



Agriculture and Local Food Economies in the Appalachian Region

■ April 2022

Prepared under Contract
CO-20164-20 for:



Appalachian
Regional
Commission

COVER PHOTO CREDITS, CLOCKWISE FROM LEFT:
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Founded as Karp Resources in 1990, Karen Karp & Partners (KK&P) is the nation's leading problem-solver for food-related enterprises, programs, and policies. Our personalized approach is designed to meet the unique challenges facing our clients. We apply a combination of analytic, strategic, and tactical approaches to every problem and deliver solutions that can be measured and are always meaningful.

Our *Good Food is Good Business* division supports the healthy development, execution, and operations of food businesses and initiatives in the public and private sectors. Our services include strategic sourcing, feasibility analysis, market research, business planning, project management, and evaluation. Our *Good People are Good Business* division builds leadership and organizational effectiveness in the food sector through talent and performance management, organizational assessment, capacity building, executive coaching, recruiting, and employee engagement services.

KK&P's clients include corporations, government agencies, small businesses, nonprofits, and educational organizations. For almost 30 years, KK&P has spearheaded and has been integral to the development and execution of food businesses, policies, and partnerships.

■ Mass Economics

Mass Economics is a research and consulting firm that specializes in urban economic growth and equity. We are a technical firm with expertise in data, analytics, modeling, and strategy as well as a mission-driven organization committed to inclusive economic growth. Founded in 2012, we have offices in Cambridge and St. Louis but work in cities all across the country.

Mass Economics works with public, private, and philanthropic institutions, and is nationally known for its work on economic cluster strategies, urban land issues, inclusive and equitable growth, and the creation of models that link economic and physical assets, such as innovation districts. We contribute to economic growth and equity in U.S. cities by leading transformative, large-scale economic development projects as well as building customized, local strategies for cities and neighborhoods. Our development strategies create jobs, strengthen innovation and entrepreneurship, rationalize urban land use, and link economic opportunity to the aspirations and needs of local residents. We are experienced in moving development strategies forward from conceptualization through implementation with a focus on locally-led engagement processes and the long-term sustainability of economic development initiatives. We are experienced in working with and alongside community stakeholders and leadership teams to support projects as they are built and scaled.

■ Acknowledgements

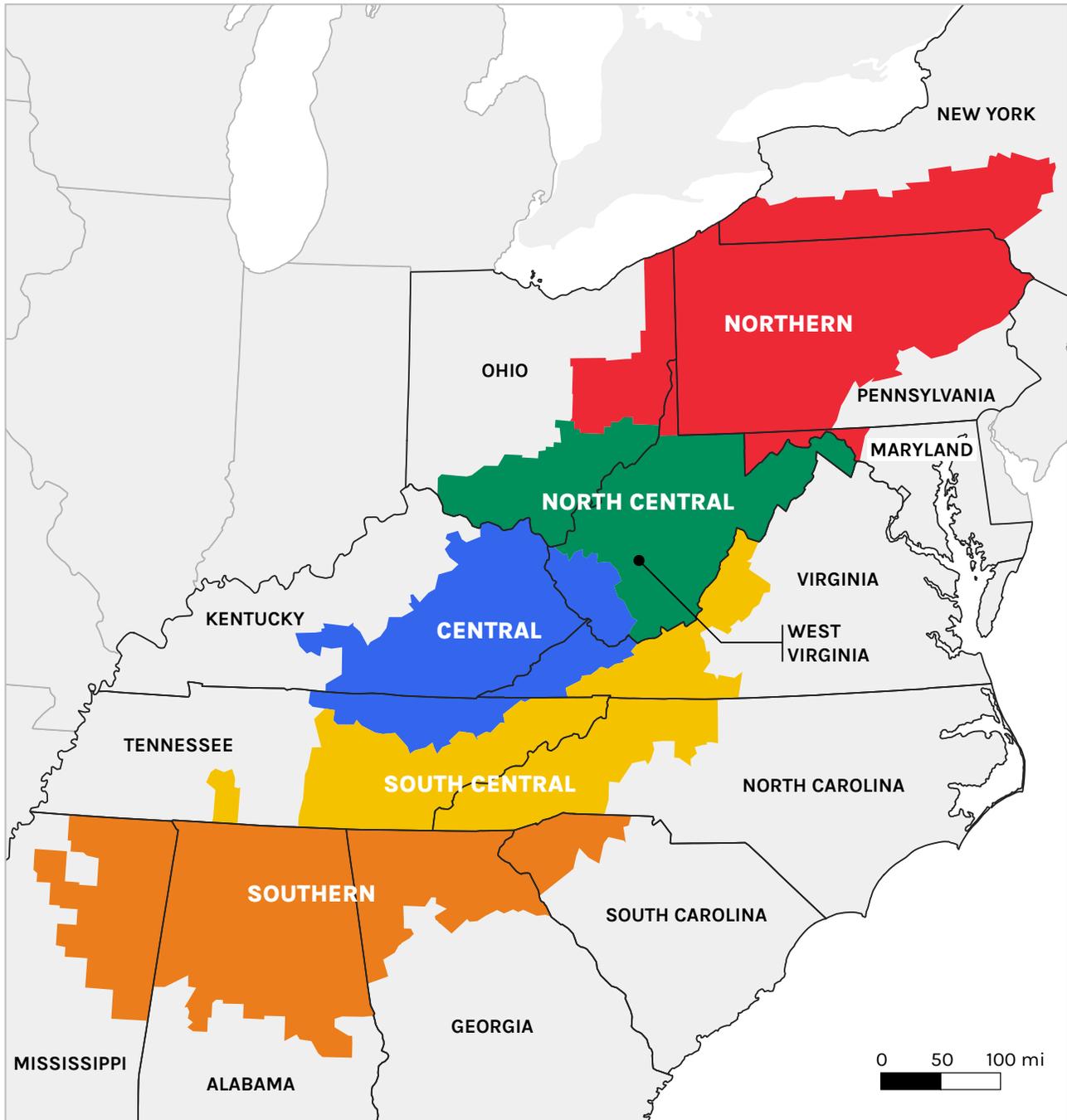
The project team would like to extend their thanks to the many stakeholders who have participated in this project, all of whom are listed in the appendix of this report. In particular, we would like to thank the Appalachian Regional Commission and all of the advisory committee members for supporting the research and development of this report.

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The Appalachian Region and its Subregions



AN INTERACTIVE COUNTY-LEVEL MAP OF ARC SUBREGIONS CAN BE ACCESSED AT ARC'S WEBSITE: <https://www.arc.gov/map/subregions-in-appalachia/>

1.

