower quality livestock, and a compromised infrastructure environment for both national commodity and local marketing operations within the region.

Share of Demand for Agricultural Support Services



Demand for Support Services from Livestock Farms



Source: IMPLAN, 2016

Agricultural Innovation

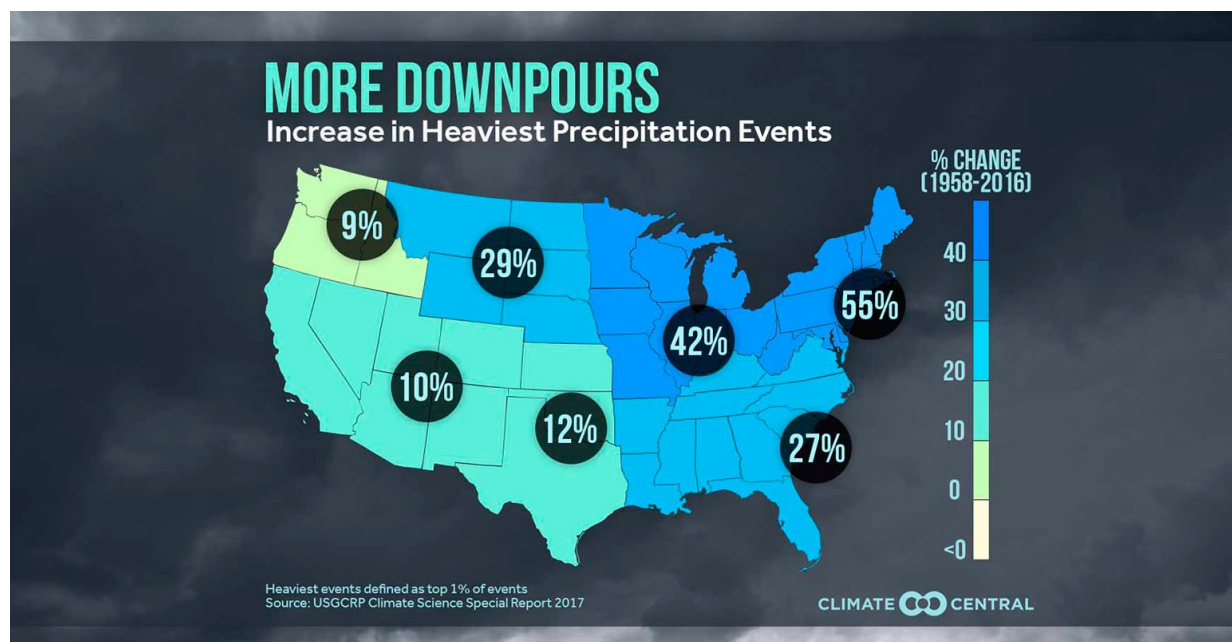
Historically, agricultural innovation has been about producing more food using fewer inputs and selling cheaper food. Today, this approach continues through advancements in gene editing, automation, robotics, and indoor-farming. However, there is growing interest in innovating to improve labor productivity and yields in the face of a changing climate and poor labor participation.

Interest in employing technology for both indoor and outdoor production systems is high among the young prospective farmers. This is particularly true in areas of sensor technology, precision agriculture, robotics, programming, and drone applications. These same young entrepreneurs are interested in the intersection between agriculture and the environment and using technology to improve and monitor advancements in soil and water health improvement in real time.

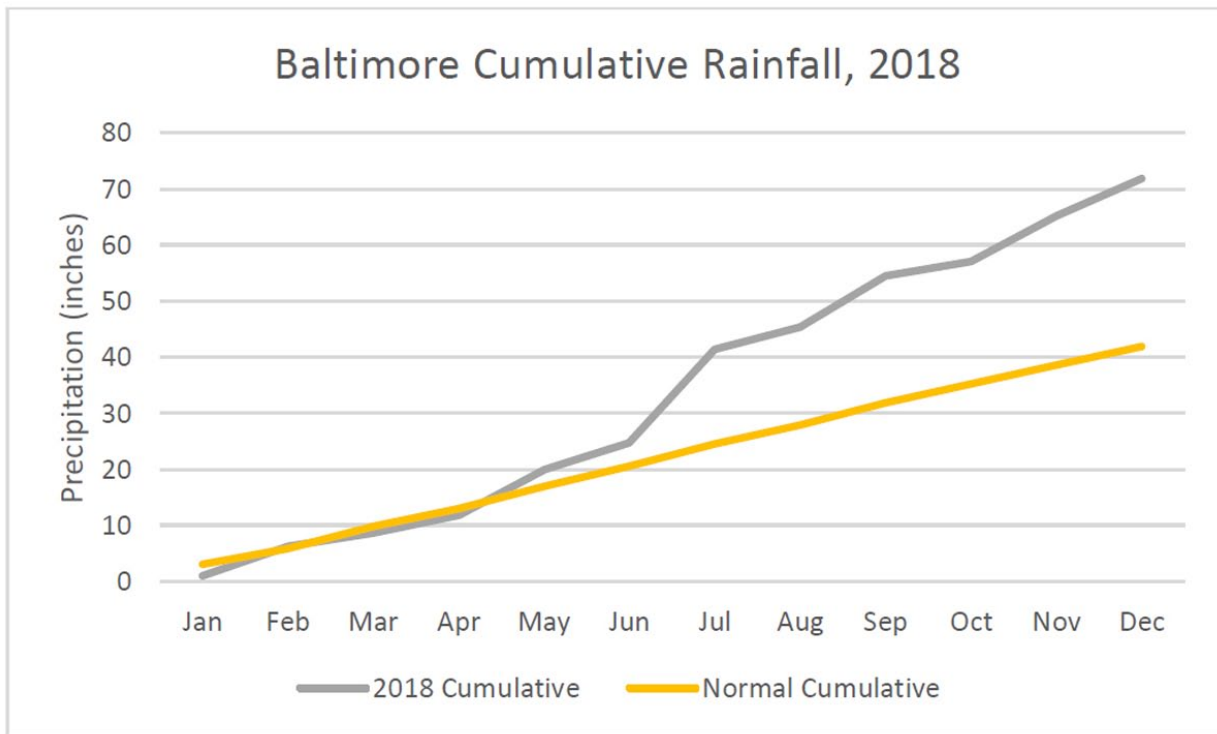
Research and Development

Interviews with farmers indicated a need for more research and development into crops that may have unique demand characteristics in the local market and the potential for higher profit margins, such as hops,

hemp, barley, millet, and other small grains for food and beverage use. This demand comes at a time when food manufacturers are increasingly marketing products to meet the ever-changing and more segmented demand of consumer markets. Consumers are demanding a greater variety of products, like low-gluten products made with ancient grains and alternative grains such as spelt, farro, and einkorn to building products made with biological fibers. As competition increases to attract the interests of buyers, even local craft beverage operations and bakeries are working with local farmers to grow new products and make new ingredients to appeal to consumers looking for new flavors and varieties. Beyond developing for changing tastes, breeding programs should create varieties that can withstand the impacts of climate change. Adaptive crops will be increasingly important for the Mid-Atlantic region, which is expected to experience more precipitation, more intense weather, rising temperatures, and greater humidity. Increased rainfall will especially impact production through greater pest and disease incidence that will reduce yields. In 2018, farmers across the region suffered significant losses as a result of record rainfall that was 71 percent above normal.



Source: National Weather Service



Source: National Weather Service

Weakening Agricultural Support Services

Shifts in the types and location of agricultural support services indicate a weakening agricultural support sector, especially for livestock production. Even though data shows that both crop and livestock support services have increased within the study area, farmer and service provider interviews indicate that they have shifted from agricultural services to support retail consumer needs such as residential landscaping and small animal veterinary services. The problem is that one or two dominant production sectors in the local market support the services that remain. For much of the study area, dairy is the largest contributor to the

agricultural economy, and the fate of key support services will track with the fate of dairy.

Overall, the trends point toward a weakening agricultural support sector. Between 2006 and 2015, industry firm concentration declined by one percent with livestock and forestry support services taking sharp declines. Given that livestock production represents over 50 percent of the economic contribution of agricultural production sectors, this has the potential to negatively affect other production sectors.

Table 7: Agricultural Support Services Firm and Industry Concentration Change

STATE	Firms 2006	Firms 2015	% Change	LQ 2006	LQ 2015	%Change
Support Activities for Agriculture and Forestry	363	376	4%	0.8	0.8	-1%
Crop Production	75	85	13%	0.4	0.4	9%
Animal Production	262	267	2%	1.4	1.4	-4%
Forestry	26	24	-8%	0.4	0.3	-7%

Source: US Census, County Business Patterns

Understanding Firm Concentration:

Firm concentration is a measure of a region's industrial specialization compared to a larger area (usually the nation). It is measured in terms of something called a location quotient or coefficient (LQs). An LQ greater than 1.0 means that a sector is more concentrated in the study area than in the larger geography, while one less than 1.0 means the industry is less concentrated.

Intermediate Supply Chain

This section summarizes the key findings and trends that currently exist in the intermediate supply chains, which includes food and beverage processors, manufacturers, aggregators, distributors, and wholesalers.

Food and Beverage Snapshot

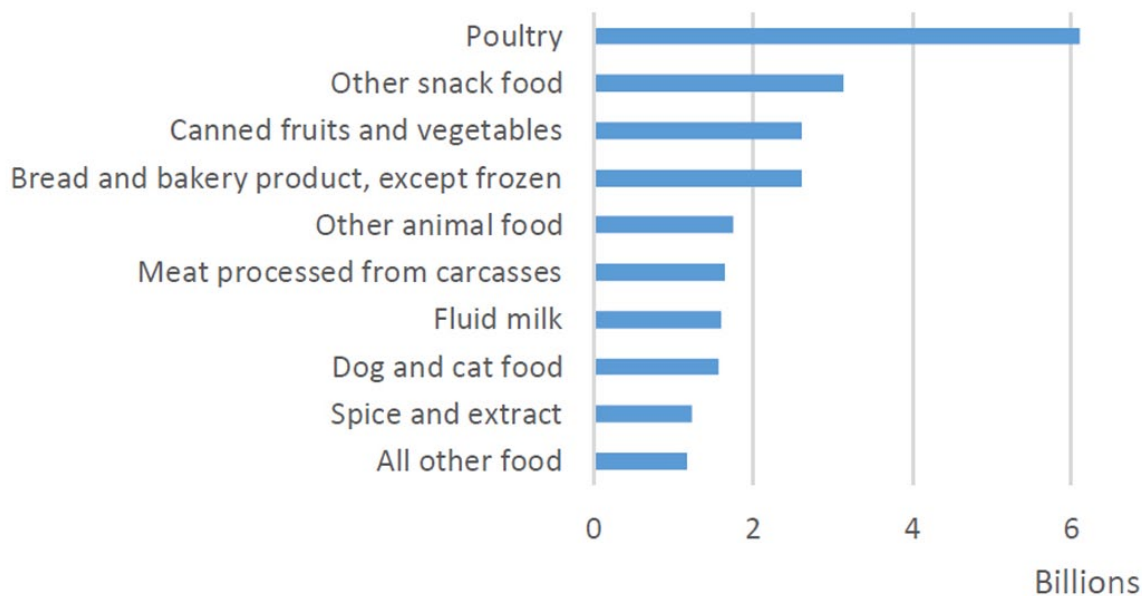
The food and beverage segments of the supply chain in the study area are among the largest economic contributors to the region's economy, particularly within the more rural regions of the foodshed. For this project, the intermediate supply chain is comprised of two primary

groupings of businesses: (1) firms that manufacture food products, and (2) firms that handle, transport, and store food products.

The food and beverage manufacturing industry contributed \$36.7 billion in economic output, 82,570 full and part-time jobs, and \$4.4 billion in wages in 2016. The food and beverage wholesaling industries also generated about \$17.5 billion in revenue and employed about 50,038 people in 2018. In addition, there is economic activity involving the trucking, warehousing, and delivery of food and beverage products, particularly through third-party logistics providers that are difficult to quantify.

The top food and beverage manufacturing industries by economic output include: poultry processing, snack food manufacturing, canned produce manufacturing, baked goods manufacturing, animal feed manufacturing, other meat processors, and fluid milk manufacturing. Key food and beverage wholesaling industries include: wholesalers of packed frozen foods, fresh produce, general line grocery items, seafood, alcoholic beverages, and poultry.

Top 10 Food Manufacturing Sectors by Output



Source: IMPLAN, 2016

Table 8. Industry Concentration for Food Manufacturing Industries		
Manufacturing Industry	LQ 2015	% Change from 2002
Seafood product preparation and packaging	1.1	-31%
Animal food manufacturing	1.0	2%
Sugar and confectionery product manufacturing	0.9	-11%
Bakeries and tortilla manufacturing	0.9	22%
Other food manufacturing	0.8	-12%
Beverage manufacturing	0.8	39%
Dairy product manufacturing	0.8	0%
Grain and oilseed milling	0.7	-18%
Animal slaughtering and processing	0.6	8%
Fruit and vegetable preserving and specialty food manufacturing	0.6	14%

Source: US Census, County Business Patterns

Table 9. Industry Concentration for Food and Beverage Wholesale Industries	
Wholesale Industry	LQ 2015
Poultry and poultry product	1.5
Fish and seafood	1.1
Beer, wine, and distilled alcoholic beverage	1.1
General line grocery	1.0
Other grocery and related products	0.8
Confectionery	0.7
Packaged frozen food	0.7
Fresh fruit and vegetable	0.7
Dairy product (except dried or canned)	0.6
Meat and meat product	0.6
Livestock	0.6
Other farm product raw material	0.5
Grain and field bean	0.3

Source: US Census, County Business Patterns

Dairy, Poultry, and Grain Industries Anchor the Regional Agricultural Economy

Dairy, poultry, and grain industries anchor the regional agricultural economy and food and are strongly linked through the use of similar suppliers, processors, and wholesalers. For instance, both poultry and dairy processors rely on proximity to farms that raise animals on animal feed, which involves a mix of unprocessed and processed grains. Similarly, the grain and oilseed processing and manufacturing industry is strongly associated with the livestock feed, snack foods, baked goods, and confectionery manufacturing sectors. These related industries use processed grain products such as flour, meal, oil, malt, and cereal. In addition, these sectors rely on processed dairy products such as milk, butter, and cream.

The relatively high economic multipliers for these industries within the study area reflect a high degree of interconnectedness. A multiplier is a measure of economic impact resulting from increased spending; it also measures how many times a dollar circulates through a locale. The higher the multiplier, the more times the dollar has been recycled. For instance, the multiplier for fluid milk manufacturing is 2.06; flour milling, 1.94; poultry processing, 2.10; and animal feed manufacturing, 1.67. (Refer to [Appendix C](#) for full list). This means that every dollar spent on the fluid milk industry generates an additional \$1.06 for the local economy.

Consolidation in Food and Beverage Supply Chains

A major phenomenon characterizing national and global food supply chains is consolidation. In the last twenty years, there were over 9,000 transactions in these sectors nationally, with a record high of 591 transactions in 2017 over the last fifteen years.¹⁰

Much of the consolidation within the upstream supply chain has been driven by consolidation among food retailers. As food retailers grow larger, they increasingly demand national brands and forgo regional or cultural favorites. This helps them to achieve scale efficiencies by working with fewer suppliers or distributors. These changes also mean that stores are replacing local suppliers with national ones, as was the case for some of Whole Foods' local suppliers after the Amazon acquisition.

Intense consolidation has resulted in a handful of companies dominating market share within key regional sectors, such as baked goods and snack foods. It is also reflected in vertically integrated industries, such as poultry, as well as national-scale supply chains for processed beef, grains, and produce. In each case, consolidation is used to improve efficiencies, reduce redundancies, and drive growth. For many large companies, which are often multinational conglomerates, this is also a tool for remaining competitive at a global or national scale.