Executive Summary



Stretching from northeastern Mississippi to the Southern Tier of New York, the Appalachian Region

is vast and diverse, home to urban centers as varied as Pittsburgh, Birmingham, Knoxville, and Youngstown; rural areas and communities in geographies as disparate as the Mississippi Lowlands and the Blue Ridge Mountains; and a wide range of climate zones, microclimates, and agricultural production characteristics and conditions. Appalachia's food systems and food economies are as diverse as its landscape and its nearly 26 million residents, with key products ranging from commodity corn and soy to large and small-scale animal agriculture, and from hay and horticulture to niche forest products like mushrooms and ginseng.

Over the past two decades, increasing attention has been given to the potential of local and regional food systems to support economic development across the United States. Local and regional food supply chains drive greater local economic impact, while also enhancing the resiliency of our food supply. The early months of the COVID-19 pandemic starkly demonstrated the fragility of our national food system, reinvigorating public interest in local and regional food systems. The agriculture and food economies of the Appalachian Region (the Region) offer a unique set of levers to advance greater economic resilience and self-reliance across the Region.

This report aims to characterize current dynamics in the Region's farm and food economies, based primarily on analysis of the most recent U.S. Department of Agriculture (USDA) Census of Agriculture (2017); the report also highlights promising opportunities and innovative approaches for building more thriving and resilient food systems across the Region. Commissioned by the Appalachian Regional Commission (ARC) as part of its mission to strengthen economic growth in Appalachia, this report focuses on the economic dimensions and benefits of local food systems, while also acknowledging a range of other impacts, including community development, public health, and environmental sustainability, all of which are inextricably linked to economic health.

DYNAMICS AND TRENDS IN APPALACHIA'S AGRICULTURE AND FOOD ECONOMIES

This report explores and describes a number of key findings that emerged from review and analysis of the USDA's 2017 Census of Agriculture, as well as other complementary quantitative data sets. These findings, which are described in more detail in the body of the report, are summarized below.

Farms and Farmland

From 2007 to 2017, the Region lost farms and farmland at rates higher than the U.S. as a whole.

	Farm Loss, 2007-2017	Farmland Loss, 2007-2017
United States:	-7.4%	-2.4%
Appalachian Region:	-10.7%	-4.7%

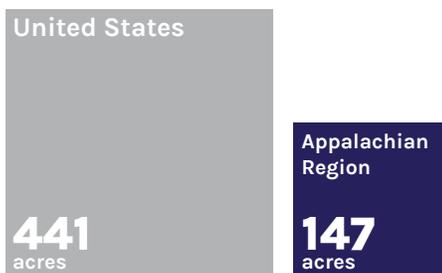
The Region lost nearly 30,000 farms and more than 1.8 million acres of farmland between 2007 and 2017, significantly outpacing national rates of farm and farmland loss. The Region lost farms more quickly than it lost farmland, suggesting a trend toward farm consolidation. Despite these losses, the Region is still home to nearly a quarter of a million farms and over 36 million acres of farmland.

Farm Size and Land Composition

The Appalachian Region is characterized by smaller farms and lower rates of agricultural land use compared to the United States.

Farms in Appalachia are, on average, about one-third the size of the average U.S. farm; and just 11% of Appalachian farmland is in farms 2,000 acres or larger - compared to over half of U.S. farmland in farms of that size. Appalachia also has a lower rate of land use for farming compared to the U.S. as a whole: while 40% of U.S. land area is devoted to agriculture, the same is true for just 28% of land in Appalachia.

Average Farm Size



Farming Participation and Farmer Demographics

	Average Farmer Age	Farmers per 1,000 Residents
United States:	57.5	10.4
Appalachian Region:	57.2	15.8

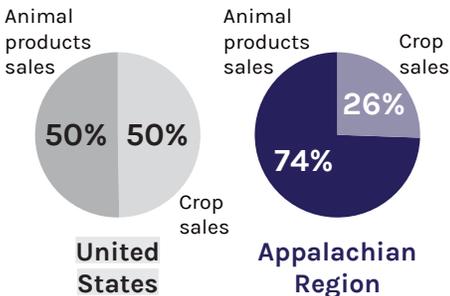
With over 400,000 farmers, the Appalachian Region’s population participates in farming at a rate higher than the U.S. as a whole.

For every 1,000 residents of Appalachia, there are 15.8 farmers, about 50% more than the U.S. overall, which has 10.4 farmers for every thousand residents. Farming participation is highest in Central Appalachia, with nearly 35 farmers for every 1,000 residents. Farming participation rates are much lower for non-white and Hispanic residents (2.4 and 2.8 farmers per 1,000 residents, respectively) compared to white residents (18.4 farmers per 1,000 residents), indicating disenfranchisement and exclusion among these communities. Female farmers account for 35% of farmers in the Region, and beginning farmers (with 10 or fewer years of experience) account for 28%.

Agricultural Products

Animal products account for a majority of the Appalachian Region’s agriculture sales.

Agriculture Sales from Crops and Animals



Sales of animals and animal products accounted for almost \$15 billion in Appalachia in 2017, 74% of its total agriculture sales. The Region’s agriculture sales lean much more heavily toward animal products than the U.S. as a whole, where sales are split almost evenly between animal products and crop sales. The Region’s top animal product categories are Poultry and Eggs, Cattle and Calves, and Milk, with Southern Appalachia’s Poultry and Egg sales alone (\$6.6 billion) accounting for a full third of the Region’s total agriculture sales. The Region’s top crop categories are Corn, Soy, and Other Field Crops (including Hay).

Sales and Revenue

The Appalachian Region’s farms generated nearly \$20 billion in sales in 2017, with sales growth that outpaced the U.S. from 2012 to 2017.

2017 Agriculture Sales

Appalachian Region:
\$19.8 Billion

5-year Sales Growth, 2012-2017

United States: **-2%**
Appalachian Region: **+6%**

Agriculture sales in the Appalachian Region totaled \$19.8 billion in 2017, a 6% increase from 2012 (a period during which total U.S. sales shrank by 2%), and a 30% increase from 2007. Southern Appalachia and Northern Appalachia led the Region in total sales. Small metro areas and the nonmetro counties adjacent to them together accounted for 59% of agriculture sales, indicating that

the Region’s small cities and the areas surrounding them are a major locus of agriculture production and sales—more so even than the Region’s rural counties.