While this makes economic and financial sense for a corporation, it is not likely to favor the growth of local and regional foods in the larger intermediated marketplace in a manner that reflects the values and interests of communities and individuals in the region. A shift towards larger supply chains generally means declines in regional brands and fewer distribution centers that are responsive to demand local and regional foods. These conditions make it difficult for regional products to compete with national brands that benefit from economies of scale and efficient distribution demanded by large retailers. However, many local processors, while pressured by this trend, have found that consolidated supply chains often leave significant opportunities to service market niches for specialty and ethnic products with specialty retailers.

¹⁰ Poinski, "From Efficiency to Innovation."

Small Limited-Resource Businesses Need Support to Enhance Local Supply Chains

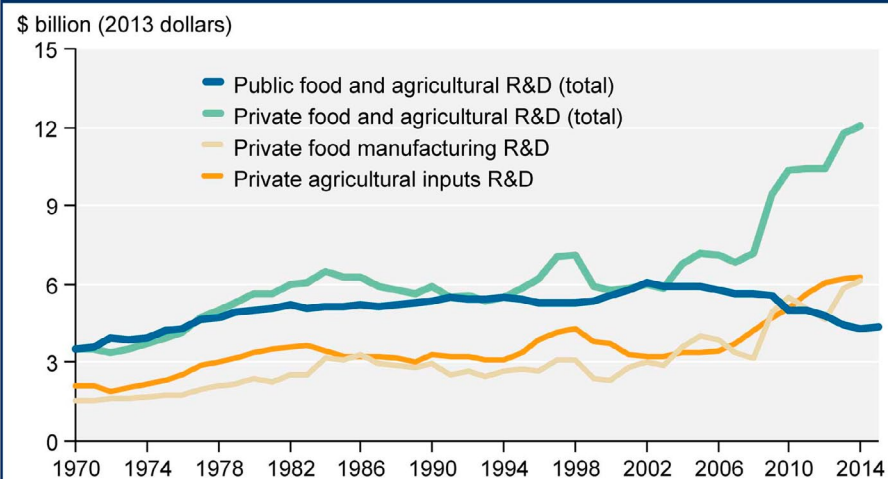
To build a strong regional food system, there need to be companies that are appropriately scaled to keep economic benefits recirculating within the region. Despite industry consolidation and high costs of entry, many small-scale, limited-resource businesses and local entrepreneurs remain. However, these businesses are not large enough to significantly impact the regional economy. A concerted effort involving many of these local businesses could help strengthen the regional supply chain. Such businesses would contrast with national or global processors. The growth of companies such as Hershey's or Utz may not generate economic benefits that primarily remain in local communities. While these companies belong to sectors that generate significant economic output, their supply chains tend to be national or global.

Investing in Innovation

While medium-sized regional businesses would have a significant impact on the local economy, large companies can play a role in stimulating innovation. They could provide opportunities for start-ups developing new food and beverage products. In recent years, such companies have been buying or cultivating food start-ups through business incubators or accelerators. Chobani, Kraft Heinz, and Kellogg's have provided technical assistance, food labs, commercial kitchens, and marketing support to spur innovation.

Historically, a combination of private and public funding led by federal spending provided this support. With this decline in spending, private investment has necessarily increased. This model of buying or investing in innovation is becoming increasingly prevalent and may serve as a model for creating local or regional entities that focus on developing start-ups that will benefit the local or regional economy. This would be suitable for social investors looking to support businesses that are mission or impact driven.

Food and agricultural research and development (R&D) funding, real (inflation-adjusted) dollars, 1970-2015



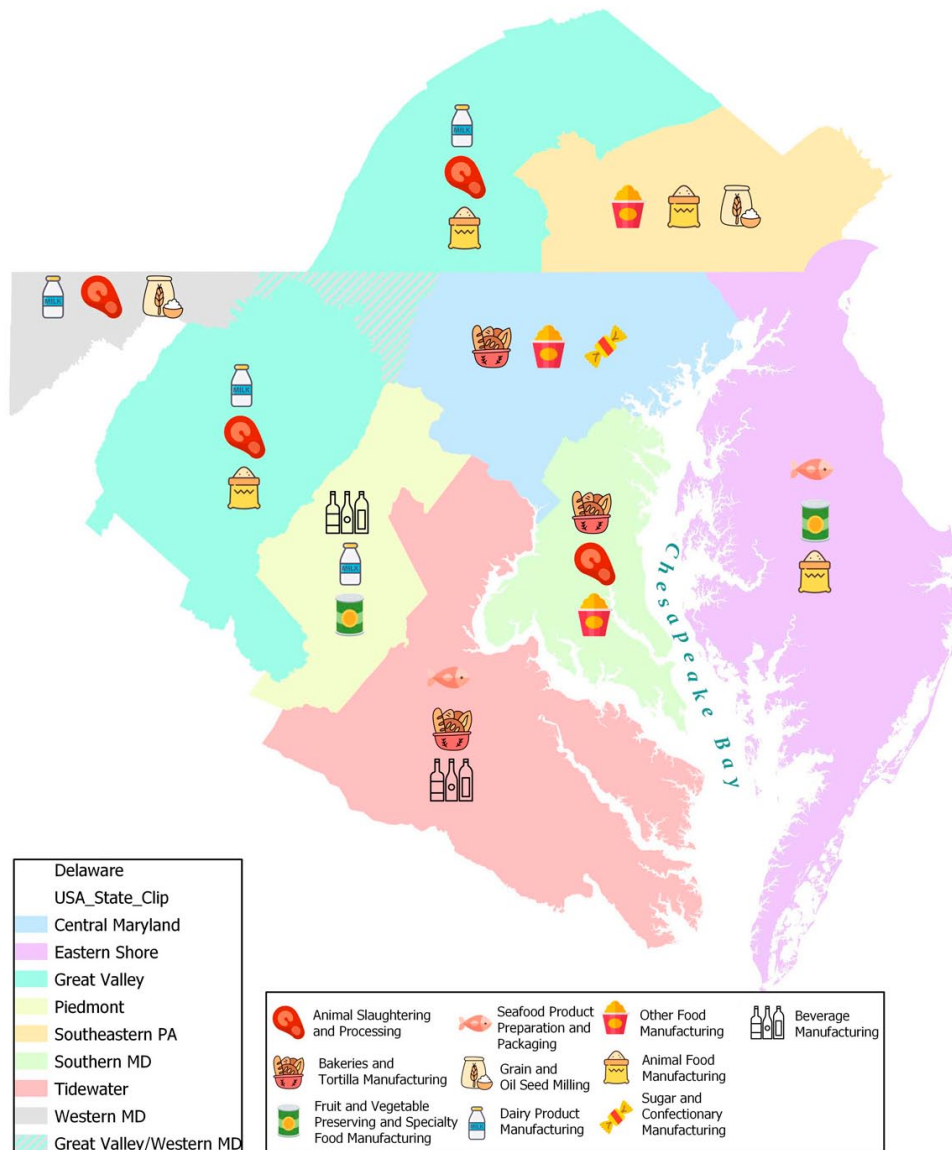
Note: Private agricultural research funding data are through 2014; public agricultural research funding is available through 2015.
 Source: USDA, Economic Research Service (ERS) using data from National Science Foundation, USDA's Current Research Information System, and various private sector data sources. Data are adjusted for inflation using an index for agricultural research spending developed by ERS. Data as of February 2019.

Centers of Activity for Processing and Manufacturing

Food and beverage processors and manufacturers often cluster around assets that lead them to concentrate in either urban or rural environments. For example, poultry processing tends to concentrate near its farm supply while dairy processing tends to concentrate near its consumer markets. The Chesapeake Foodshed has many examples of concentrated economic activities by region as depicted in the map(s) below.

By value, the intermediated supply chain concentrates in population centers, key infrastructure, and logistics services. Most of these businesses cluster around Washington D.C. and Baltimore City. In general, counties in Central Maryland, Northern Virginia, and Southeastern Pennsylvania are home to the majority of these establishments. Not coincidentally, there are concentrations of distribution facilities and logistics services in these counties.

Top Three Manufacturing Clusters by Sub-Region

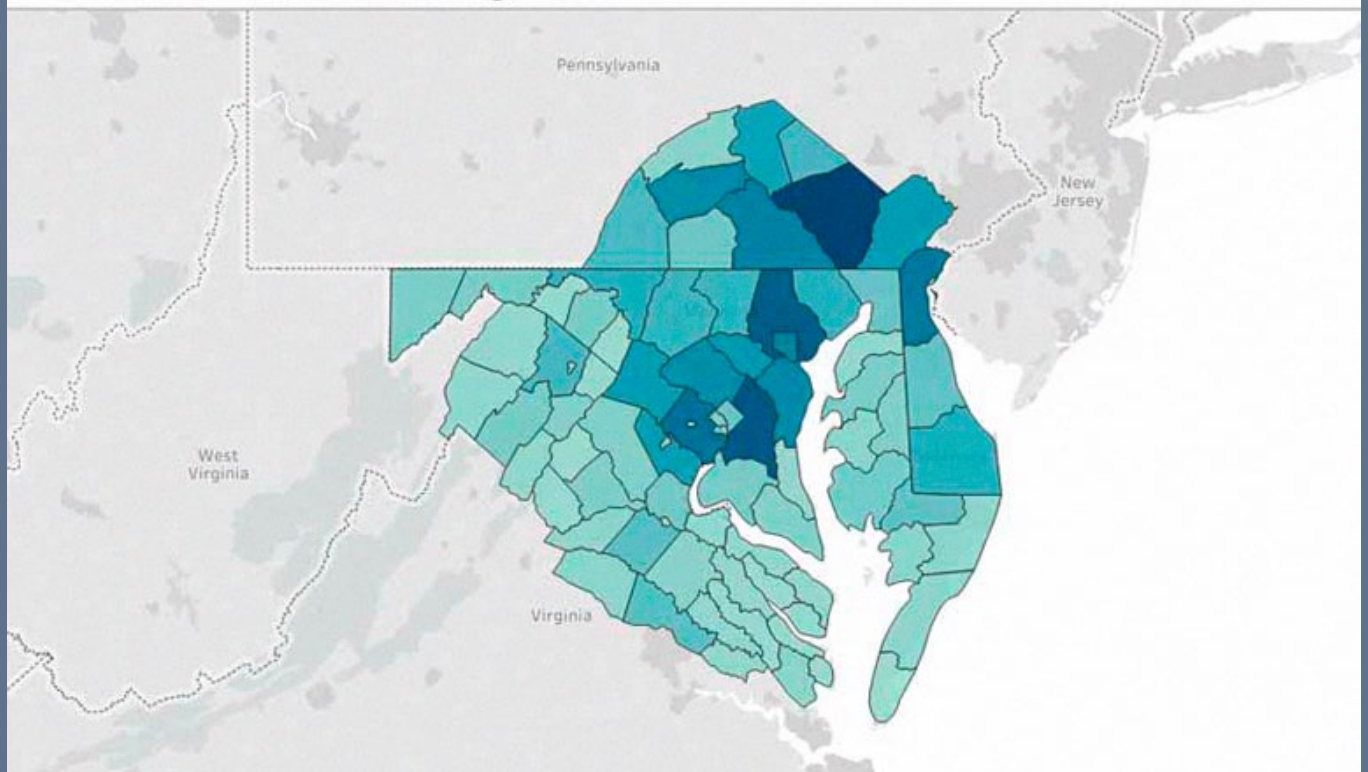


Logistics, Distribution, and Warehousing

The logistics, distribution, and warehousing sectors are important for storing, packing, transporting, and delivering products. They provide liquidity to the food system and play an integral role as an information conduit between suppliers and buyers. Having sufficient and diverse types of these supporting services is crucial for addressing the varying needs of farms, processors, wholesalers, and retailers. In particular, specialized freight trucking, refrigerated warehousing, and farm product warehousing are important for supporting the food supply chain.

As stated earlier, these support services and infrastructure are located in several activity centers: central Maryland, Southeastern Pennsylvania, and counties near Washington D.C. In particular, places like Jessup, Maryland are home to many distribution and storage facilities and serve as the meeting point where local farmers intersect with other businesses in the food system.

Distribution & Warehousing, 2015



Source: US Census Community Business Patterns, 2015

Shifts in the Number and Location of Warehousing Facilities

The number of firms providing warehousing and storage facilities in the study area increased by four percent between 2006 and 2015. Increased numbers of general warehousing facilities drive this growth, which includes distribution centers. However, these facilities are moving out of the urban I-95 corridor and shifting towards rural counties in Pennsylvania and Virginia along Interstate corridors such as I-81, I-76, I-70, and I-476, as well as major arteries such as US Routes 50, 22, and 13. In particular, York and Lancaster counties in Pennsylvania have experienced the greatest increase in the number of these facilities.

During this period, there was also a loss of refrigerated warehousing and farm product warehousing. While refrigerated warehouses are still primarily located in central Maryland and Southeastern Pennsylvania, the number of these firms declined over the years in these subsectors, causing seasonal shortages of cold and freezer storage. The decline means that some locally produced products are exported outside of the region for storage. In some cases, the value-added activity associated with these products is now happening outside of the region at points closer to the storage activity.

Most of the farm product warehousing operations are located in the more rural counties on the Eastern Shore. Despite this, firm concentration for farm product warehousing is increasing relative to the rest of the country, which raises questions about whether these facilities represent forward storage for imported agricultural products.

Opportunities exist to increase the presence of both cold and farm product logistics facilities in the rural areas of the region and will be driven by three major factors. First

is market access that allows distributors to maximize the local freight transportation benefits for local delivery relative to the new over-the-road rules that limit drivers to a practical driving day of ten hours. Second is the congestion patterns that make areas like the Eastern Shore less likely to see growth than the Shenandoah and Great Valley regions of Virginia and Pennsylvania. Third is the changing composition of agriculture, which may favor the development of new logistics facilities to support the needs of emerging sectors.

Shifts in Freight Trucking

The study area is also experiencing shifts in general and specialized freight trucking. Both types of trucking are becoming less concentrated. These services are also specialized for local or long-distance freight. 57 percent of the trucking services in the study area are local freight, but the number of these firms is declining by 12 percent. Meanwhile, the number of long-distance freight services is declining by 8 percent. In general, most of these services are located in central Maryland and Southeastern Pennsylvania, but Pennsylvania has more specialized long-distance freight services.

Overall general freight trucking has not changed much, but the types of general freight trucking have. Between 2006 and 2015, there was an increase in local freight, a decrease in long-distance truckload (TL) freight, and an increase in long-distance less-than-truckload (LTL) freight. Conversations with industry experts and anecdotal evidence also confirm that the industry is shifting towards more LTL freight as more trucks leave or return with mixed loads.

In general, LTL freight can be more efficient since it combines partial loads to create full multi-stop truckloads. LTL shipping has contributed to a phenomenon called “wholesale bypass,” because full truckloads are less

likely to find their way onto the local spot market, making wholesale markets like the Philadelphia Produce Market less valuable in the supply chain. Offsetting this negative impact, LTL is more environmentally-friendly since it results in fewer trucks carrying full loads, rather than more trucks carrying less than their carrying capacity. However, coordination to ensure each vehicle and route is maximized for efficiency is complicated and requires centralized data management.

This trend presents opportunities for businesses and policymakers to address the needs of a regional food supply chain. The right policies can encourage fewer trucks on more efficient routes in urban areas and reduce conflict between cars and trucks. LTL freight services can also help boost small-business activity and make it easier for delivery services involving farm products, food, and beverage.

Specialized freight trucking is also experiencing shifts. Both local and long-distance specialized freight trucking have declined sharply between 2006 and 2015. The decrease is problematic because these businesses haul agricultural products, milk, logs, juices, agricultural chemicals, top-soil, livestock, and forest products. Shrinkage in these services means difficulty establishing a local or regional supply chain.

In areas where failures have had acute impacts on agriculture, farmers have created collaborative solutions to trucking shortages. By example, farmers in western New York started a company called Agricultural Transport to aggregate and deliver loads of perishable products to eastern seaboard markets and take backhaul to local markets.

Traffic and Roads

Freight trucking and other delivery services face unique challenges across the region generated by the widely varied conditions of roadways, new regulatory pressures, and highly congested traffic patterns in urban areas. Many in the industry consider traffic to be the largest issue.