Local Food Economies

Retail Direct (Direct to Consumer) Sales per Capita

United States:	\$8.57
Appalachian Region:	\$9.44

Wholesale Direct Sales Share of Total Agriculture Sales

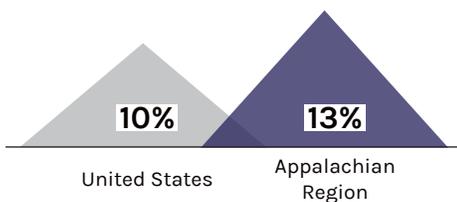
United States:	2.3%
Appalachian Region:	1.3%

The Region’s local food economies vary widely in their level of development. Potential for growth may be slowed by limited production of fruits and vegetables.

Available measures of local food sales present a nuanced portrait of the Appalachian Region when compared to the United States. The Region’s retail direct (or direct-to-consumer) sales are greater than the U.S. in per capita terms and as a share of its total agriculture sales, as well as in the share of farms participating in direct-to-consumer sales; but the Region’s wholesale direct sales (sales from farms to restaurants, retailers, and institutions) are lower as a share of total sales. These retail direct and wholesale direct sales metrics vary widely at the subregional level, with Northern Appalachia leading all subregions, as well as the U.S. as a whole, on virtually all measures. Compared to the United States as a whole, the Region has approximately 75% less vegetable and orchard acreage per capita, indicating that limited supply of fresh produce, an important product category for local food systems, may hinder growth in the Region’s local food economies.

SNAP Benefits (Food Stamps) and Local Foods

Percent of Households on SNAP



The Appalachian Region appears to have room for growth in capturing SNAP dollars for the Region’s farmers and food economies.

The Appalachian Region has a higher rate of household SNAP (Supplemental Nutrition Assistance Program, formerly known as food stamps) usage (13%) than the U.S. as a whole (10%), with Central Appalachia having a household SNAP rate as high as 20%, or one in five households. Farmers’ markets and farm stands can become authorized to accept SNAP dollars, allowing low-income residents to purchase more locally produced foods, while also improving local farm viability by allowing farmers to capture more revenue through these SNAP dollars. The Appalachian Region has a lower rate of SNAP acceptance at farmers’ markets than the U.S. as a whole on a per-SNAP-household basis: for every 100,000 households receiving SNAP benefits, Appalachia has 17.8 farmers’ markets that accept SNAP, compared to 22 for the U.S. overall.

Consistently with this indicator, states in the Appalachian Region also have a lower rate of SNAP spending at farmers' markets and farm stands than the U.S. as a whole (this data is for entire states, so is not limited to the Appalachian portions of these states). Taken together, these measures suggest that the Appalachian Region has significant opportunity to capture more SNAP dollars for the Region's farmers and food economies.

OPPORTUNITIES TO STRENGTHEN THE APPALACHIAN REGION'S LOCAL FOOD ECONOMIES

Informed by these data findings, input from stakeholders and this report's advisory committee, and further qualitative research, this report outlines seven opportunities to strengthen the Region's local food economies, each with case studies of initiatives and best practices. These opportunity areas are summarized below.

Farmer Training and Land Access

Support the long-term viability of Appalachian agriculture through farmer training and land access and preservation.

A strong Appalachian food economy relies on the preservation and growth of a skilled farmer population paired with affordable access to quality farmland. As previously noted, Appalachia has lost both farms and farmland at a faster rate than the U.S. as a whole. Practice-based farmer training programs, such as the Pasa Apprenticeship Programs in Pennsylvania, provide exposure to



CURRENT APPRENTICE CRAIG ALLEN AT COUNTRY SUNRISE CREAMERY. CREDIT: PASA SUSTAINABLE AGRICULTURE

Owners of a regional meat processing facility say their business is not a “build it, they will come” model. Instead, it is a “hunt them down, market your product, comply with regulatory demands, build relationships, manage the short comings, adapt, change, be resilient” model.

farming as an occupation for new and beginning farmers, while organizations like the Center for Heirs’ Property Preservation in South Carolina work to keep inherited farmland in agricultural use. Equally as important as training new farmers with the skills to produce food are programs that support farmers in accessing and meeting market opportunities.

Funding

Pursue innovative funding and financing models that open new streams of capital for local food businesses.

Local and regional food sector businesses often lack support from traditional funding sources. Expanding or creating entirely new “right-fit” sources of capital can play an important role in strengthening Appalachian food economies. Many farm and food entrepreneurs require “patient capital” or investors who are willing to accept more modest returns than traditional venture capital. Local food businesses are community assets that offer wide-ranging benefits to their communities, which allows many of these businesses to secure investment from within their own communities, as illustrated by a case study of Goshen Homestead in Southwest Virginia.

Value Chain Coordination

Enhance the efficacy of the Region’s distribution networks through strategic regional collaboration.

Food distribution in Appalachia is often expensive due to the Region’s mountainous topography, smaller scale and geographically dispersed farms, fewer major highways, and relatively few urban markets within the Region. Strategic regional collaborations can reduce costs by leveraging existing assets that streamline food distribution while reducing the need for high-cost physical infrastructure investments. Regional production coordination and planning can also facilitate market access for small and mid-size farms, while also supporting a more resilient regional food supply. Turnrow Appalachian Farm Collective demonstrates how diverse entities can share resources and expertise to achieve cost-effective local food distribution.



BLACK COHOSH FARMER, MICHELLE PRIDGEN OF WINDY HILL FARM . CREDIT: PRIYA JANISHKAR

Animal Agriculture

Build and strengthen supply chain networks and partnerships that support animal-based agriculture.

While animal and animal product sales amount to nearly 75% of agricultural sales in Appalachia, many of these products flow into national supply chains, leaving the Region before being processed or sold to consumers. Increasing the Region's meat processing capacity is one strategy for capturing more of the value of meat and animal products that are produced in the Region. Planning efforts such as infrastructure feasibility studies can be used to determine locations for expanding or building new processing facilities to meet local needs. Strategic collaborations such as that between Marksbury Farm Market, a Kentucky producer and processor, and Hickory Nut Gap, a North-Carolina-based producer and retail brand, have leveraged knowledge, relationships, and synchronized product standards to expand the marketing reach of their businesses.

Appalachian Products and Identity

Elevate the Region's unique identity through distinct Appalachian crops and products and place-based regional branding.

The Appalachian Region's distinctive character, agricultural heritage, and unique crops and products can be leveraged to capture the interest of consumers. From heirloom varieties of commonly cultivated crops to edible forest products, the Region's

producers can benefit from making Appalachia’s identity a central part of their branding and product selection. Organizations like Appalachian Sustainable Development and their Harvest Herb Hub are working to provide resources, technical support, aggregation, and marketing services to Appalachian farmers that cultivate distinctly Appalachian products.

Food Security

Capture more public and private food assistance dollars to support local food producers while enhancing community food security.

Only a small portion of federal food assistance dollars are spent on local foods in Appalachia each year. Expanding SNAP (formerly food stamps) acceptance at farmers’ markets and improving access and affordability of local foods can increase the amount of food assistance dollars that go to local and regional farmers. Furthermore, community food security organizations such as food banks and food pantries can create mutually beneficial partnerships with local growers to increase the distribution and consumption of local foods.

The Future of Farming in Appalachia

Support the viability of farms into the future by cultivating place-based entrepreneurship and climate-resilient enterprise models.

On average, Appalachian farms were less profitable than the national average in 2017, likely a contributing factor to the Region’s higher rate of farm loss. Meanwhile, the volatility of climate change presents an additional layer of uncertainty for the financial security of the Region’s farm operations. Building an ecosystem of support that provides food sector businesses with the tools to meet emerging market demand and develop resilient enterprise models can bolster the food and farm sector into the future. Organizations such as Tennessee-based nonprofit AgLaunch Initiative are working to promote a culture of forward-looking entrepreneurship among their farmer members, while technological innovations, such as those central to AppHarvest’s large-scale controlled environment agriculture facilities, are bound to play an increasingly important role in the 21st century farming sector.



This report only scratches the surface of the complexity, richness, and myriad opportunities to be found across the Appalachian Region's farm landscapes and food supply chains.

Nevertheless, the intent of this report is to equip the Region's stakeholders with a deeper understanding of important dynamics in their food systems, and to spark innovation and creativity by shining a light on key areas of opportunity for more thriving and resilient Appalachian food economies.

2.

Introduction and Background



Project Introduction

Project Background

As a federal-state-local partnership with a focus on economic development, the Appalachian Regional Commission (ARC) works broadly to increase economic opportunity and vibrancy for Appalachian communities. Spurred by the U.S. Department of Agriculture's (USDA) release of the 2017 Census of Agriculture, this project seeks to highlight agricultural trends within the Region, determine the state of the Region's local food economies, and identify opportunities and strategies for how communities can better support and cultivate thriving food and agriculture economies. The timing of the project is responsive to the challenges facing farmers related to climate change, shifting consumer demands, and economic and health crises that existed even before the coronavirus pandemic. COVID-19 has sent additional shocks up and down the agriculture and food supply chain and has added urgency to understanding where and how our food is produced and how it can most equitably be distributed.

After issuing a Request for Proposals (RFP) in 2020, the Appalachian Regional Commission retained a team led by Karen Karp & Partners (KK&P) to conduct the research and prepare this report. Primary team members included Ben Kerrick (project lead), Shayna Cohen, Brian De Corte, and Emily Sandusky of KK&P, Teresa Lynch and Thomas Goff of Mass Economics, and additional team members Erin Hostetler, Jennifer Brodsky, and Gabo Halili. The KK&P consultant team initiated its work in October 2020 and completed its research by October 2021.

Methodology

The RFP outlined three primary assignments:

1. Provide a quantitative overview of agricultural and local food activity throughout the Appalachian Region
2. Identify best practices and promising models from across Appalachia, as well as elsewhere in the country, that support the development of local food systems and help

farms increase revenues

3. Identify emerging opportunities in agriculture throughout the Region, including types of crops and products as well as strategic and technological innovations

In pursuit of these research goals, the KK&P team assembled an advisory committee composed of eight members, all of whom are based in the Appalachian Region. Committee members were selected to represent the diversity of the Region, including geographic distribution (representing each of ARC's five subregions), urban and rural, food/agriculture sector roles and expertise, and demographic diversity.

Literature Review

The literature review is intended to serve as a resource for future research conducted on the Region's agriculture and food system. The literature review included academic papers on local food systems and economic development, food system reports from across the Appalachian Region, "best-in-class" food system reports from outside the Appalachian Region, relevant past ARC-funded research, and case studies of relevant food system initiatives and innovations.

Quantitative Overview

The quantitative overview provided a detailed analysis of agriculture and local food activity indicators across the Appalachian Region. Key themes and findings from the data analysis are based primarily on data from the USDA Census of Agriculture (2007 to 2017), and are complemented by a range of other data sources. The quantitative research was distilled to seven key findings that illustrate local and regional food system dynamics within Appalachia.

Qualitative Research

Following the literature review and data analysis research phases, the research team hosted an advisory committee charrette and conducted subsequent interviews with key food system stakeholders and sector experts to "ground-truth" the data, and to identify specific gaps, challenges, assets, and opportunities for



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food system development in the Appalachian Region. Findings from these conversations are woven throughout this report and informed the development of the opportunity profiles and case studies.

Opportunity Profiles and Case Studies

The literature review and quantitative and qualitative research phases yielded seven key opportunities for strengthening local and regional food systems in Appalachia. Within the discussion of each opportunity area, case studies are included to highlight existing projects that demonstrate innovative or time-tested approaches related to a given opportunity. Desk research and interviews were used to craft the case studies featured in the report.

Local Food Systems and Economic Development

Overview

Local and regional food systems are increasingly recognized as a key lever for economic development. Local and regional foods are congressionally defined as agricultural products that are raised, produced, distributed, and consumed within the same geographic area, typically within a radius of 400 miles or less.¹ A drawback of selecting political boundaries and geographic distance to define food system boundaries is that food systems and supply chains are inherently complex and resist confinement to arbitrary boundaries.² For example, two neighboring farms may be separated by a state boundary but sell to the same market, illustrating the ways in which a food system is ill-defined by strict political boundaries. Similarly, the distinction between local and regional food systems is generally fluid yet important to consider from an economic development standpoint. The two scales provide different yet connected economic benefits as local food systems are nested within a regional food system. While a local food system lens focuses on community food assets and needs, a regional perspective offers important context for the work of food system practitioners operating at the local scale, as well as a broader base of resources and infrastructure. Leveraging local and regional food system development in tandem offers the most potential economic impact from food system development.³

The theory that underlies food systems as an economic development strategy is that local and regional food systems offer two primary economic benefits: (1) strengthened rural-urban economic relationships, and (2) substitution of local purchases for otherwise imported goods (also known as import substitution).⁴ Import substitution is also understood to

provide a multiplier effect whereby local or regional spending spurs further localized spending through the recirculation of money. In acknowledgement of this opportunity, the USDA highlights local and regional food systems as a key economic development strategy, especially in rural communities. The USDA offers numerous grant and loan programs that span the food supply chain and are designed to support local foods, including the Local Food Promotion Program, the Farmers Market Promotion Program, Community Food Projects, and the Farm to School Grant Program. Through such programs, the USDA invested over \$1 billion in public funds in over 40,000 projects during the six-year period from 2009–2015.⁵ Local and regional food system investments offer the potential to benefit farmers and communities alike.