The core metropolitan areas of the foodshed region have the 6th worst traffic congestion in the United States.¹¹ Roadways, particularly within and around the Interstate 95 corridor, are among the most congested in the United States. I-95 sees high levels of freight and commuter traffic, so its congestion makes logistics planning and management difficult and creates major challenges including:

- Time of day delivery restrictions that keep delivery trucks off city streets during commuting hours
- Periodic delays in delivery times due to traffic congestions, road work, public events, and accidents that cause reliability problems and raise costs
- New food safety rules affecting trucking, which have reduced the number of third-party refrigerated trucks on the road
- Changes to Department of Transportation regulations that restrict the number of driving hours in a day for local and long-distance hauling.

The complexity creates additional costs and complications associated with operating in the I-95 corridor. As a result, companies heavily invested in local logistics in the region have increased fleet sizes and changed operating characteristics to be clear of urban centers outside of restricted hours. Meanwhile, companies that rely on local markets, but do not need to run large logistics networks, are shifting to where their customers are located. Large food-logistics companies are increasingly shifting to the Interstate 81 corridor to avoid the I-95 congestion, which is effectively shifting the center of distribution activity from central Maryland to the Shenandoah Valley of Virginia and the Great Valley in Pennsylvania.

¹¹ Winship, "The 10 US Cities with the Worst Traffic."

Impact of Food Safety Regulations

Additional changes in transportation infrastructure are expected with the implementation of the transportation rule required by the *Food Safety Modernization Act*. Changes include the adoption of more door-to-door temperature control, increased lighting requirements, automated monitoring of truck temperatures, and the requirement for sanitary washing of food truck interiors. As a result, manufacturing and distribution activities are likely to shift to new buildings with access to the specialized infrastructure needed to meet these regulations. As commercial real estate developers gear up, these facilities are likely to move out of the I-95 corridor and may adversely impact grower access to urban markets.

Geographic Dispersion of Supporting Industries Poses Challenges

Even though there is an aggregation of particular industries and key supply chain infrastructure around activity centers within the study area, there is also a diverse array of manufacturing and wholesaling sectors dispersed across the region. One implication of this geographic dispersion of supporting industries is that building a regional supply chain becomes challenging. The processed vegetable and meat packing supply chains illustrate this dynamic.

Processed Vegetable Production

Vegetable processing is a low-margin industry that requires specialized support industries near manufacturing to remain viable. These support services range from specialized harvesting to conditioning and transportation equipment needed to get crops from field to factory. When any element of this supply chain falters, it can bring the entire supply chain to a halt.

The shrinkage of services has impacted the vegetable processing industry on the Eastern Shore. Fifty years ago, the study area was one of the largest processed vegetable production areas in the United States. There were more than 150 processors on the Eastern Shore of Maryland alone, which included the largest cannery

in the United States. As more efficient production arose in California, certain support infrastructure in the region failed, and the industry ceased to be a viable option for farmers. As a result, the region hosts few options for either small-scale or large-scale processing outside of a narrow range of products.

Meat Packing

The early history of meatpacking was similar to that of vegetable processing. The region boasted a wide range of processors in both urban and rural settings. Active auction markets and livestock buying stations abounded in the region, as did the number of large animal veterinarians, shippers, brokers, tanners, and renderers.

When packers consolidated, the number of buyers shrank and caused the closure of markets and buying stations. Despite this, the livestock production sector continued to thrive as farmers began to specialize, even though farmers had to rely on fewer and more geographically dispersed services and also serve increasingly distant markets. With the resurging interest in local foods, demand for local processing has been rebounding, allowing new entrants into the market such as Seven Hills Abattoir and Meat Crafters.

The Future Offers Opportunities for Innovative Entrepreneurs

The intermediate supply chain is under tremendous pressure to innovate to increase efficiency, support last-mile delivery activities, and design new intermediate and finished products. Downstream demand by restaurants and institutions for labor savings is increasing the demand for intermediate processed products, such as pre-cut vegetables and fruits, pre-portioned proteins, and ready-to-serve products. At the retailer level, there is pressure to develop convenience-oriented foods such as meal kits, culturally identified foods, and pre-portioned products.

Labor and transportation efficiency are areas in which businesses are investing in innovation. With declining unemployment and crisis in finding a qualified workforce, this segment of the industry is increasingly pushing toward full automation of warehousing activities, using a combination of robotics, automated guided vehicle, and artificial intelligence applications. These systems intend to improve industry efficiency by reducing labor costs, increasing warehouse utilization rates, improving scalability, reducing supply chain disruptions, and increasing customer service levels. Similarly, distributors and trucking companies are investing in the use of self-driving trucks to improve transportation system efficiency, reduce regulatory downtime, and diminish the rate of bodily injury accidents.

Other trends that will drive entrepreneurship and innovation in the intermediate supply chain include:

1. Comprehensive, product cycle-based sustainability certified across the supply chain, including packaging, energy conservation, waste management, soil health, water use, and water quality
2. Full transparency involving food safety, origination and sourcing, labeling, and on-demand tracking using blockchain technology
3. Food products for specialty markets such as ethnic specialty foods and functional foods customized for athletic performance, health and wellness, senior needs, and youth
4. Increased convenience for consumers through last-mile delivery and fulfillment, more healthy food options, and customizable meal kits
5. Consumers buying values-based foods that support self-expression, personal values, and quality of life.

Forest Product Manufacturing

While most of the report is dedicated to evaluating crop, livestock, food, and beverage production, the forestry industry is also an invaluable piece of the agricultural economy. Forestland helps properties remain rural or maintain an agricultural assessment. In 2012, woodlands represented about 18 percent of total agricultural lands in the study area. The timber and logs harvested from these operations help support the forest product manufacturing industry, which contributed \$10.7 billion in economic output, 33,458 full and part-time jobs, and \$2 billion in wages in 2016.

Consumer-Facing Industries

This section summarizes the key findings and trends that currently exist in consumer-facing industries such as groceries, restaurants, and other institutions (e.g., hospitals, schools, accommodations, etc.).

Industry Snapshot

Consumers traditionally get most of their food and groceries at food and beverage retail businesses. In 2018, there were about 4,295 supermarkets and grocery stores that generated \$10.8 billion in revenue. There were also 836 specialty markets (e.g., seafood markets, meat markets, produce markets, bakeries) that generated \$462 million in revenue.

Consumers also purchase much food from restaurants, other food and drinking places, as well as special food services (food service contractors, caterers, mobile food services). This buying channel is becoming increasingly popular as consumers dine-out more often and as the line between supermarkets and restaurants is blurred (e.g., supermarkets selling meal kits or providing more prepared food options through mini food courts). In 2018, 26,066 restaurants generated \$12.6 billion in revenue, and 1,805 special food services grossing \$7.6 billion in revenue.

Institutions also play an important role in how people access food. Hospitals, schools, accommodations, and entertainment venues are all major buyers of food. For many in the region, hospitals and schools present opportunities to support local food systems. In 2016, public schools in the study area spent \$762 million on food, universities and colleges spent \$319 million, and hospitals spent \$457 million.

In 2016, these industries combined for about \$48.5 billion in economic output and 728,182 full and part-time jobs. Food retail also represents 2 percent of the businesses and 2.8 percent of the jobs in the study area; eating and drinking places represent 6.1

percent of the businesses and 7 percent of the jobs. Due to industry trends, retail jobs in the region are expected to decline.

Overall, firm concentration across all of the food retail and food services industries in the study area grew by two percent between 2006 and 2015. This growth was primarily driven by increased numbers of food service contractors, drinking places, and restaurants. There was also a 5 percent increase in grocery stores and supermarkets, but a 22 percent decline in other food retail stores. These trends suggest that the market is responding to changes in how and where consumers buy food.

Table 10. Industry Concentration for Food Retail and Food Services Industries

Industry	% Change Firms (2006 vs. 2015)	LQ 2015	% Change LQ (2006 vs. 2015)
Food Retail and Food Services	12%	1.0	2%
Grocery stores	3%	1.0	2%
Specialty food stores ¹²	-22%	1.0	-6%
Beer, wine, and liquor stores	8%	1.4	-3%
Special food services ¹³	17%	1.3	1%
Drinking places (alcoholic beverages)	-8%	0.6	4%
Restaurants	17%	1.0	2%

Source: US Census, County Business Patterns

12. Specialty food stores include meat markets, fish and seafood markets, fruit and vegetable markets, baked goods stores, confectionery and nut stores, and other specialty food stores.

13. Special food services include food service contractors, caterers, and mobile food services.

Retail Apocalypse

One of the most glaring trends occurring across the nation is the rapid loss of brick and mortar retail stores. This retail apocalypse is occurring at a time when consumer confidence is high and unemployment is low. While growth of online shopping is a key cause, there are other issues at play.

In 2017, over 6,700 retail stores (excluding restaurants and grocery stores) closed, which is a rate comparable with the losses during the Great Recession.¹⁴ While most of these closings involved apparel retailers and department stores, the wave of closures may soon reach food retail. In 2018, companies including Sam's Club, Subway, Chipotle, and Starbucks closed several hundred stores.

Several factors are driving these closures. Some of the closings are the result of mergers and acquisitions (M&A). In other cases, companies are closing unprofitable locations and adding new ones elsewhere. However, most of the closings are a result of over-expansion in retail locations, the rise of e-commerce, and lots of risky debt heading towards maturity.

The food retail sector is exhibiting many of the characteristics that led to significant closures and bankruptcies among non-food retailers. Expansion of retail food locations is accelerating at a time when retail space dedicated for food is at a record high.¹⁵ Competition from discount grocery chains as well as Walmart and Amazon is also driving down prices, which may cause consumers to expect low prices and discounts. Lastly, while e-commerce is not as great of a threat to groceries,

it will hurt companies that do not develop an effective omnichannel marketing strategy. It also points to the fact that smart technology, robotics, and automation will be important for remaining competitive.

Consolidation in Food Retail

Consolidation in food retail has been occurring for many years. Traditionally, food retailers followed the model of growth by acquisition. As food retailers bought other food retailers, the result was supermarket conglomerates such as Kroger's, Albertsons, and Ahold Delhaize. These companies own popular brands such as Harris Teeter, Safeway, Food Lion, and Giant.

In recent years, consolidation has been driven by logistics, technology, and e-commerce. Many mid-sized grocers are pressured by cost concerns, logistics efficiency, and changing technology. Also, local and specialty markets, along with online shopping, are taking away market share. For many, consolidation is a way to remain competitive and trim operating costs. The abundance of private equity among food and beverage investors also makes it easier to finance these purchases.

However, more and more mass merchandisers and online retailers are getting involved in food retail through M&A's and other measures. Examples include Amazon's purchase of Whole Foods Market and Walmart opening their own dairy processing plant. Additionally, many supermarkets and groceries are working to partner with or purchasing meal kit companies to remain competitive.

¹⁴ Townsend et al., "America's 'Retail Apocalypse' Is Really Just Beginning."

¹⁵ Peterson, "The Retail Apocalypse Is Heading Straight for Kroger, Whole Foods, and Aldi."

Rise of E-commerce and Omnichannel Retail

E-commerce has taken over much of the retail sector in the U.S., except for online groceries. Even though the U.S. lags behind other countries in e-commerce adoption for groceries, this market is set for accelerated growth.¹⁶

Even as brick and mortar stores are beginning to offer online options, formerly online-only retailers are investing in physical stores. This exemplifies the shift toward omnichannel retail, where consumers are engaging in cross-channel purchasing through a seamless experience. This means the use of online stores, mobile apps, in-store technology, and new pickup or delivery options to create a convenient shopping experience.

Ultimately, these trends impact how food moves through the supply chain and how data is gathered. E-commerce and omnichannel retail present new logistical challenges with transporting and storing food. In many cases, automation and robots will be used to increase efficiency, which will impact labor and the design of stores, distribution centers, and transportation. Technologies used to aid in this transition will also be important for gathering, sharing, and tracing data, which can have positive implications for issues such as food safety and transparency.

Automation

Automation powered by robots and artificial intelligence will increasingly be used in retail grocery to fulfill orders and interact with consumers. Such a development presents opportunities to use technology to create innovative in-store experiences. However, it will likely reduce the need for retail staff, while those jobs will likely shift towards warehouse and logistics roles.

This year, Albertsons engaged in a technology partnership to develop and pilot its automated e-commerce infrastructure to fulfill online orders, using its stores as distribution centers. This effort is a part of developing a more efficient grocery store network that helps advance last-mile delivery services through easy pickups or third-party distributors.

Last-mile Delivery

Consumers are increasingly ordering their favorite foods and groceries to be delivered on-the-go. The demand for convenience has spurred a flood of new entrants trying to compete for restaurant and grocery delivery services. Some of the popular services include Instacart, Lyft, Uber Eats, DoorDash, Seamless, Postmates, and GrubHub. The growing market has also spurred the development of refrigerated storage locker to service communities and housing complexes. In turn, these delivery services have affected the sales and growth of direct-to-consumer channels such as farmers markets and community support agriculture (CSA).

As the last-mile delivery sector grows and matures, many new entrants will fail or get purchased by larger more well-established companies. Data suggests that this has already begun. The study area experienced a 30 percent decline in local delivery services between 2006 and 2015, with significant firm number declines in urban areas like Washington D.C. and Baltimore City. The decline reflects the fact that many delivery drivers are joining larger networks such as Uber Eats instead of working for a small local company.

¹⁶ Woo, "Three Shifts Driving US Grocery M&A Activity."

In 2018, Amazon started a program to help entrepreneurs start their own delivery companies that will be part of Amazon's delivery network. Companies wishing to be part of this program must meet Amazon's strict entry requirements. Such programs reflect growing competition among major delivery service providers and experimenting with decentralized approaches to increase the volume and speed last-mile fulfillment.

Farm to Restaurant

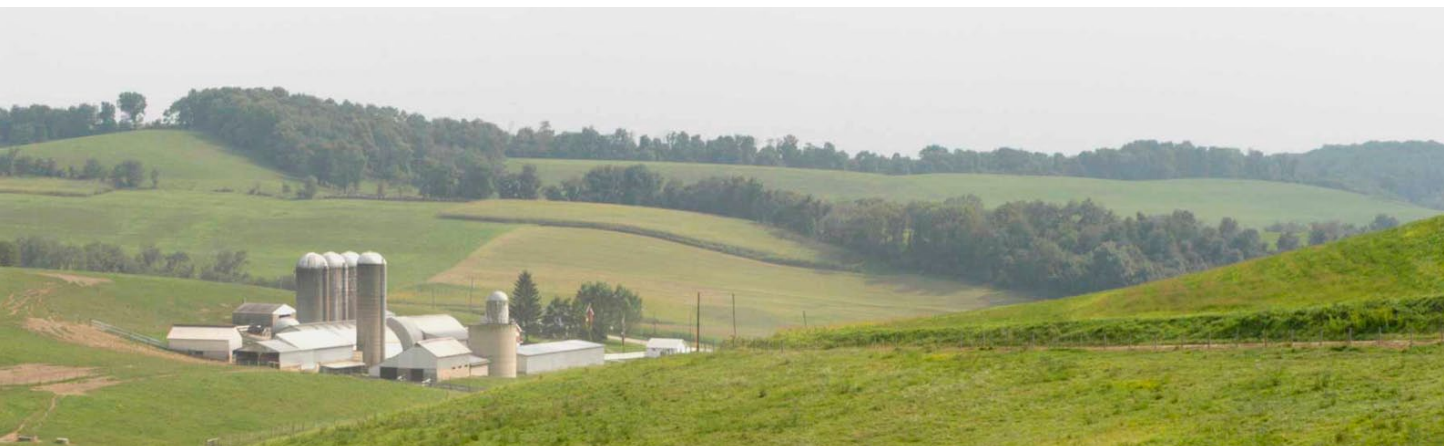
While the retail industry is facing changes due to consolidation and consumer desire for convenience, the restaurant industry is undergoing a transformation. Interest in sourcing from local farmers at restaurants continues to grow and will expand beyond market segments that are health-conscious or trend-aware. Restaurants are also moving beyond simply procuring local produce and are including local seafood, beef, dairy products, and grains on their menus. Some restaurants are also going hyper-local by growing their own produce on rooftops or restaurant property.