Benefits to Farmers

Farms are the foundation of local and regional food systems, and the financial viability of farms is therefore critical to achieving broader economic returns from food system development activities. Recent reports based on preliminary evidence suggest that farms producing for local and regional markets are more profitable than their counterparts.⁶ Drivers of this trend likely include a combination of factors, from consumer preference for local foods to the benefits associated with shorter supply chains.

National consumer trends and growing preferences for local foods over the past two decades have helped some farmers receive a premium for their product. Regional variability in consumer preferences influences the degree to which producers can attain a market premium for their products within a given locality. Nationally, some evidence suggests that consumer preference for local foods often precedes local food system development strategies;⁷ the preference for local foods has

1. Dumont, A., Davis, D., Wascalus, J., Wilson, T. C., Barham, J. A., and Tropp, D. (Eds.). (2017). Harvesting opportunity: The power of regional food system investments to transform communities. Federal Reserve Bank of St. Louis and the Board of Governors of the Federal Reserve System.

2. Clancy, K. (2014). Digging Deeper: Bringing a Systems Approach to Food Systems: Food System Governance. *Journal of Agriculture, Food Systems, and Community Development*, 4(2), 3–6. <https://doi.org/10.5304/jafscd.2014.042.012>

3. Ibid.

4. Dumont et al. (2017). Harvesting opportunity.

5. Vilsack, T. (2016). New markets, new opportunities: Strengthening local food systems and organic agriculture. USDA Results. Available at <https://medium.com/usda-results/new-markets-new-opportunities-strengthening-local-food-systems-and-organicagriculture-17b529c5ea90#vnd29i12a>.

6. Dumont et al. (2017). Harvesting opportunity.

7. Ibid.

2019 Farm Share of the Food Dollar



According to research by the USDA, in 2019, farmers captured just \$0.14 of every dollar that U.S. consumers spent on food. Local food systems with shorter supply chains provide opportunities for farmers to capture more of that dollar, and for a greater proportion of a consumer's food purchases to recirculate within the local economy.

grown steadily for over a decade.⁸ Consumers experience a series of benefits from local foods, including superior quality characteristics (freshness, nutrition, flavor, etc.), social outcomes (fairness for farmworkers, racial and gender equity, etc.), and environmental outcomes (reduced greenhouse gas emissions, sustainable agricultural practices, etc.), to name a few.⁹ These perceptions contribute to consumers' increased willingness to pay when purchasing local foods. Nowhere are these trends clearer than in the restaurant and retail industries. A 2015 consumer survey report by the National Grocers Association found that consumers consider the availability of local foods as a major influence on which restaurant or grocery store to patronize.¹⁰

Shorter supply chains may also help farmers receive a better price for their products. For one, shorter supply chains can increase the farmer's share of the food dollar. This means that for each consumer dollar spent on food, more of that dollar goes to the grower rather

than to marketing, processing, or distribution.¹¹ Additionally, shorter supply chains can be more adaptive to consumer demand shifts. This adaptability allows producers to respond to market dynamics with targeted marketing efforts.¹² Shorter supply chains, as in farmers' market transactions and direct wholesale relationships, can allow for face-to-face interaction with customers, which provides an opportunity for farmers to differentiate themselves from market alternatives, respond nimbly to customer interest and demand, and build relationships directly with their customer base.

From capitalizing on market dynamics to shorter supply chains, local and regional marketing can improve farm profitability. To secure access to local or regional markets, farmers rely on scale-appropriate supply chain infrastructure—such as aggregation, distribution, and processing facilities and services— but many regions across the country lack supply chain capacity and infrastructure that is “right-sized” for small and mid-size growers, while also lacking organized efforts to aggregate product in a way that allows smaller farmers access to existing infrastructure. In areas that do have adequate infrastructure, farms with local or regional markets achieve an increase in positive net farm income and have lower operating expense ratios compared to farms without such markets.¹³

Each of the benefits discussed above contribute to the increased viability of farms that sell to local and regional markets.¹⁴ Furthermore, local food markets and direct markets offer an affordable and accessible entry point for beginning farmers. For both beginning and experienced farmers, local and regional food marketing offers the potential for a thriving and resilient agriculture, the basis for achieving broader community-wide economic benefits from the food system.

8. Dumont et al. (2017). Harvesting opportunity; Thilmany McFadden, D., Conner, D., Deller, S., Hughes, D., Meter, K., Morales, A., & Tropp, D. (2016). The economics of local food systems: A toolkit to guide community discussions, assessments, and choices. US Department of Agriculture, Agricultural Marketing Service. Retrieved from www.ams.usda.gov/sites/default/files/media/EconomicsofLocalFoodSystemsToolkit.pdf.

9. Dumont et al. (2017). Harvesting opportunity.

10. National Grocers Association (2015). National Grocers Association SupermarketGuru Consumer Survey Report.

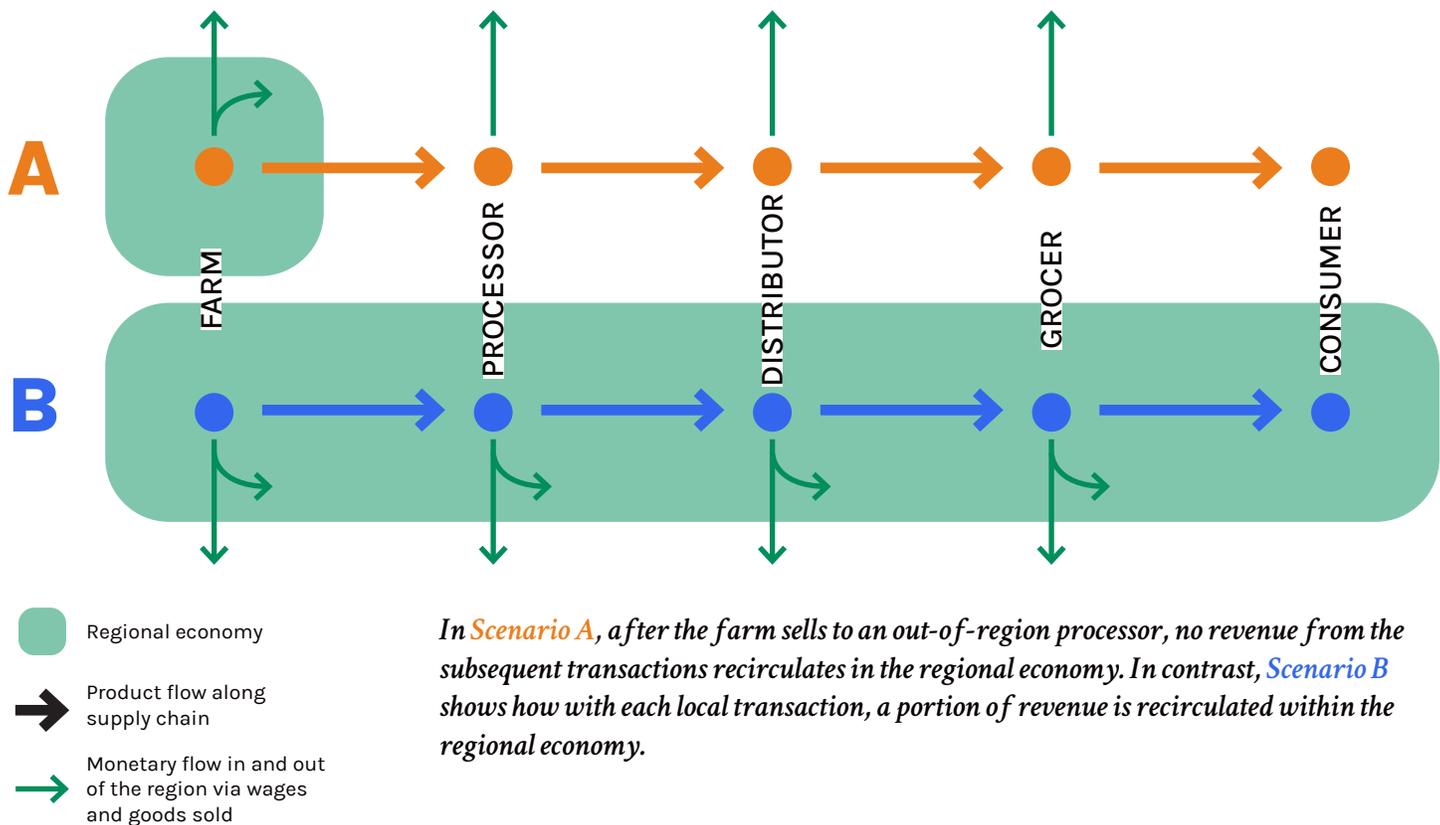
11. Diamond, A., Tropp, D., Barham, J., Frain, M., Kiraly, S., & Cantrell, P. (2014). Food value chains: Creating shared value to enhance marketing success (No. 1470-2016-120664).

12. Ibid.

13. Dumont et al. (2017). Harvesting opportunity.

14. Low, S. A., Adalja, A., Beaulieu, E., Key, N., Martinez, S., Melton, A., ... & Jablonski, B. B. (2015). Trends in US local and regional food systems: A report to Congress.

Economic Implications of Regional vs. Nonregional Food Supply Chains



Community-Wide Benefits

When local farms increase their profits, the economic benefits to the broader community are wide-ranging. First and foremost, local and regional food system development benefits the economy through the concept of revenue circulation.¹⁵ When farmers or local food businesses earn more money, they spend more money at local businesses. Businesses that depend on farmers for revenue from products such as fertilizer, seed, and animal feed benefit most directly.¹⁶ As these agriculture-supporting businesses increase their profits, the benefits flow through the community across sectors. One study found that consumer spending at independently owned retailers generated 3.7 times more local economic benefit for communities than spending at national chains.¹⁷

Communities with strong local and regional food systems can experience greater economic independence and resilience. Economic

resilience is considered the degree to which economies can recover from a shock, withstand a shock, or avoid a shock altogether.¹⁸ Local and regional food system development initiatives improve resilience to social and economic disruptions through the principle of economic diversity. Diverse economies are better positioned to weather economic downturns resulting from the downturn of a particular industry. Furthermore, local and regional food system development provides meaningful opportunities for work for community members,¹⁹ boosting community capacity through workforce development and career pathways.

Local and regional food system development offers opportunities for building social equity within communities.²⁰ For example, food insecurity (defined as a lack of consistent access to enough food for every person in a household to live an active, healthy life²¹)

15. Diamond et al. (2014). Food value chains.

16. American Independent Business Alliance (2012). Ten new studies of the "local economic premium." Retrieved from: <https://www.amiba.net/resources/studiesrecommended-reading/local-premium/>

17. Ibid.

18. Definition from the U.S. Economic Development Administration.

19. Dumont et al. (2017). Harvesting opportunity.

20. Ibid.

21. Definition from Feeding America.

disproportionately impacts minority, immigrant, rural, and economically vulnerable communities. Investments in local and regional food systems can simultaneously combat issues like food insecurity while creating a wealth of community-wide benefits that extend beyond economic stimulation such as improved health outcomes, employment and job training opportunities, strengthened community ties, and political advocacy.²² Building social equity and opportunity through local and regional food system investments is a critical piece to strengthening community resilience, self-reliance, and sustainability.

Resilience, Self-Reliance, and Sustainability in Local Food Economies

Just as local and regional food system development promotes community-wide economic resilience, it also improves a food system's ability to provide a sufficient supply of accessible food in the face of shocks and stresses to national and global supply chains. Disruptions such as the coronavirus pandemic highlight the vulnerabilities of overreliance on these larger-scale supply chains. In 2020, large-scale meat processing facilities temporarily closed, leaving producers across the country without access to their usual end markets and a simultaneous meat shortage at the grocer; at the same time, distribution companies that serve the food service industry (e.g., restaurants and institutional cafeterias) had an overabundance of food without the relationships, packing infrastructure, or adaptability to pivot products to retail markets. Decentralized food systems are by no means immune to societal disruptions but can be more adaptive and improve the economic and food security outlook for communities in times of crisis.

Strengthening local and regional food production and processing capacity can hedge against geopolitical and climate-driven disruptions to the global food supply chain outside the Appalachian Region. These climate-related disruptions to agriculture and supply chains are expected to both decrease

The COVID-19 pandemic sent shockwaves up and down U.S. food supply chains.

Closures of large-scale meat processing facilities led to grocery meat shortages, while restaurant closures left onion farmers without 40% of their market. Sudden closures of many high volume dairy buyers (e.g., schools and coffee shops) forced U.S. dairy farmers to dump an estimated 3.7 million gallons of milk per day. Such disruptions in large-scale supply chains have spurred a renewed interest in more localized food systems.

Citations:

Ellison, B., & Kalaitzandonakes, M. (2020). Food Waste and Covid-19: Impacts along the supply chain. *Farmdoc Daily*, (10), 164.