Today, millennial consumers are demanding authentic experiences in addition to convenience and fresh food. In turn, restaurant chains are beginning to create brands that are unique to a locale instead of carbon copy franchises. In other cases, locals and tourists are drawn to experiences at on-farm restaurants and farm bed and

breakfasts, which can boost agritourism activity. Lastly, restaurants are increasingly engaging in charitable efforts and community activities in response to consumer desire to purchase from companies that share their values.

Although consumers want more local food at restaurants, there are many supply and logistics challenges. First, getting the quantity and quality of food that restaurants need is difficult based on insufficient and seasonal production. Second, there are issues with transparency and accountability, and the definition of local. Many farmers have been frustrated that restaurants continue to claim they feature local items on menus when they no longer buy locally. Third, it is challenging to match the quantity, price, and delivery timing between farmers production schedules and restaurants' needs. Restaurants prefer a one-stop shop solution so they do not have to call multiple farmers to make orders.

Ultimately, it is clear that there needs to be a solution to improve the communication, procurement, and logistics between farmers and restaurants. [BlueCart](#), a start-up in Washington D.C., is an example of a platform that helps connect restaurants with vendors, streamlining the ordering process and increase profitability for wholesale suppliers.



Farm to Institution

Public schools and hospitals are two institutions that purchase a significant amount of food and can grow their share of local purchasing. In particular, farm-to-school activity has been growing in the region with support from the USDA and state governments. Today, every state in the region is engaged in some level of local procurement, with some being more successful than others. Overall, the 6-state region spends about 11 percent on local food, most of which is spent on milk.

Healthcare providers are also engaging in local food as a way to improve food access and health outcomes. These programs go beyond hospitals hosting farmers markets and involve a concerted effort among healthcare providers, local health departments, retailers, and farmers to encourage and incentivize healthier eating. Examples of these efforts include produce-as-prescription programs, and partnerships between hospitals and insurance companies to incentivize healthier diets and lifestyles.

There are several challenges to increasing local procurement, whether it is getting farm products to schools or hospitals. Like farm to restaurant, seasonal production in

the Mid-Atlantic limits the amount of local procurement. For schools, this is especially problematic since the height of the growing season is during the summer break, when school food procurement is low. In addition, these institutions are more demanding when it comes to quantity, food safety, and product specifications. In most cases, food needs to be processed and packaged in a particular way, and many farmers do not have this capacity. Lastly, pricing and information transparency is a significant barrier, especially when the bidding process does not favor smaller companies or new entrants. Transparency challenges also make it difficult to determine if distributors are actually purchasing from local farms.

For many small farms, the burden of adopting internal standards that meet food safety and traceability requirements seems insurmountable. These standards, however, are not significantly different than any other type of regulatory compliance paperwork and will soon be required by all growers under the Food Safety Modernization Act. As a note, many of the paperwork requirements fall under the Good Management Practices (GMP's) recommended by the Food and Drug Administration and serve as excellent risk management tools.

Table 11. School Food Spending in 2015

State	Total Food Spending	Local Food (incl. milk)	Local Food (excl. milk)	Percent Local (incl. milk)	Percent Local (excl. milk)
DC	\$16,401,861	\$4,690,535	\$3,622,252	29%	22%
DE	\$20,816,425	\$5,286,111	\$999,578	25%	5%
MD	\$94,589,792	\$24,718,582	\$8,727,797	26%	9%
PA	\$112,176,963	\$18,059,655	\$7,193,467	16%	6%
VA	\$296,992,917	\$7,778,177	\$2,328,019	3%	1%
WV	\$172,579,228	\$21,279,288	\$18,227,626	12%	11%
Total	\$713,557,186	\$81,812,348	\$41,098,739	11%	6%

Source: USDA Farm to School Census, 2015

Consumers

The Chesapeake Foodshed region is one of the most densely populated regions in the country. Several major metropolitan areas (Richmond, Washington D.C., Baltimore, Philadelphia, and New York City) also influence the economies within the region.

Demographic Snapshot

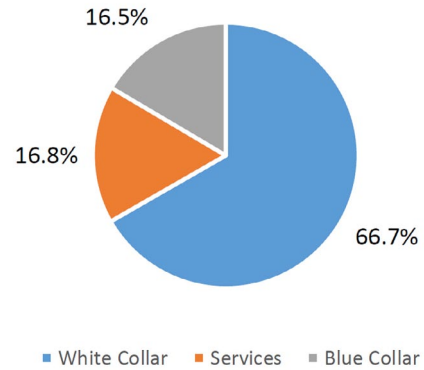
In the study area alone, there are about 14.2 million people. Over three-quarters of the population live in an urban area, and the total is both growing and becoming more diverse. Residents are educated, with over 40 percent having at least a bachelor's degree and over 90 percent having at least a high school diploma. Most are working a white-collar job and only about 0.4 percent of the population works in farming, forestry, or fishing.

Table 12.
2018 Population 25+
by Educational Attainment

Less than 9th Grade	3.9%
9th - 12th Grade, No Diploma	5.7%
High School Graduate	22.3%
GED/Alternative Credential	3.2%
Some College, No Degree	17.1%
Associate Degree	6.7%
Bachelor's Degree	22.2%
Graduate/Professional Degree	18.9%

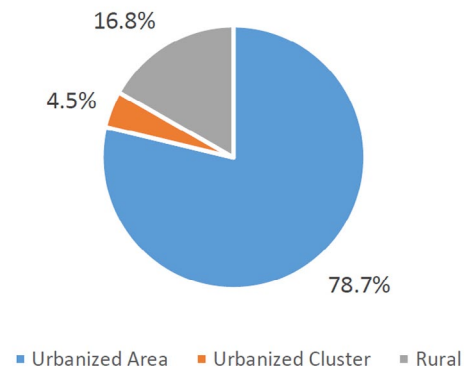
Source: ESRI Business Analyst, 2018

2018 Employed Population by Occupation Type



Source: ESRI Business Analyst, 2018

2018 Population By Urban/Rural Status



Source: ESRI Business Analyst, 2018

Consumers Increasingly Likely to Spend on Food Away from Home

The average household spent an average of \$90,636 on goods and services in 2018. About 12 percent of this spending was on food, mostly for at home consumption. Compared to the national average, households in the study region are more likely to spend more on food, both at home and away. However, households in the region are much more likely to dine out than the rest of the country.

Consumers tend to demand more convenience and will pay more for it. When dining out, consumers in the study area are more likely to buy food at a family restaurant than at a fast food establishment. However, the on-the-go nature of consumers means that when consumers purchase from fast food venues, they are more likely to get home deliveries and take-out. Many consumer behaviors related to at-home food consumption mimic the behaviors of those purchasing food away from home. Increased use of convenience foods such as prepared meal kits allows families to have the menu variety of eating out without the preparation time.

The shift towards convenience has also changed both shopping and eating patterns. Americans on average spend one hour a day eating and drinking, which suggests U.S. households treat mealtime as a secondary activity in the home rather than a primary activity. Focus group participants also indicated that meals have become less frequently a family-centered event. In 2003, research revealed only 40 percent of American households eat three or more meals together in a week.¹⁷ Ten years later, a Gallup study showed that the percentage of households eating together less than four times a week increased from 16 percent to 21 percent between 1997 and 2013.¹⁸

Ultimately, these behaviors favor convenience and instant gratification, which can create disconnects between people and food. As people focus on speed and efficiency, other values such as nutrient density, healthy eating, and supporting local agriculture may become secondary.



17 ConAgra Foods, Inc, "National Survey Reveals Nearly Half of American Families Eat Dinner Together Fewer Than Three Times A Week Or Not At All."

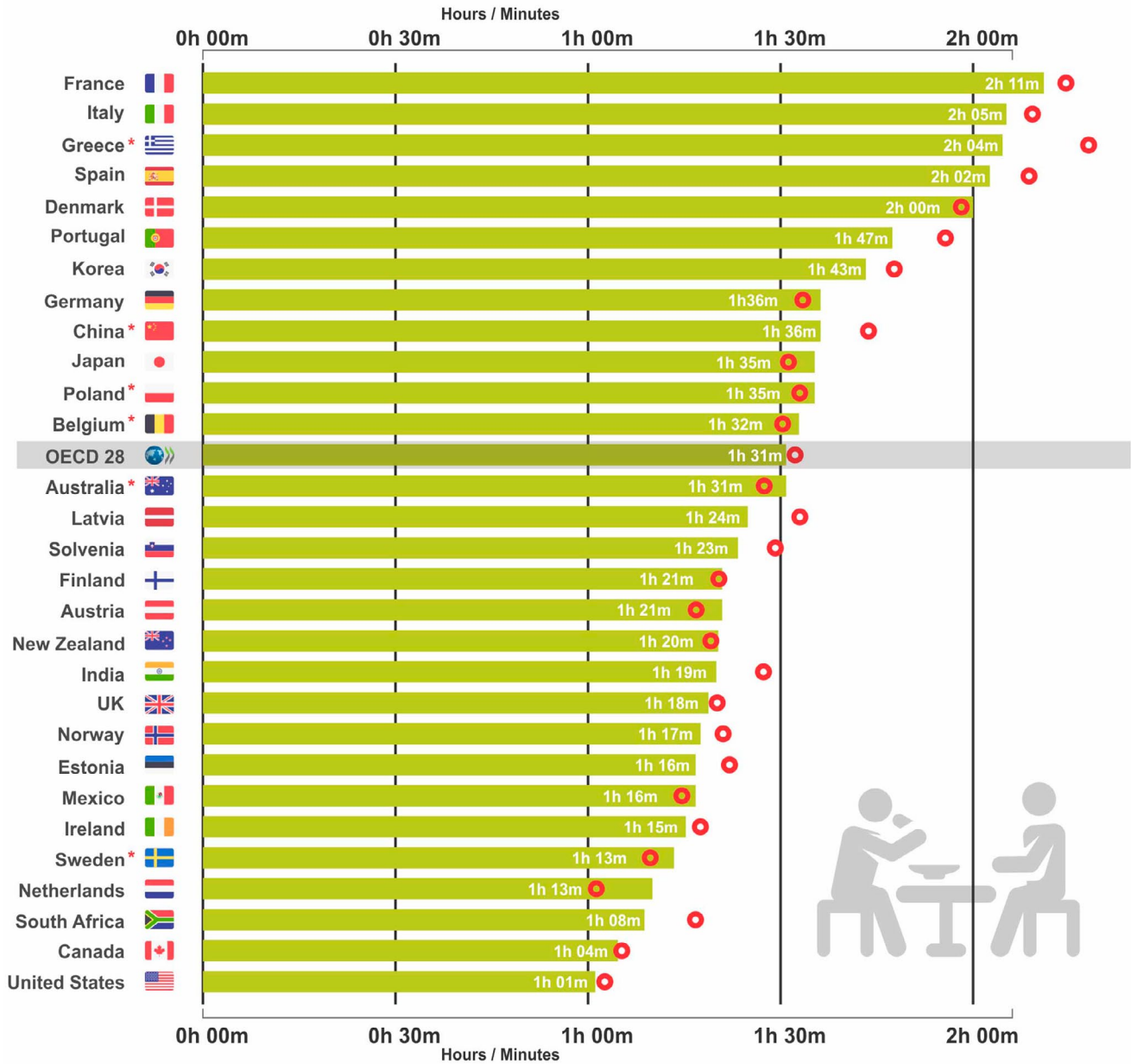
18 Lydia Saad, "Most U.S. Families Still Routinely Dine Together at Home."



Time spent eating and drinking

Time spent eating & drinking each day, in hours/minutes

Woman and Men (15-64), 2015 or nearest year (OECD and other selected countries)



Note: Reference years vary across countries. The * denotes that time use estimates are not fully comparable, due to a difference in the reference age group.

Source: OECD Gender Data Portal based on the OECD Time-Use Database
www.oecd.org/gender/data/



Searching for Convenience

Consumers are increasingly gravitating towards more convenient foods; dining out more often is one manifestation of this trend. Growing online purchases through e-grocers and food delivery services indicate this continued shift. For food retail, this has meant a substantial increase in the purchase of frozen products, with nearly 2 percent growth in dollars spent.¹⁹ The deli section of the grocery store has outpaced the growth in all other sectors, growing by \$875 million and increasing by 240 million units between 2017 and 2018. The increase was prompted by an increase in consumption of store-made meal kits and ready-to-eat main courses.

Switching Channels

Today, consumers can get products through a multitude of channels, including retail stores, online retail, home delivery, farmers markets, concierge services, and others. Consumers can easily switch between channels depending on what they want and what products and deals are available. This phenomenon increasingly referred to among suppliers as “channel switching.” Channel shifting has increased the instability of the retail sector for most consumer groups; however, the trend is most pronounced for households with high levels of mobile connectivity and higher than average income.

For example, consumers may switch between meal kit providers when offered discounts, or intentionally purchase local products only in the summer when they can attend farmers markets. Channel switching can be problematic for retailers or farmers looking to gauge or maintain customer loyalty. Meal kits, in particular, have a difficult time inspiring brand loyalty, likely due to low switching costs and heavy discounting among competitors and new entrants in the field.²⁰

Consumption Trends

Several major food consumption trends will affect the demand for local food.

Growing Meat and Seafood Consumption

Meat consumption in the U.S. is expected to increase from 218 pounds per person in 2017 to 222 pounds by 2027. However, consumers are eating more chicken rather than beef or pork. Many of the factors influencing these purchasing decisions include health concerns, nutrition, taste, ease of preparation, food safety, and value. The increased availability of ready-to-cook poultry and lower retail price of chicken are among the reasons for growing chicken consumption.

Similarly, Americans are increasing their consumption of seafood, even though the amount of seafood consumed is low compared to other protein sources.²¹ About 74 percent of the seafood Americans consume is fresh or frozen, a demand that has plateaued in recent years. About 24 percent of the seafood consumed is canned, with most of it being canned tuna. The other 2 percent represents cured seafood that is smoked, salted, or pickled.

Dairy Consumption Continues to Decline

US consumption of dairy products has continued to decline over the last few decades. This decline has been largely driven by lower fluid milk consumption, which may be related to the reduced consumption of ready-to-eat cereals. Also, Americans are eating fewer frozen dairy products.

¹⁹ Nielsen, “Merging Tables & Aisles.”

²⁰ Demetrakakes, “Meal Kits Inspire Growth but Not Loyalty.”

²¹ Leschin-Hoar, “Hey, Looks Like Americans Are Finally Eating More Fish.”

Instead, many consumers are choosing full-fat dairy products such as butter, cheese, and yogurt.²² Even with fluid milk, consumers are shifting towards whole and flavored milk. Sales of full-fat flavored and whole milk are up 1.1 billion pounds from 2012 to 2016.²³ Reduced-fat flavored milk sales are also growing, with school lunch guidelines driving some of this consumption.

Two other trends are also influencing the dairy market. There is an increased demand for grass-fed products. For example, sales of grass-fed yogurt and kefir have increased by over 38 percent in 2017.²⁴ Lastly, consumers are increasingly turning to plant-based alternatives such as almond- and coconut-based beverages.

Plant-Based Alternatives for Meat and Dairy

Demand for plant-based protein is growing. 23 percent of North American consumers are demanding more of these options in stores.²⁵ Sales of plant-based foods went up 8.1 percent between 2016 and 2017.²⁶

The meat alternatives sector is expected to grow rapidly at a compounded annual growth rate of 6.8 percent.²⁷ It is an estimated \$4.6 billion market in 2018 and is projected to grow to \$6.3 billion by 2023. Health and wellness trends and consumer concern for the environment are driving this demand. Companies such as Beyond Meat and Impossible Burger are capitalizing on these trends by offering meat created completely from plant proteins.