Yaffe-Bellany, D., & Corkery, M. (2020, April 11). Dumped Milk, Smashed Eggs, Plowed Vegetables: Food Waste of the Pandemic. *The New York Times*. <https://www.nytimes.com/2020/04/11/business/coronavirus-destroying-food.html>

food supplies and increase food prices. If current global emissions trends continue, the Appalachian Region is predicted to experience increased evapotranspiration²³ rates resulting from hotter temperatures, leading to less water retained in the land. Southern Appalachia is expected to see less precipitation compared to today while northern Appalachia is expected to experience a precipitation increase.²⁴ Increasing seasonal and geographic variability in precipitation combined with hotter temperatures will likely make Appalachian farming more challenging as agriculture depends on predictable weather patterns.²⁵

Appalachian farmers can mitigate some of the impacts of changing weather patterns through the implementation of regionally adapted regenerative or conservation agriculture practices, which have been demonstrated to improve crop yield stability with benefits for farm profitability.²⁶ A strong, resilient, diversified Appalachian agriculture may also open the door to economic opportunity as other food

23. Loss of water through evaporation and transpiration from plants.

24. Fernandez, R., & Zegre, N. (2019). Seasonal changes in water and energy balances over the Appalachian Region and beyond throughout the twenty-first century. *Journal of Applied Meteorology and Climatology*, 58(5), 1079-1102.

25. Lal, R. (2014). Abating climate change and feeding the world through soil carbon sequestration. In *Soil as World Heritage* (pp. 443-457). Springer, Dordrecht; Poeplau, C., & Don, A. (2015). Carbon sequestration in agricultural soils via cultivation of cover crops—A meta-analysis. *Agriculture, Ecosystems & Environment*, 200, 33-41.; Toensmeier, E. (2016). *The carbon farming solution: A global toolkit of perennial crops and regenerative agriculture practices for climate change mitigation and food security*. Chelsea Green Publishing.

26. Page, K. L., Dang, Y. P., & Dalal, R. C. (2020). The ability of conservation agriculture to conserve soil organic carbon and the subsequent impact on soil physical, chemical, and biological properties and yield. *Frontiers in sustainable food systems*, 4, 31.

22. Dumont et al. (2017). Harvesting opportunity.

production centers around the country and globe experience damaging climate impacts.

A strong and sustainable regional agriculture sector is also considered to benefit community food security as local food systems decrease dependence on food imports from outside the region.²⁷ Community food security is critical to community economic health. Economic access is improved as communities become more self-reliant economically, and physical access to food is improved as more of it is produced, processed, and marketed within the region. Planning for resilience, sustainability, and self-reliance within local and regional food economies can position communities for success and opportunity in an uncertain future.

Equity and Economic Development in the Food System

Historically, the food system has been a vector of inequity along gender and racial lines, impacting farmers' access to land, capital, infrastructure, community support, and community-wide agricultural resiliency. Generally, it is more challenging for minority farmers to access loans and capital than their white counterparts. Farmers who belong to a racial minority also experience land repossession at a disproportionate rate compared to non-minority farmers. In an article from the Equal Justice Initiative, 98% of Black agricultural landowners have lost their land since the 1950s, totaling 12 million acres of land and affecting one million Black farmers.²⁸ Many of these landowners are situated in the southern U.S. and the Appalachian South. There are also inequities among Hispanic farmers and access to land, capital, and other resources needed to start an agricultural operation. The gender gap also exists in the agriculture economy. According to the USDA Economic Research Service (ERS), in 2016, only 13% of principal farm operators were female. Of these, 27% of female farmers operate a limited resource farm, defined by the USDA as having low farm sales two years in a row (in 2020, low farm sales were gross sales below

\$180,300).²⁹ Building equity in the food system offers both social and economic benefits to communities. Expanding opportunities in food and agriculture for historically disadvantaged groups can strengthen local economies by promoting and expanding access to entrepreneurship.

Examples of Local and Regional Food System Development Initiatives

As previously discussed, local and regional food system development offers the potential to bolster economies in several ways. However, connections between food systems and the economy are inherently complex and therefore require careful attention to the impacts, positive and negative, that can stem from efforts to spur economic growth.³⁰ The local or regional context determines which initiatives will be the most effective use of often limited economic development resources. While a food hub might be a viable solution to serve a region, a farmland protection plan may be a more prudent undertaking in a single county; and while a multi-species slaughterhouse may be a significant need in a given place, it may not be financially viable to build and sustain one. Differences in demographics, culture, history, climate, soil types, and geographies are critical when determining the needs of a region's food economy.

Here, we describe initiatives from communities across the United States that span a variety of approaches to food system development, from food system assessment to marketing activities. The initiatives described reveal a range of challenges, opportunity areas, and responsive solutions that are commonly implemented for development of local food systems.

Food System Assessment

Food system assessment has emerged as a method for developing a thorough understanding of a region or community in advance of implementing targeted development

27. Dumont et al. (2017). Harvesting opportunity.

28. Equal Justice Initiative (2019, October 11). One Million Black Families in the South Have Lost Their Farms. <https://eji.org/news/one-million-Black-families-have-lost-their-farms/>

29. USDA ERS - Socially Disadvantaged, Beginning, Limited Resource, and Female Farmers and Ranchers. (2021, May 20). USDA Economic Research Service. <https://www.ers.usda.gov/topics/farm-economy/socially-disadvantaged-beginning-limited-resource-and-female-farmers-and-ranchers/>

30. Thilmany et al. (2016). The economics of local food systems.



AUNTIE RUTH'S DONUT AND PRETZEL STAND IN UNICOI COUNTY, TN. CREDIT: TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

initiatives. Assessments have been conducted across the United States at geographic scales ranging from individual cities or counties to multi-state regions.³¹ Just as the geographic scope of reports vary, so do the focus areas. Some analyses focus on the economic viability of agriculture³² while others articulate a vision for the region's food system as a whole.³³ Food system assessments typically include a combination of data analysis, literature review, and community engagement to lay a foundational understanding of the region under consideration. This combination of methods intends to uncover the significant challenges and opportunities for food system development within a region and provides the context necessary for future development endeavors.

Agriculture and Food Production

Agriculture-centric solutions intend to preserve

or increase the availability of local foods and economic viability of agriculture within a region or locality. Communities and individuals may produce food as a market opportunity, for self-sufficiency, or for community food sovereignty. Economically resilient agriculture depends on farmers having access to land, which multiple reports identify as a challenge to building local and regional food systems.³⁴ Farmland access and farmland protection programs are frequently proposed solutions to improve the chances of success for beginning farmers and to protect farmland from conversion to other uses.³⁵ Other efforts to promote the resiliency of local agriculture include production coordination and aggregation initiatives, the establishment of farmer training programs, incentives for regulatory compliance, mentorship programs, and technical assistance for local farmers.³⁶ Reports often recommend

31. Food Well Alliance (2017). Atlanta's Local Food Baseline Report; Karen Karp and Partners (2017). Innovating Food & Agriculture in the Mid-South Delta; Baxley, S., Chiarenzelli, A., Drummond, L., Liu, T. L., & Niles, M. T. (2020). Vermont Agriculture and Food System Plan 2020--A Review of Recommendations (Part One); Donahue, B., Burke, J., Anderson, M., Beal, A., Kelly, T., Lapping, M., ... & Berlin, L. (2014). A New England food vision.