Plant-based alternatives to traditional milk are also becoming more popular as dairy consumption declines. Demand is expected to grow even faster than that of

meat alternatives. In 2015, this sector grew by 9 percent.²⁸ Among the alternatives, almond milk is growing the fastest. Between 2012 and 2015, almond milk sales grew by 250 percent and represented 5 percent of the milk market.²⁹ Sales are double of all the other milk alternatives combined (includes soy milk, coconut milk, rice milk, and other milk substitutes). Consumers are demanding new dairy alternatives such as those made from barley, hemp, pea, flax, and quinoa.³⁰

Demand for Fresh, Snack-sized, and Value-Added Produce

Per capita produce consumption has been in decline for more than a decade, according to the Economic Research Service at USDA.³¹ Mainstay product offerings such as citrus, potatoes, and lettuce account for the largest overall declines in volume consumed. However, consumer trends in health, wellness, and convenience are driving shifts toward value-added and snack-sized produce options.

On the one hand, per capita produce consumption in the US has been declining over the years and is projected to decline 0.2 percent over the next five years. Data from Nielsen show that produce sales over the last year has remained flat at 0.3 percent.³² Meanwhile, volume consumption has stagnated, with a 3 percent rate of decline.

On the other hand, many consumers are demanding fresh, snack-sized, and value-added produce, which is driven by demands for health, wellness, nutrition, and convenience. Nielsen data revealed that while major fruit-basket items have declined in sales, easily snackable fruits have increased in sales.³³ These include cherries, mandarins, and avocados.

22 VAFB, "Dairy Industry Has Seen Consumer Trends Drying."

23 Newton, "Trends in Beverage Milk Consumption."

24 Matsumoto, "Why More Farmers Are Making The Switch To Grass-Fed Meat And Dairy."

25 Cosgrove, "What Happened in Plant-Based Protein in 2017?"

26 Simon, "Plant Based Foods Sales Experience 8.1 Percent Growth Over Past Year."

27 Market and Markets, "Meat Substitutes Market: Global Forecast until 2023."

28 Mintel Press Team, "US Sales of Dairy Milk Turn Sour as Non-Dairy Milk Sales Grow 9% in 2015."

29 Nielsen, "Americans Are Nuts for Almond Milk."

30 Packaged Facts, "Dairy and Dairy Alternative Beverage Trends in the U.S., 3rd Edition: Market Research Report."

31 Lin and Morrison, "A Closer Look at Declining Fruit and Vegetable Consumption Using Linked Data Sources."

32 Nielsen, "Total Consumer Report."

33 Nielsen.

Value-added produce products include fresh-cut produce and snacks. Currently, the fastest growing segment in the produce sector is in pre-cut, pre-washed, and packaged produce, which makes \$12 billion in sales each year.³⁴ Shopper data shows that 23 percent of shoppers plan to increase their spending on value-added produce.³⁵ In particular, households are more likely to buy value-added fruits (82 percent) than value-added vegetables (48 percent). However, both categories are expected to grow between 8.3 percent and 8.7 percent.

General Food & Beverage Trends

Several key trends are driving the food and beverage industry. Consumers are increasingly focused on products that emphasize health, convenience, all-natural, organic, quality, fresh, and local. These values permeate almost every product category including baked goods, snack foods, dairy products, and beverages. Shoppers are buying products such as all-natural drinks and nourishing on-the-go beverages that include probiotics, functional ingredients, and animal proteins. This demand has driven companies to offer individually packaged snacks made free of artificial colors or flavors.

However, despite increasing concerns about sugar and artificial ingredients, nostalgia is a growing trend in food and beverage.³⁶ Many consumers are still willing to indulge in brands such as Hershey's or Mountain Dew, which are aimed towards indulgence. The confluence of these trends has allowed for product categories such as chocolate to diversify, hence the growth of options involving organic, alcohol flavored, low-sugar, sugar-free, gluten-free, and low-fat chocolates. Furthermore, consumers are showing interest in chocolates that include nuts, fruits, and probiotics.

A recent survey determined that consumers would purchase local produce over organic produce if quality and price are equal. Even when the price is differentiated, consumers still choose local over organic. While consumers choose organic produce primarily for health and environmental reasons, the desire local produce is centered on community, the local economy, and product freshness.

Lastly, organic and fresh foods are driving sales. Organic products are expanding rapidly across the food and beverage sector. Today, 48 percent of U.S. consumers choose local, natural and organic products when possible.³⁷ Fresh foods have also posted \$1.5 billion in sales gains in 2017.³⁸ However, food labeled as local may be the most popular among consumers, especially for produce. A recent survey determined that consumers would purchase local produce over organic produce if quality and price are equal.³⁹ Even when the price is differentiated, consumers still choose local over organic. While consumers choose organic produce primarily for health and environmental reasons, the desire local produce is centered on community, the local economy, and product freshness.

34 Fruit Growers News, "Fresh-Cut Remains Fastest-Growing Trend in Produce Industry."

35 Stein, "The Power of Produce 2017."

36 Devenyns, "Hershey's, Oreo and M&M's among 10 Brands Most Trusted by Millennials, Gen Z."

37 Nielsen, "Tops of 2016."

38 Nielsen, "The (Lunch) Meat of the Matter."

39 Stein, "The Power of Produce 2017."

Food Access

Access to healthy food is a key determinant of health and wellness. Moreover, it is an important component of building healthy and sustainable food systems and communities. Unfortunately, access to food is still a challenge for many low-income residents living in rural and urban communities alike.

Many programs in the region are intended to improve food access to healthy, fresh, affordable, culturally relevant food. Today, many farmers' markets are equipped to accept SNAP, WIC, and Senior Farmers Market Nutrition Program benefits. On top of this added convenience, markets in the region such as FRESHFARM and Community Foodworks offer incentives that double or increase the purchasing power of those who use food assistance.

Many local governments, non-profit organizations, and food policy councils in the region are working to develop innovative solutions using a holistic, food systems approach. For instance, the Baltimore City Health Department's [Baltimarket Virtual Supermarket Program](#) uses an online grocery platform to deliver food to neighborhoods with low vehicle ownership and inadequate access to healthy food. Through this program, residents can order online and pick up at their community site with no delivery charges. Simultaneously, the program works with corner stores to provide nutrition

education and marketing strategies for stocking and selling healthier foods.

Some school districts are augmenting their involvement in addressing food access. These schools work with local organizations and food banks to provide weekend bags to students from low-income households and/or provide mobile food pantries. Other districts like Anne Arundel County Public Schools have gone further, providing community meals, mobile farmers markets in low-income communities, and cooking classes. Some districts are using Farm to School grants to encourage students to consume more produce, learn how to cook, and engage in gardening (e.g., DC Central Kitchen's Fresh Feature Friday and Cafeteria Chefs programs).

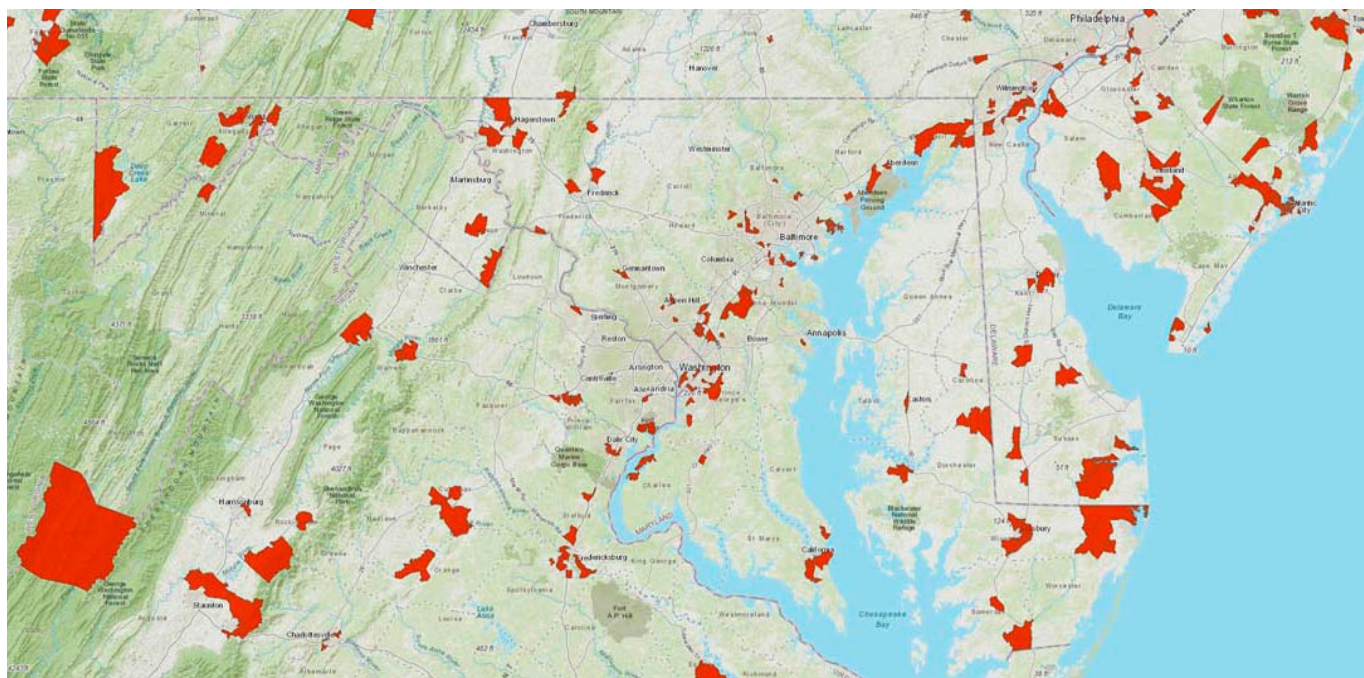
Poverty and SNAP Recipients

Within the study area, about one in ten households received SNAP (Supplemental Nutrition Assistance Program, formerly known as food stamps) in 2017. Similarly, 9 percent of the households were also living below the poverty level for the past year, and about 43 percent of these households received SNAP benefits.

Food insecurity permeates even the wealthiest regions. In the largest metropolitan regions of the study area, the lowest incidence of SNAP benefit recipients in 2017 was 14 percent of the population, its highest at more than a quarter of the city's residents.

Table 13. Poverty and SNAP Recipients in Key Metropolitan Areas

	Baltimore, MD	Philadelphia, PA	Washington, DC	Richmond, VA
Poverty Rate	23.1%	25.9%	17.9%	25.4%
With Supplemental Security Income	9.5%	10.4%	5.5%	7.2%
With Cash Public Assistance Income	5.4%	6.8%	3.7%	2.9%
With SNAP benefits in past 12 months	25.3%	24.5%	14.4%	16.3%



Source: [USDA ERS Food Access Research Atlas](#)

Rural Food Insecurity

Three quarters of the counties with the highest rates of food insecurity are in rural areas, and 76 percent of the top ten most insecure counties in the U.S. are rural.⁴⁰ Rural areas often have less concentrated populations over a wider geography and must travel further distances to access food retail. USDA's Economic Research Service published a Food Access Research Atlas with low income and low access layers utilizing 2015 data. The map below demonstrates a section of the Chesapeake foodshed study region and highlights low-income census tracts where a significant share of residents is more than 1 mile (urban) or 20 miles (rural) from the nearest supermarket.

Source: USDA ERS Food Access Research Atlas

Food insecure residents of rural areas may have transportation difficulties, limited employment options, and limited mobility, exacerbating their inability to access fresh foods. However, rural food insecurity can also

occur in wealthy rural areas based solely on distance from supermarkets. These wealthier rural communities may technically be food insecure, but may not suffer economically and may overcome the long distances from supermarkets by ready access to reliable vehicles.

The Decline of Home Economics

Skills in the home are just as important as skills in the workforce when it comes to expanding opportunities in the foodshed. Historically, home economics (Family and Consumer Sciences) was a required part of school curriculum that taught skills such as cooking, meal planning, nutrition, and budgeting. Unfortunately, many school districts have phased out these classes, and enrollment in these classes have also declined over the years of those that remain. Enrollment in home economics classes was under 3.5 million in the 2011–2012 school year, a 38 percent decrease between 2001 and 2011.⁴¹

40 Feeding America, "Rural Hunger Facts"; Erbrant, et al.

"Hunger In Rural America Is Less Visible, But Just As Pressing."

41 R. Werhan, "Family and Consumer Sciences Secondary School Programs."

Through the focus groups, consumers indicated that they increasingly felt detached from food and community. Participants also discussed these sentiments in conjunction with their observations of the decline in cooking at home. They felt that the decline in home economic programming was a significant contributor to this.

Focus Group Findings

As mentioned above, the project team held seven town hall type meeting that included consumers from across Maryland, within easy reach of the rest of the study region. Participants from various socioeconomic situations, cultures, geographies, and roles in the food system attended the meetings. Despite this diversity, several overarching themes confirmed many of the findings discussed above. In almost all regions, participants observed or emphasized:

- A cultural shift away from the sense that food is important for the individual and the community, towards an emphasis on convenience, use of pre-prepared foods, and spending minimal time, cost and effort to acquire and prepare it
- Fewer families and other social groups preparing, cooking, and eating together
- Widespread loss of knowledge about food, where it comes from, as well as how to select, prepare, and cook it
- A desire to be part of community that recognizes the cultural importance of food as a context for health, family, community, and economy
- A need to expose, educate, and reintroduce people to the values of food, the ways it is produced, and the skills needed to prepare and cook foods
- A desire to make local and regional foods more accessible, convenient, and affordable.

Across the meetings, participants acknowledged the loss of a sense of community around food and a desire to regain it. There was also a desire for community meals and events, centered on local foods as opportunities for interaction and learning. Attendees in Salisbury, for example, discussed an “On the Table” meal series the city held to bring residents together over a shared meal to discuss issues and ideas specific to their community. Other discussions echoed the sentiment that these types of interactions have value for building community and solving shared problems.

Another common theme was the need to educate the general public—and youth in particular—about agriculture, food, nutrition, and cooking. People felt schools should bring back home economics classes with updated content and pursue farm-to-school efforts that help children learn about food and its importance. Communities also recognized the need to educate politicians about food system issues from standpoints of consumers, communities, and the supply chain. Without this, many felt that elected officials would not be able to make effective policy that leads to desirable food system outcomes.

Numerous consumers at community discussions said that the importance of local products to them depended on a variety of factors, including knowledge about agricultural practices, availability of local products, knowledge about relative benefits of local foods, price, accessibility, and convenience. Many said that transparency and trust in food sources is more important than local geography.

Constraints to Buying Local

During the last decade and half, the demand for local food grew rapidly. Between 2008 and 2014, local food sales in the US more than doubled from \$5 billion to \$12 billion.⁴² Even as consumer demand spurred groceries, restaurants, and manufacturers to offer more locally-grown or locally-made products, there were various challenges to buying local.

Not Enough Production to Meet Consumption

The first constraint is that the region does not produce enough of many of the commonly consumed food products. **Table 14** shows that only lima beans, chicken, and corn have sufficient production to meet most of the local demand; and this corn is used for livestock feed or ethanol, not for direct human consumption. Pork, milk, and wheat have the potential to support between 60 to 90 percent of the demand. The product types also reflect the regional characteristic of more livestock and grain production and insufficient produce production.

Food Product	Production (ac/head)	Consumption (ac/head)	Potential to Meet Demand	Surplus/Deficit
Strawberries	482	27,881	2%	-27,399
Blueberries	185	8,467	2%	-8,282
Apples	14,809	38,499	38%	-23,690
Beans	20,206	22,366	90%	-2,160
Lima Beans	14,682	2,240	100%	12,442
Snap Beans	5,524	20,126	27%	-14,602
Sweet Corn	21,082	44,464	47%	-23,382
Tomatoes	2,295	69,576	3%	-67,281
Pumpkins	3,358	4,076	82%	-718
Squash	842	7,164	12%	-6,322
Potatoes	6,459	63,706	10%	-57,247
Pork	3,043,728	4,570,003	67%	-1,526,275
Beef	660,793	1,479,799	45%	-819,006
Chicken	748,338,024	176,713,587	100%	571,624,437
Dairy	323,746	521,981	62%	-198,235
Wheat	476,307	532,945	89%	-56,638
Corn (grain)	825,919	79,182	100%	746,737

Source: USDA NASS Census of Agriculture; USDA ERS Food Availability Data System

42 Hesterman and Horan, "The Demand for 'local' Food Is Growing – Here's Why Investors Should Pay Attention."

However, this data does not indicate how much is actually purchased locally. Various factors in the supply chain and consumer-facing sectors influence whether consumers actually can purchase local products.

Consumer Perceptions and Experience with Local Food

Beyond the inherent issue of insufficient local production, there are also problems such as loose definitions of local food, demand for convenience, perceptions of affordability, the profitability of local farms, and marketability of products.

Many consumers believe that local foods are less accessible and costlier. More specifically, consumers perceive that it is often more affordable or convenient to purchase food through big-box retailers and supermarkets than through farmers markets and CSAs. Research and community discussions suggest that time and budget constraints, and an increasingly digital world are driving these trends. Still, some consumers go out of their way to purchase, prepare, and eat local foods despite the perceived or real inconveniences.

Inertia in the Supply Chain

Even where consumers demand local products, producers, processors, and distributors have difficulty supplying it. Integrating more local product into larger-scale supply chains is challenging because companies are reluctant to change current operating practices. Businesses in the food system rely heavily on trusted relationships with long-standing partners and have to deal with small margins. Consequently, it is often difficult for new entrants or small-scale producers to access a larger supply chain.

Impact on Direct-to-Consumer Markets

Direct-to-consumer markets such as farmers markets and CSAs have been popular venues for selling local food. The combination of production and supply chain obstacles as well as growing consumer demand for convenient food options and home delivery have caused these markets to experience stagnant or declining sales. Instead, meal kits, online groceries, and mobile food services are growing rapidly.

However, growers and markets in the region are adapting to changing consumer preferences to combat slowing sales. Many farmers are turning to co-ops, home delivery, agritourism, and value-added processing to remain competitive. Farmers markets are also increasingly hosting vendors that offer value-added products, prepared foods, and alcoholic beverages. Although it is the case that some markets limit this approach since it can divert foot traffic away from producers of raw agricultural products.

How much stays local?

The previous section showed that production for most food products is insufficient to support local demand. However, it does not show what is actually purchased locally. Average regional purchasing coefficients (RPCs) provide the best estimate of actual local spending.

Table 15 shows that, while the study produces enough chickens for the local demand, local purchasing of processed poultry products is 48 percent. This vast difference is the result of trade activity (exports and imports), supply chain dynamics, the location of infrastructure, and demand characteristics.

Differences also occur between unprocessed and processed commodities. For instance, the region supports 57 percent of the local demand for unprocessed grains, but consumers primarily purchase processed grain products such as flour. Since national scale firms such as General Mills and ADM dominate the grain processing industry, many of their facilities are located outside of the study area. As a result, only about 29 percent of the flour is purchased from local manufacturing plants.

Another example involves fruits and vegetables. When consumers are asked about local food, produce is often the first product type they consider. However, because of the lack of produce grown in the study area, much has to be imported. The study area supplies about 11–12 percent of the fresh produce demand. Given relatively low production in the region and high consumer demand, there is a significant deficit that is met through imports. As a result, the study area imports about \$2.1 billion in fresh produce and exports \$91.3 million.

Table 15. Estimate of Local Spending for Select Food Commodities

Commodity	Average RPC	E/I Ratio
Grains	57%	0.93
Vegetables and melons	12%	0.04
Fruit	11%	0.04
Poultry and egg products	72%	1.19
Flour	29%	0.32
Fluid milk	56%	0.73
Creamery butter	25%	0.05
Cheese	11%	0.59
Dry, condensed, and evaporated dairy products	10%	0.22
Ice cream and frozen dessert	54%	3.20
Meat (except poultry) produced in slaughtering	4%	0.09
Meat processed from carcasses	22%	0.38
Processed poultry meat products	48%	2.38
Seafood products	23%	0.62

Source: IMPLAN, 2016

Most of Our Food Comes from Other Regions

Most of the food consumed in the study area comes from other regions, except poultry and dairy. Such a situation is to be expected, given the large population and declining agricultural production. Beyond production and consumption dynamics, the structure of supply chain logistics and marketing systems also contribute to the gap.

A significant consequence of these logistics and marketing systems is that relatively little of the food dollars spent by consumers stays local. For instance, household spending in the study area shows that in only about 35 percent of food-related expenditures are spent locally, meaning that, for every dollar spent, only 35 cents stay within the area and 65 cents pays for food grown or manufactured elsewhere. This means fewer funds are reinvested in the region's communities that could build and enhance the infrastructure needed to support growth of local foods in the region.

Many of the processed and manufactured food products that consumers purchase also come from other regions because the firms that make them are located outside of the study area. In particular, meat slaughter and processing facilities, as well as produce processors, are primarily located elsewhere. Conversations with livestock farmers and agricultural marketing specialists confirm that it has been challenging for many growers to find available facilities nearby. Imports of processed meats also far outweigh exports.

However, some processors may be finding their way back to the region. For instance, produce canning operations increased from 21 to 31 operations between 2006 and 2015. Additionally, the region is still home to some of the largest of baked goods, snack foods, and confectionery manufacturers. Companies such as Snyder's, Utz, and Hershey's are located in York County, Pennsylvania—also known as the Snack Food Capital of the world. The region also has a high concentration of seafood processors. Despite this, the region imports more fresh and processed seafood products than it exports.

For aggregation, distribution, and wholesaling of food, many products come into the region through national and global supply chains. As a result, many of the jobs and revenues in these sectors are also dispersed across larger geographies. The larger the supply chain, the less money is recirculated in a local economy. Individual farms in the region struggle to meet the demand needs of larger institutional or wholesale buyers. Responding to the issue of farm scale, some counties have conducted studies to build food hubs to help support local agriculture.

Ultimately, most of the income and profits generated by the region's food dollars end up outside the region. That money is used to support food system infrastructure, jobs, and other economic benefits in communities in other areas. Shifting this money back into the region will require changes in the supply chain.

Commodity	Total Exports
Poultry and egg products	\$ 1,007,959,783
Oilseeds	\$ 769,618,945
Greenhouse, nursery, and floriculture products	\$ 656,022,526
Grains	\$ 517,060,312
Dairy cattle and milk products	\$ 389,733,226
Support activities for agriculture and forestry	\$ 180,398,568
Fish	\$ 145,908,418
Beef cattle	\$ 134,312,565
Animal products, except cattle and poultry and eggs	\$ 125,655,793
Logs and round wood	\$ 69,641,354

Source: IMPLAN, 2016

Commodity	Total Imports
Fruit	\$ 1,125,434,462
Vegetables and melons	\$ 1,000,775,643
Poultry and egg products	\$ 848,803,898
Fish	\$ 722,233,841
Greenhouse, nursery, and floriculture products	\$ 593,619,905
Grains	\$ 553,506,462
All other crops	\$ 439,684,207
Tree nuts	\$ 347,231,542
Animal products, except cattle and poultry and eggs	\$ 275,180,603
Beef cattle	\$ 223,563,514

Source: IMPLAN, 2016

Opportunities to Improve the Local/Regional Supply Chain

Supply chain opportunities:

Seafood

The region can benefit from more local seafood. Within the study area, commercial fishing and seafood processing contributed \$751 million in output in 2016. It also generated about 4,964 full and part-time jobs and \$92 million in wages. Most of these operations are engaged in aquaculture. Both the production and processing operations are primarily located in southern Maryland and the Eastern Shore.

However, the study area is a net importer of fish and seafood products, with \$1.3 billion in imports. Decades of overfishing in US waters have lowered supply availability in the region. Thus, the seafood sector relies on imports, which have continued to increase. However, the industry can benefit from health trends and declining prices that have encouraged consumers to eat more seafood.

Seafood processors and markets are becoming less concentrated in the study area, providing an opportunity for new businesses that find innovative ways to distribute and market more reliably sourced regional seafood to regain market share. It can also benefit from selling regional products that offer transparency and trust and help build consumer confidence in an industry that has high rates of fraud.⁴³

Case Example: A group of seafood harvesters, intermediaries, and consumers across the United States and Canada collaborate to create markets for sustainable seafood under the [Local Catch](#) brand. Transactions between consumers and harvesters/growers are intermediated and delivered through a subscription-based service modeled after CSAs.

Grains

Grain production is a significant contributor to the study area's economy that has the opportunity to expand local production and use. It is the largest commodity grown by acreage at 1.8 million acres in 2012. As a staple food, grains are used to make a variety of products, including: flour, processed corn products, bread and bakery products, snack foods, beers, liquors, malt, breakfast cereals, and other manufactured food products. In addition to foods that are available for direct human consumption, grains are fed to chickens, dairy cows, and beef cattle. Many of the industries that manufacture these products are concentrated in the study area and have output multipliers between 1.5 and 2.0. So, for every dollar of sales, the local economy benefits from an additional 50 cents to \$1 in other economic activity produced by local spending on inputs, supplies, and services.

There are several industry and consumer-driven changes of which local farms and processors can take advantage. For instance, poultry integrators like Perdue are looking to increase their sourcing of organic grain in response to consumer demand for organic chicken. The company is also willing to support farmers as they undergo the three-year transition period to become certified organic.

⁴³ Consumer Reports News, "Consumer Reports Investigation: More Than One-Fifth of Tested Seafood Mislabeled, Incompletely Labeled, or Misidentified By Store or Restaurant Employee"; Consumer Reports News, "What Fish Is on Your Plate?"; Picchi, "Seafood Fraud"; Blank, "Virginia Supplier Pleads Guilty in Crab Fraud Case."

The alcoholic and craft beverage industries are also being driven by consumer interest for new flavors, local products, and a need to differentiate. In response, many craft brewers are looking for new varieties of grains. Similarly, the demand for local beers is attracting interest for local malting facilities. Currently, the study area has three malting facilities, with new ones being proposed. These provide a market for increased barley and small grain production in the region.

Lastly, the baked goods and snack foods industries are driven by a growing market for ancient grains and alternative grains. Local bakeries are also becoming more interested in using more varieties and other small grains. Farmers who produce local grains that meet changing preferences can benefit from this shift. Ultimately, there is an opportunity to build a local grain supply chain akin to the one in New York, but research is needed to develop varieties suited for climate and taste in the region.

Case Example: The American White Wheat Producers' Association (AWWPA) was formed to open markets for identity preserved grains using grower owned and controlled genetics and marketing systems. The AWWPA was one of the first businesses to target non-commodity markets grains allowing producers to sustain themselves through wildly fluctuating wheat markets.⁴⁴

Beef

It is also possible to improve the local beef supply chain. Beef cattle production contributed \$465 million in economic output to the study area in 2016 and ranked seventh among the production sectors. While a high proportion of beef cattle can be sourced locally, only 60 percent of the beef cattle that cattle farms and slaughterhouses need are bought in the study area. While the study area has some feedlots, most cattle are finished on feedlots in the South and Central Great Plains states.

Consumers are purchasing the locally slaughtered and processed beef products. The proportion of slaughtered and processed meat products purchased locally is about 4 percent and 22 percent respectively, meaning that most of the meat that households purchase is coming from outside of the study area. Shifting more of the purchasing back to the region requires increasing production and processing capacity.

Industry and consumer demand reveal some opportunities to increase local beef production and processing. Major buyers such as Wegmans are always on the lookout for additional sources of local beef. There is also an opportunity to address declining beef consumption through product differentiation. Today's consumers are increasingly concerned about eating healthy. Offering products associated with healthier outcomes, such as lean beef, grass-fed beef, and local beef may address some of these concerns, and reward producers and processors who make appropriate investments. However, this is more of a niche market until the supply chain infrastructure can accommodate scaled production.

Simultaneously, there is a recognition that more local slaughter/processing facilities are needed for producers to take advantage of these opportunities. Conversely, investment in more slaughter and processing facilities depends on enough livestock operations in the region. To differentiate supply and increase local production, Beef Quality Assurance programs (BQAs), regional branding, and livestock farmer training can help build a local supply chain.

Case Example: [Meyer Natural Beef](#) provides locally sourced natural beef under private label agreements to some of the nation's largest retail companies. They help growers form local supply networks to service using well controlled and transparent supply chains. Meyer is currently seeking to broadly expand in the study area. Participating farmers are paid a premium for their participation.

Produce

Opportunities for produce processing in the region can also induce more production. Between 2006 and 2015, firm concentration in the study area for processors increased, primarily due to growth in the number of canning and juice operations. An increase in juicing operations may be in part due to increasing consumer demand for more convenient ways to consume produce, as in juices, smoothies, and frozen products. In 2016, the produce canning industry contributed \$2.6 billion to the economy within the study area while frozen produce and juice industries contributed \$179 million.

Another opportunity for increased fruit and vegetable production in the region is the current growth in urban agriculture. Many urban farms specialize in hydroponic production. These and other evolving production practices increase the ability of local producers to access institutional and other markets. For example, Hummingbird Farms on the Eastern Shore specializes in hydroponic heirloom tomatoes and has sold them to public schools. Similarly, George Mason University was able to sell hydroponic produce grown on campus through Sodexo, its dining service provider. Sodexo would not have accepted produce grown on-campus in soil without complex food safety requirements. Hydroponic products were more readily accepted.

Lastly, many growers in the study area struggle to access or remain profitable in direct-to-consumer and wholesale markets because of a limited growing season in the Mid-Atlantic. Technologies and growing practices that help extend the growing season will be important to improve the market for local produce, including investments in hoopouses, greenhouses, hydroponics, and research in new crop varieties and production techniques.

Case Example: [Eden Valley Growers](#) is a farmers' cooperative business owned by 10 member farms, producing summer vegetables for wholesale and retail clients in major East Coast markets. Because the cooperative is focused on accessing major wholesale accounts, its members must meet Harmonized GAP as well as New York Grown and Certified standards. The cooperative also serves as a purchasing agent for its grower members to reduce the costs and overhead burden of ordering and receiving operating supplies.

Dairy

The dairy industry faces unique challenges along the entire supply chain. The issues are further compounded by an industry that is the most concentrated among all food and beverage sectors in the study area. For local dairies to thrive, vertical integration within the regional/local supply chain is important. Such an effort would involve regional branding, cooperative action with downstream supply chain partners, strong knowledge of consumer demand, and efficient distribution networks.

Dairy processors' priority is to evaluate an optimal product mix. Consumption for fluid milk is on a long-term decline, but consumption of cheese, butter, and yogurt are increasing. On-farm creameries and dairy processors can take advantage of increased demand for full-fat dairy products. However, processors and cooperative still have to sell fluid milk, a product category that has lacked product development.

Given consumer trends, the dairy industry needs investments in product development focused on health, nutrition, functional ingredients (such as probiotics and protein), new flavors, and indulgence products such as sweets and ice creams. Additionally, processors can dif-

ferentiate themselves by offering grass-fed, extra-protein, and probiotic dairy products. Other trending products ripe for development include flavored and high-fat dairy products for Asian and Hispanic markets and kosher products for Jewish consumers.

Case Example: [Hudson Valley Fresh](#) is a cooperative of small farms that manufactures and markets milk and innovative dairy products in the Hudson Valley and New York City's metropolitan market area. Hudson Valley Fresh controls its production and marketing systems from the farm to the store front.

Wholesale and Retail Opportunities

The "retail apocalypse" is a national phenomenon that has caused declines in brick and mortar retail activity. Much of the loss of retail stores can be attributed to growing volumes of online purchases. By extension, this also affects the wholesale sector and how products get to customers. Within the study area, the wholesale and retail sectors as a whole decreased between 2006 and 2015, regarding their concentration, by number of firms and employees.

However, the data suggest opportunities for food, beverage, and farm product wholesaling in the study area. During the period, the number of food, beverage, and farm product wholesalers increased 9 percent. The concentration of these sectors in the region also grew by 4 percent as compared to the rest of the country. Much of this growth can be attributable to grocery and alcoholic beverage wholesale activity. The growing concentration of the beverage manufacturing industry, which includes wineries, breweries, and distilleries, in the study area also supports increased wholesale activity.

Opportunities in food retail vary. Despite major disruptions in the industry from meal-kit businesses and large mergers, grocery stores and supermarkets are still growing. The number and concentration of food service contractors, caterers, and mobile food services also increased. However, meat and seafood markets are declining. These shifts present new challenges and opportunities for farmers to market their products through wholesale channels, online stores, mobile food services, and other non-traditional means, in addition to the traditional last receivers: retail, institutions, and restaurants.

The number of restaurants and food places in the region is also growing slightly faster than the national growth rate. The growth reflects the fact that the region is home to several major metropolitan areas where consumers have high levels of disposable income and are increasingly dining out. Efforts to encourage farm-to-restaurant can present opportunities for local farms to tap into growing demand. However, this is not the easiest or most stable market for small-scale farmers or beginning farmers due to various logistical and food safety obstacles to overcome.

Retail of alcoholic beverages presents another opportunity. The region has some of the highest levels of alcohol consumption in the country. DC and Delaware are two of the top 3 states for per capita consumption, most of it in wine and spirits. The Mid-Atlantic region generates 18 percent of the national consumption of alcohol.

Due to strong regional interest in on-farm craft beverage operations, the region has seen significant growth in the retail of alcoholic beverages. However, consumers still purchase from traditional establishments such as fine dining, liquor stores, bars, or clubs. Although, consumers are buying less from on-premise sources (restaurants, bars, tasting rooms) and opting for off-premise sources (beer, wine, and liquor stores). Ultimately, whether consumers purchase alcohol at a store or farm, they will have an abundance of options. Given that national alcohol sales growth is slowing down, it will be imperative that businesses in the industry align with evolving consumer preferences.

Case Example: [Local Roots](#) provides a year-round marketplace for locally produced fruits, vegetables, meats, cheeses, baked goods, arts and crafts through a producer-consumer cooperative. Farmers sell their products and also sell them on consignment. In 2010, the market's first year, they sold nearly \$300,000 worth of local products from nearly 100 producers. When the co-op turns a profit, the members receive a distribution.



C: Key Economic Indicators by Commodity and Industry

Commodity	Average RPC	E/I Ratio	Industry Multiplier
Oilseeds	23%	5.02	1.87
Grains	57%	0.93	1.97
Vegetables and melons	12%	0.04	1.79
Fruit	11%	0.04	1.87
Tree Nuts	0%	0.00	1.75
Greenhouse, nursery, and floriculture products	29%	1.11	1.75
Tobacco	3%	1.37	1.86
Cotton	78%	15.84	2.48
Sugarcane and sugar beets	37%	0.01	0.00
All other crops	43%	0.14	1.95
Beef cattle	60%	0.60	1.84
Dairy cattle and milk products	81%	2.28	1.85
Poultry and egg products	72%	1.19	1.90
Animal products, except cattle and poultry and eggs	40%	0.46	1.64
Forest, timber, and forest nursery products	46%	0.50	2.14
Logs and round wood	74%	0.93	1.94
Fish	9%	0.20	1.52
Wild game products, pelts, and furs	40%	0.07	1.48
Support activities for agriculture and forestry	98%	12.82	1.82
Other animal food	49%	0.60	1.67
Flour	29%	0.32	1.94
Rice	0%	0.00	0.00
Malt	0%	0.00	0.00
Wet corn	7%	0.29	1.89
Soybean and other oilseed processing	5%	0.11	1.53
Fats and oils refining and blending	7%	0.22	1.38
Breakfast cereal	11%	0.88	1.54
Beet sugar	0%	0.00	0.00
Sugar cane	23%	1.01	1.47
Non-chocolate confectioneries	15%	1.10	1.68
Chocolate and confectioneries from cacao beans	17%	1.27	1.64
Confectioneries from purchased chocolate	21%	2.12	1.70

Commodity	Average RPC	E/I Ratio	Industry Multiplier
Frozen fruits, juices and vegetables	9%	0.30	1.75
Frozen specialties	9%	0.06	1.73
Canned fruits and vegetables	25%	1.47	1.69
Canned specialties	4%	0.27	1.52
Dehydrated food products	10%	0.01	1.57
Fluid milk	56%	0.73	2.06
Creamery butter	25%	0.05	1.95
Cheese	11%	0.59	1.98
Dry, condensed, and evaporated dairy products	10%	0.22	1.83
Ice cream and frozen dessert	54%	3.20	1.70
Meat (except poultry) produced in slaughtering plant	4%	0.09	1.91
Meat processed from carcasses	22%	0.38	1.62
Processed animal rendered byproducts	27%	1.11	1.90
Processed poultry meat products	48%	2.38	2.10
Seafood products	23%	0.62	1.57
Bread and bakery products, except frozen	32%	0.88	1.83
Frozen cakes and other pastries	16%	0.95	1.73
Cookies and crackers	23%	0.55	1.73
Dry pasta, mixes, and dough	12%	0.71	1.64
Tortillas	3%	0.00	1.82
Roasted nuts and peanut butter	42%	0.17	1.44
Other snack foods	55%	3.88	1.55
Coffee and tea	11%	0.65	1.66
Flavoring syrup and concentrate	1%	0.08	1.30
Mayonnaise, dressings, and sauces	19%	1.35	1.56
Spices and extracts	19%	1.69	1.67
All other food products	15%	0.86	1.76
Beer, ale, malt liquor and nonalcoholic beer	29%	0.30	1.62
Wine and brandies	6%	0.46	1.72
Distilled liquors except brandies	2%	0.42	1.26

Source: IMPLAN, 2016

D: Sub-Region Agricultural and Consumer Stats

CENTRAL MARYLAND	Central Maryland	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$464,629	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	46%	40%	97%
Market Value of Agricultural Sales per acre	\$843	\$1,225	\$432
Direct to Consumer Sales as Share of Total	1.4%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$436,875	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	77,902	1,892,400	92,281,080
Gross Margin Ratio	17%	22%	23%
Expense to sales ratio	0.94	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Dairy	70,149	769,798	35,512,120
Grains and Oilseeds	50,230	1,136,156	131,135,151
Other crops and hay	14,567	85,991	16,061,669
Horticultural Products	13,411	60,783	5,104,694
Vegetables	5,888	150,969	16,851,235
Fruits	5,107	135,192	25,869,700
Cattle and calves	2,821	162,518	76,380,153
Poultry and Eggs	506	1,742,336	42,751,468
Hogs and pigs	313	127,814	22,492,611
Aquaculture	0	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	7,385	72,274	3,233,358
Change in farmers (2002-2012)	-0.2%	4.4%	3.8%
Farms	4,455	45,991	2,109,303
Change in farms (2002-2012)	-5.6%	0.3%	-0.9%
Farmland (acres)	551,001	6,870,583	914,527,657
Change in farmland (2002-2012)	-9.4%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	10%	2%	
Farmland Concentration (Percent of Total Acres)	8%	1%	

CENTRAL MARYLAND	Central Maryland	Foodshed Study Area	United States
Manufacturing Clusters			
Bakeries and tortilla manufacturing			
Other food manufacturing			
Sugar and confectionery product manufacturing			
Grain and oilseed milling			
Dairy product manufacturing			
CONSUMER DATA			
Population (2017)	4,190,679	14,159,565	330,088,686
Households (2017)	1,622,943	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$77,334	\$79,339	\$58,100
Average Household Income	\$108,466	\$107,210	\$83,694
Per Capita Income	\$42,542	\$40,768	\$31,950
Diversity Index	65	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Enterprising Professionals (2D)	8.8%		
Savvy Suburbanites (1D)	7.1%		
Metro Renters (3B)	6.5%		
Top Tier (1A)	6.5%		
Laptops and Lattes (3A)	5.7%		
Total	34.6%		
Spending Potential			
Food at Home	130	125	100
Food Away from Home	134	127	100

CENTRAL MARYLAND	Central Maryland	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	94	98	100
Used bread in last 6 months	98	100	100
Used chicken (fresh or frozen) in last 6 months	99	101	100
Used turkey (fresh or frozen) in last 6 months	98	100	100
Used fish/seafood (fresh or frozen) in last 6 months	102	102	100
Used fresh fruit/vegetables in last 6 months	100	101	100
Used fresh milk in last 6 months	98	100	100
Used organic food in last 6 months	124	114	100
Went to family restaurant/steak house in last 6 months	100	102	100
Went to family restaurant/steak house: 4+ times a month	97	101	100
Went to fast food/drive-in restaurant in last 6 months	99	100	100
Went to fast food/drive-in restaurant 9+ times/month	96	99	100
Fast food/drive-in last 6 months: eat in	94	99	100
Fast food/drive-in last 6 months: home delivery	103	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	93	99	100
Fast food/drive-in last 6 months: take-out/walk-in	111	106	100

EASTERN SHORE	Eastern Shore	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$2,768,319	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	71%	40%	97%
Market Value of Agricultural Sales per acre	\$1,674	\$1,225	\$432
Direct to Consumer Sales as Share of Total	0.3%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$2,478,074	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	754,197	1,892,400	92,281,080
Gross Margin Ratio	27%	22%	23%
Expense to sales ratio	0.90	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Poultry and Eggs	678,993	1,742,336	42,751,468
Grains and Oilseeds	664,195	1,136,156	131,135,151
Vegetables	92,914	150,969	16,851,235
Dairy	56,878	769,798	35,512,120
Aquaculture	31,587	33,448	1,552,375
Cattle and calves	13,013	162,518	76,380,153
Horticultural Products	11,259	60,783	5,104,694
Other crops and hay	5,158	85,991	16,061,669
Fruits	1,665	135,192	25,869,700
Hogs and pigs	1,461	127,814	22,492,611
Farms and Farmland			
Farmers (2012)	10,486	72,274	3,233,358
Change in farmers (2002-2012)	8.3%	4.4%	3.8%
Farms	6,796	45,991	2,109,303
Change in farms (2002-2012)	4.8%	0.3%	-0.9%
Farmland (acres)	1,653,413	6,870,583	914,527,657
Change in farmland (2002-2012)	-0.2%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	15%	2%	
Farmland Concentration (Percent of Total Acres)	24%	1%	

EASTERN SHORE	Eastern Shore	Foodshed Study Area	United States
Manufacturing Clusters			
Seafood product preparation and packaging			
Fruit and vegetable preserving and specialty food manufacturing			
Animal food manufacturing			
Animal slaughtering and processing			
Sugar and confectionery product manufacturing			
CONSUMER DATA			
Population (2017)	1,480,499	14,159,565	330,088,686
Households (2017)	565,110	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$59,901	\$79,339	\$58,100
Average Household Income	\$80,313	\$107,210	\$83,694
Per Capita Income	\$31,237	\$40,768	\$31,950
Diversity Index	51.5	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Parks and Rec (5C)	7.9%		
Green Acres (6A)	6.4%		
Southern Satellites (10A)	5.1%		
The Great Outdoors (6C)	4.9%		
Front Porches (8E)	4.7%		
Total	29.0%		
Spending Potential			
Food at Home	99	125	100
Food Away from Home	99	127	100

EASTERN SHORE	Eastern Shore	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	102	98	100
Used bread in last 6 months	101	100	100
Used chicken (fresh or frozen) in last 6 months	101	101	100
Used turkey (fresh or frozen) in last 6 months	105	100	100
Used fish/seafood (fresh or frozen) in last 6 months	100	102	100
Used fresh fruit/vegetables in last 6 months	100	101	100
Used fresh milk in last 6 months	101	100	100
Used organic food in last 6 months	93	114	100
Went to family restaurant/steak house in last 6 months	102	102	100
Went to family restaurant/steak house: 4+ times a month	103	101	100
Went to fast food/drive-in restaurant in last 6 months	101	100	100
Went to fast food/drive-in restaurant 9+ times/month	99	99	100
Fast food/drive-in last 6 months: eat in	102	99	100
Fast food/drive-in last 6 months: home delivery	92	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	104	99	100
Fast food/drive-in last 6 months: take-out/walk-in	100	106	100

GREAT VALLEY	Great Valley	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$2,192,573	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	78%	40%	97%
Market Value of Agricultural Sales per acre	\$1,051	\$1,225	\$432
Direct to Consumer Sales as Share of Total	0.3%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$1,786,584	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	503,563	1,892,400	92,281,080
Gross Margin Ratio	23%	22%	23%
Expense to sales ratio	0.81	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Poultry and Eggs	562,387	1,742,336	42,751,468
Dairy	517,205	769,798	35,512,120
Grains and Oilseeds	158,047	1,136,156	131,135,151
Fruits	122,764	135,192	25,869,700
Hogs and pigs	102,484	127,814	22,492,611
Cattle and calves	96,209	162,518	76,380,153
Other crops and hay	33,385	85,991	16,061,669
Vegetables	19,456	150,969	16,851,235
Horticultural Products	3,546	60,783	5,104,694
Aquaculture	63	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	22,026	72,274	3,233,358
Change in farmers (2002-2012)	10.3%	4.4%	3.8%
Farms	14,194	45,991	2,109,303
Change in farms (2002-2012)	6.5%	0.3%	-0.9%
Farmland (acres)	2,086,291	6,870,583	914,527,657
Change in farmland (2002-2012)	3.4%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	31%	2%	
Farmland Concentration (Percent of Total Acres)	30%	1%	

GREAT VALLEY	Great Valley	Foodshed Study Area	United States
Manufacturing Clusters			
Dairy product manufacturing			
Animal slaughtering and processing			
Animal food manufacturing			
Fruit and vegetable preserving and specialty food manufacturing			
Sugar and confectionery product manufacturing			
CONSUMER DATA			
Population (2017)	1,581,521	14,159,565	330,088,686
Households (2017)	617,775	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$57,889	\$79,339	\$58,100
Average Household Income	\$75,271	\$107,210	\$83,694
Per Capita Income	\$29,859	\$40,768	\$31,950
Diversity Index	30.2	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Salt of the Earth (6B)	12.2%		
Green Acres (6A)	10.9%		
Middleburg (4C)	7.6%		
Parks and Rec (5C)	5.9%		
Comfortable Empty Nesters (5A)	5.8%		
Total	42.4%		
Spending Potential			
Food at Home	94	125	100
Food Away from Home	93	127	100

GREAT VALLEY	Great Valley	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	103	98	100
Used bread in last 6 months	101	100	100
Used chicken (fresh or frozen) in last 6 months	101	101	100
Used turkey (fresh or frozen) in last 6 months	105	100	100
Used fish/seafood (fresh or frozen) in last 6 months	99	102	100
Used fresh fruit/vegetables in last 6 months	101	101	100
Used fresh milk in last 6 months	102	100	100
Used organic food in last 6 months	85	114	100
Went to family restaurant/steak house in last 6 months	102	102	100
Went to family restaurant/steak house: 4+ times a month	103	101	100
Went to fast food/drive-in restaurant in last 6 months	101	100	100
Went to fast food/drive-in restaurant 9+ times/month	101	99	100
Fast food/drive-in last 6 months: eat in	104	99	100
Fast food/drive-in last 6 months: home delivery	92	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	107	99	100
Fast food/drive-in last 6 months: take-out/walk-in	96	106	100

PIEDMONT	Piedmont	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$233,694	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	42%	40%	97%
Market Value of Agricultural Sales per acre	\$356	\$1,225	\$432
Direct to Consumer Sales as Share of Total	0.4%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$303,605	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	-45,302	1,892,400	92,281,080
Gross Margin Ratio	-19%	22%	23%
Expense to sales ratio	1.30	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Dairy	24,492	769,798	35,512,120
Cattle and calves	24,037	162,518	76,380,153
Grains and Oilseeds	20,758	1,136,156	131,135,151
Other crops and hay	6,893	85,991	16,061,669
Vegetables	3,350	150,969	16,851,235
Fruits	2,970	135,192	25,869,700
Horticultural Products	2,014	60,783	5,104,694
Poultry and Eggs	214	1,742,336	42,751,468
Hogs and pigs	209	127,814	22,492,611
Aquaculture	0	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	6,996	72,274	3,233,358
Change in farmers (2002-2012)	0.5%	4.4%	3.8%
Farms	4,329	45,991	2,109,303
Change in farms (2002-2012)	-2.9%	0.3%	-0.9%
Farmland (acres)	657,096	6,870,583	914,527,657
Change in farmland (2002-2012)	-7.6%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	9%	2%	
Farmland Concentration (Percent of Total Acres)	10%	1%	

PIEDMONT	Piedmont	Foodshed Study Area	United States
Manufacturing Clusters			
Beverage manufacturing			
Dairy product manufacturing			
Fruit and vegetable preserving and specialty food manufacturing			
Other food manufacturing			
Grain and oilseed milling			
CONSUMER DATA			
Population (2017)	556,471	14,159,565	330,088,686
Households (2017)	190,078	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$109,061	\$79,339	\$58,100
Average Household Income	\$133,711	\$107,210	\$83,694
Per Capita Income	\$45,844	\$40,768	\$31,950
Diversity Index	55.1	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Boomburbs (1C)	26.9%		
Enterprising Professionals (2D)	14.6%		
Professional Pride (1B)	11.7%		
Savvy Suburbanites (1D)	8.6%		
Green Acres (6A)	5.4%		
Total	67.2%		
Spending Potential			
Food at Home	156	125	100
Food Away from Home	165	127	100

PIEDMONT	Piedmont	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	103	98	100
Used bread in last 6 months	101	100	100
Used chicken (fresh or frozen) in last 6 months	105	101	100
Used turkey (fresh or frozen) in last 6 months	103	100	100
Used fish/seafood (fresh or frozen) in last 6 months	105	102	100
Used fresh fruit/vegetables in last 6 months	103	101	100
Used fresh milk in last 6 months	101	100	100
Used organic food in last 6 months	126	114	100
Went to family restaurant/steak house in last 6 months	108	102	100
Went to family restaurant/steak house: 4+ times a month	107	101	100
Went to fast food/drive-in restaurant in last 6 months	102	100	100
Went to fast food/drive-in restaurant 9+ times/month	105	99	100
Fast food/drive-in last 6 months: eat in	107	99	100
Fast food/drive-in last 6 months: home delivery	106	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	110	99	100
Fast food/drive-in last 6 months: take-out/walk-in	114	106	100

SOUTHEAST PENNSYLVANIA	Southeast Pennsylvania	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$2,369,762	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	79%	40%	97%
Market Value of Agricultural Sales per acre	\$2,736	\$1,225	\$432
Direct to Consumer Sales as Share of Total	0.2%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$1,898,992	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	557,381	1,892,400	92,281,080
Gross Margin Ratio	24%	22%	23%
Expense to sales ratio	0.80	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Poultry and Eggs	499,756	1,742,336	42,751,468
Dairy	83,479	769,798	35,512,120
Grains and Oilseeds	42,472	1,136,156	131,135,151
Horticultural Products	28,774	60,783	5,104,694
Hogs and pigs	22,999	127,814	22,492,611
Other crops and hay	16,198	85,991	16,061,669
Fruits	14,350	135,192	25,869,700
Vegetables	10,406	150,969	16,851,235
Cattle and calves	1,653	162,518	76,380,153
Aquaculture	1,353	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	15,055	72,274	3,233,358
Change in farmers (2002-2012)	2.5%	4.4%	3.8%
Farms	9,558	45,991	2,109,303
Change in farms (2002-2012)	-2.0%	0.3%	-0.9%
Farmland (acres)	866,038	6,870,583	914,527,657
Change in farmland (2002-2012)	0.1%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	21%	2%	
Farmland Concentration (Percent of Total Acres)	13%	1%	

SOUTHEAST PENNSYLVANIA	Southeast Pennsylvania	Foodshed Study Area	United States
Manufacturing Clusters			
Other food manufacturing			
Animal food manufacturing			
Grain and oilseed milling			
Sugar and confectionery product manufacturing			
Dairy product manufacturing			
CONSUMER DATA			
Population (2017)	1,520,154	14,159,565	330,088,686
Households (2017)	566,997	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$69,976	\$79,339	\$58,100
Average Household Income	\$95,866	\$107,210	\$83,694
Per Capita Income	\$36,144	\$40,768	\$31,950
Diversity Index	33.1	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Green Acres (6A)	12.3%		
Salt of the Earth (6B)	7.9%		
Parks and Rec (5C)	7.7%		
Middleburg (4C)	5.5%		
Savvy Suburbanites (1D)	5.4%		
Total	38.8%		
Spending Potential			
Food at Home	116	125	100
Food Away from Home	117	127	100

SOUTHEAST PENNSYLVANIA	Southeast Pennsylvania	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	101	98	100
Used bread in last 6 months	101	100	100
Used chicken (fresh or frozen) in last 6 months	102	101	100
Used turkey (fresh or frozen) in last 6 months	106	100	100
Used fish/seafood (fresh or frozen) in last 6 months	101	102	100
Used fresh fruit/vegetables in last 6 months	101	101	100
Used fresh milk in last 6 months	102	100	100
Used organic food in last 6 months	99	114	100
Went to family restaurant/steak house in last 6 months	104	102	100
Went to family restaurant/steak house: 4+ times a month	104	101	100
Went to fast food/drive-in restaurant in last 6 months	101	100	100
Went to fast food/drive-in restaurant 9+ times/month	100	99	100
Fast food/drive-in last 6 months: eat in	104	99	100
Fast food/drive-in last 6 months: home delivery	96	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	105	99	100
Fast food/drive-in last 6 months: take-out/walk-in	101	106	100

SOUTHERN MARYLAND	Southern Maryland	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$82,559	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	83%	40%	97%
Market Value of Agricultural Sales per acre	\$398	\$1,225	\$432
Direct to Consumer Sales as Share of Total	2.2%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$93,395	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	3,527	1,892,400	92,281,080
Gross Margin Ratio	4%	22%	23%
Expense to sales ratio	1.13	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Grains and Oilseeds	27,236	1,136,156	131,135,151
Vegetables	5,911	150,969	16,851,235
Dairy	1,555	769,798	35,512,120
Other crops and hay	1,461	85,991	16,061,669
Cattle and calves	1,240	162,518	76,380,153
Fruits	945	135,192	25,869,700
Poultry and Eggs	136	1,742,336	42,751,468
Hogs and pigs	52	127,814	22,492,611
Horticultural Products	21	60,783	5,104,694
Aquaculture	0	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	3,147	72,274	3,233,358
Change in farmers (2002-2012)	-4.5%	4.4%	3.8%
Farms	2,011	45,991	2,109,303
Change in farms (2002-2012)	-8.6%	0.3%	-0.9%
Farmland (acres)	207,364	6,870,583	914,527,657
Change in farmland (2002-2012)	-10.2%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	4%	2%	
Farmland Concentration (Percent of Total Acres)	3%	1%	

SOUTHERN MARYLAND	Southern Maryland	Foodshed Study Area	United States
Manufacturing Clusters			
Bakeries and tortilla manufacturing			
Animal slaughtering and processing			
Other food manufacturing			
Beverage manufacturing			
Animal food manufacturing			
CONSUMER DATA			
Population (2017)	1,870,207	14,159,565	330,088,686
Households (2017)	661,656	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$83,818	\$79,339	\$58,100
Average Household Income	\$103,873	\$107,210	\$83,694
Per Capita Income	\$37,166	\$40,768	\$31,950
Diversity Index	68.3	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Pleasantville (2B)	14.9%		
Enterprising Professionals (2D)	10.6%		
Savvy Suburbanites (1D)	10.1%		
Soccer Moms (4A)	6.8%		
Bright Young Professionals (8C)	5.7%		
Total	48.1%		
Spending Potential			
Food at Home	124	125	100
Food Away from Home	127	127	100

SOUTHERN MARYLAND	Southern Maryland	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	98	98	100
Used bread in last 6 months	100	100	100
Used chicken (fresh or frozen) in last 6 months	102	101	100
Used turkey (fresh or frozen) in last 6 months	104	100	100
Used fish/seafood (fresh or frozen) in last 6 months	104	102	100
Used fresh fruit/vegetables in last 6 months	101	101	100
Used fresh milk in last 6 months	100	100	100
Used organic food in last 6 months	116	114	100
Went to family restaurant/steak house in last 6 months	102	102	100
Went to family restaurant/steak house: 4+ times a month	103	101	100
Went to fast food/drive-in restaurant in last 6 months	100	100	100
Went to fast food/drive-in restaurant 9+ times/month	101	99	100
Fast food/drive-in last 6 months: eat in	97	99	100
Fast food/drive-in last 6 months: home delivery	104	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	99	99	100
Fast food/drive-in last 6 months: take-out/walk-in	112	106	100

TIDEWATER	Tidewater	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$268,536	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	70%	40%	97%
Market Value of Agricultural Sales per acre	\$378	\$1,225	\$432
Direct to Consumer Sales as Share of Total	1.0%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$288,449	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	37,682	1,892,400	92,281,080
Gross Margin Ratio	14%	22%	23%
Expense to sales ratio	1.07	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Grains and Oilseeds	172,647	1,136,156	131,135,151
Vegetables	12,916	150,969	16,851,235
Cattle and calves	12,425	162,518	76,380,153
Dairy	6,127	769,798	35,512,120
Other crops and hay	4,049	85,991	16,061,669
Fruits	1,306	135,192	25,869,700
Horticultural Products	991	60,783	5,104,694
Aquaculture	445	33,448	1,552,375
Poultry and Eggs	332	1,742,336	42,751,468
Hogs and pigs	186	127,814	22,492,611
Farms and Farmland			
Farmers (2012)	5,439	72,274	3,233,358
Change in farmers (2002-2012)	-2.8%	4.4%	3.8%
Farms	3,542	45,991	2,109,303
Change in farms (2002-2012)	-7.5%	0.3%	-0.9%
Farmland (acres)	710,066	6,870,583	914,527,657
Change in farmland (2002-2012)	-11.7%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	8%	2%	
Farmland Concentration (Percent of Total Acres)	10%	1%	

TIDEWATER	Tidewater	Foodshed Study Area	United States
Manufacturing Clusters			
Seafood product preparation and packaging			
Bakeries and tortilla manufacturing			
Beverage manufacturing			
Fruit and vegetable preserving and specialty food manufacturing			
Other food manufacturing			
CONSUMER DATA			
Population (2017)		14,159,565	330,088,686
Households (2017)		5,325,469	124,110,001
Household Income (2017)			
Median Household Income		\$79,339	\$58,100
Average Household Income		\$107,210	\$83,694
Per Capita Income		\$40,768	\$31,950
Diversity Index		59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Enterprising Professionals (2D)	13.8%		
Top Tier (1A)	10.0%		
Metro Renters (3B)	7.2%		
Savvy Suburbanites (1D)	6.5%		
Laptops and Lattes (3A)	5.6%		
Total	43.1%		
Spending Potential			
Food at Home	152	125	100
Food Away from Home	158	127	100

TIDEWATER	Tidewater	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	95	98	100
Used bread in last 6 months	99	100	100
Used chicken (fresh or frozen) in last 6 months	101	101	100
Used turkey (fresh or frozen) in last 6 months	97	100	100
Used fish/seafood (fresh or frozen) in last 6 months	104	102	100
Used fresh fruit/vegetables in last 6 months	102	101	100
Used fresh milk in last 6 months	99	100	100
Used organic food in last 6 months	130	114	100
Went to family restaurant/steak house in last 6 months	103	102	100
Went to family restaurant/steak house: 4+ times a month	101	101	100
Went to fast food/drive-in restaurant in last 6 months	100	100	100
Went to fast food/drive-in restaurant 9+ times/month	98	99	100
Fast food/drive-in last 6 months: eat in	101	99	100
Fast food/drive-in last 6 months: home delivery	103	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	98	99	100
Fast food/drive-in last 6 months: take-out/walk-in	112	106	100

WESTERN MARYLAND	Western Maryland	Foodshed Study Area	United States
AGRICULTURAL DATA			
Production Output			
Market Value of Agricultural Sales (\$1,000)	\$142,273	\$8,418,097	\$394,644,481
Market Value Growth (2002-2012)	72%	40%	97%
Market Value of Agricultural Sales per acre	\$545	\$1,225	\$432
Direct to Consumer Sales as Share of Total	0.4%	0.4%	0.3%
Total farm production expenses (\$1,000)	\$116,561	\$7,324,129	\$328,939,354
Net Cash Farm Income (\$1,000)	35,756	1,892,400	92,281,080
Gross Margin Ratio	25%	22%	23%
Expense to sales ratio	0.82	0.87	0.83
Production Clusters, Market Value of Agricultural Sales (\$1,000)			
Dairy	53,859	769,798	35,512,120
Cattle and calves	11,310	162,518	76,380,153
Other crops and hay	8,992	85,991	16,061,669
Fruits	5,462	135,192	25,869,700
Grains and Oilseeds	1,120	1,136,156	131,135,151
Vegetables	177	150,969	16,851,235
Hogs and pigs	113	127,814	22,492,611
Horticultural Products	86	60,783	5,104,694
Poultry and Eggs	17	1,742,336	42,751,468
Aquaculture	0	33,448	1,552,375
Farms and Farmland			
Farmers (2012)	2,849	72,274	3,233,358
Change in farmers (2002-2012)	9.1%	4.4%	3.8%
Farms	1,818	45,991	2,109,303
Change in farms (2002-2012)	7.8%	0.3%	-0.9%
Farmland (acres)	261,058	6,870,583	914,527,657
Change in farmland (2002-2012)	-1.9%	-2.5%	-2.5%
Farm Concentration (Percent of Total Farms)	4%	2%	
Farmland Concentration (Percent of Total Acres)	4%	1%	

WESTERN MARYLAND	Western Maryland	Foodshed Study Area	United States
Manufacturing Clusters			
Dairy product manufacturing			
Animal slaughtering and processing			
Grain and oilseed milling			
Bakeries and tortilla manufacturing			
Animal food manufacturing			
CONSUMER DATA			
Population (2017)	255,469	14,159,565	330,088,686
Households (2017)	97,781	5,325,469	124,110,001
Household Income (2017)			
Median Household Income	\$50,501	\$79,339	\$58,100
Average Household Income	\$65,569	\$107,210	\$83,694
Per Capita Income	\$26,162	\$40,768	\$31,950
Diversity Index	26	59.2	60.6
Top 5 Tapestry Segments (percent of total households)			
Midlife Constants (5E)	11.9%		
Green Acres (6A)	11.7%		
Heartland Communities (6F)	9.7%		
Parks and Rec (5C)	8.4%		
Salt of the Earth (6B)	6.2%		
Total	47.9%		
Spending Potential			
Food at Home	84	125	100
Food Away from Home	81	127	100

WESTERN MARYLAND	Western Maryland	Foodshed Study Area	United States
CONSUMER DATA			
Market Potential (MPI)			
Used beef (fresh/frozen) in last 6 months	103	98	100
Used bread in last 6 months	101	100	100
Used chicken (fresh or frozen) in last 6 months	99	101	100
Used turkey (fresh or frozen) in last 6 months	106	100	100
Used fish/seafood (fresh or frozen) in last 6 months	98	102	100
Used fresh fruit/vegetables in last 6 months	100	101	100
Used fresh milk in last 6 months	102	100	100
Used organic food in last 6 months	82	114	100
Went to family restaurant/steak house in last 6 months	99	102	100
Went to family restaurant/steak house: 4+ times a month	100	101	100
Went to fast food/drive-in restaurant in last 6 months	98	100	100
Went to fast food/drive-in restaurant 9+ times/month	97	99	100
Fast food/drive-in last 6 months: eat in	103	99	100
Fast food/drive-in last 6 months: home delivery	94	100	100
Fast food/drive-in last 6 months: take-out/drive-thru	103	99	100
Fast food/drive-in last 6 months: take-out/walk-in	92	106	100

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