32. Baxley et al. (2020). Vermont Agriculture and Food System Plan.

33. Donahue et al. (2014). A New England food vision.

34. County of Santa Clara and Santa Clara Valley Open Space Authority (2018). Santa Clara Valley Agricultural Plan: Investing in our Working Lands for Regional Resilience; Donahue et al. (2014). A New England food vision.

35. County of Santa Clara and Santa Clara Valley Open Space Authority (2018). Santa Clara Valley Agricultural Plan.

36. Baxley et al. (2020). Vermont Agriculture and Food System Plan.

policy reform to increase agricultural production in urban areas and advocacy for racial justice in agriculture.³⁷

Aggregation, Processing, and Distribution

The food system assessments reviewed often identified a need for expanding local food aggregation, processing, and distribution infrastructure to facilitate local and regional food sales. These strategies are intended to improve local and regional market access mainly for small to midsize farms, which typically do not produce sufficient volumes to access larger markets (such as institutions), necessitating the aggregation and distribution functions of entities like food hubs. The reviewed reports proposed a range of strategies, such as building food hubs and scale-appropriate processing infrastructure, including dairy, meat, and grain processing facilities.³⁸

Local Food Purchasing

Strategies to increase the purchasing of local foods include both direct-to-consumer and wholesale local procurement strategies. Direct-to-consumer strategies are understood to increase farmer viability and local food access with co-benefits for food security, community capacity, and placemaking.³⁹ Food system reports often recommend the establishment or expansion of farmers' markets⁴⁰ and the promotion of community supported agriculture (CSA) initiatives to facilitate consumers' local purchasing.⁴¹ Both avenues provide community members with consistent access to local foods throughout the growing season. Reports also proposed harnessing the institutional purchasing power of schools, hospitals, and other institutions through farm-to-institution programs to increase local foods purchasing.⁴²

Entrepreneurship

A strong local or regional food economy depends

Placemaking

Placemaking refers to the strengthening of connections between people and the places they share. Placemaking often refers to a community-driven planning approach to building on the existing assets, inspiration, and potential of a community to improve the quality of public spaces and the well being of community members. Within the context of food systems, placemaking involves strengthening or enhancing opportunities to experience the identity of a place through its food and agricultural heritage, such as farmers' markets, home-grown food entrepreneurs and products, food and agriculture festivals, agritourism, etc.

on a robust cohort of food and agricultural entrepreneurs, but these entrepreneurs often lack essential support in the start-up phase and as they seek to scale up. Reports recommended increasing support for food business entrepreneurs to spur local and regional food and agricultural business growth. One common barrier to entrepreneurship is access to capital. Reports noted the need to expand capital access for farmers and food business owners.⁴³ Other reports recommended the establishment of kitchen incubators,⁴⁴ shared community kitchens,⁴⁵ and business assistance programs⁴⁶ to improve the chances of success for entrepreneurs and promote job creation.

Consumer Education and Branding

Bolstering local and regional food systems depends on consumer demand for local and regional products. Strategies recommended for increasing consumer demand include regional branding initiatives⁴⁷ and consumer education programming.⁴⁸ Regional branding initiatives aim to differentiate and increase consumer preference for regional food products while consumer education programming focuses on informing consumers about the benefits of locally or regionally grown foods.

37. Donahue et al. (2014). A New England food vision.

38. Baxley et al. (2020). Vermont Agriculture and Food System Plan.; Donahue et al. (2014). A New England food vision.; Econsult Solutions and Urbane Development (2014). Economic analysis of Detroit's food system.

39. Placemaking is defined as strengthening the connections between people and the places they share. <https://www.pps.org/article/what-is-placemaking>

40. Karen Karp and Partners (2018). Unlocking the Potential of Charlotte's Food System and Farmers' Markets.; Metro Vancouver (2016). Metro Vancouver Regional Food System Action Plan.

41. Food Well Alliance (2017). Atlanta's Local Food Baseline Report.

42. Baxley et al. (2020). Vermont Agriculture and Food System Plan.; Donahue et al. (2014). A New England food vision.

43. Donahue et al. (2014). A New England food vision.; Karen Karp and Partners (2018). Unlocking the Potential of Charlotte's Food System.

Metro Vancouver (2016). Metro Vancouver Regional Food System Action Plan.

44. Econsult Solutions and Urbane Development (2014). Economic analysis of Detroit's food system.

45. Metro Vancouver (2016). Metro Vancouver Regional Food System Action Plan.

46. Baxley et al. (2020). Vermont Agriculture and Food System Plan.

47. City of Columbus and Franklin County Ohio (2016). Local Food Action Plan.; County of Santa Clara and Santa Clara Valley Open Space Authority (2018). Santa Clara Valley Agricultural Plan.

48. City of Columbus and Franklin County Ohio (2016). Local Food Action Plan.

The Appalachian Regional Commission’s Research and Impact in the Region’s Food Economies

Since its formation over 50 years ago, the Appalachian Regional Commission (ARC) has invested \$4.5 billion in approximately 28,000 projects to strengthen the communities and economies within its 420-county region.⁴⁹ Past efforts have included the commissioning of 130 research reports as part of the organization’s mission to “innovate, partner, and invest to build community capacity and strengthen economic growth in Appalachia.”⁵⁰ ARC’s most recent work has funded research on a number of topics including entrepreneurship,⁵¹ tourism,⁵² economic resilience,⁵³ and food systems.⁵⁴ ARC’s previous strategic plan set a course for their investments between 2016 and 2021 and outlined the following strategic investment goals: (1) Economic opportunities; (2) Ready

workforce; (3) Critical infrastructure; (4) Natural and cultural assets; and (5) Leadership and community capacity. ARC recently adopted a new strategic plan to guide its activities from 2022 to 2026, with goals that closely align with the previous plan.

Along with other key sectors, investment in agriculture and food systems is well positioned to address each of the organization’s current strategic investment goals. For this reason, agriculture and food systems have emerged as one of several key economic sectors across ARC’s work.⁵⁵ From 2012 to 2015, ARC commissioned three research projects targeted specifically at local foods development, including a local food forum, data brief, and a food system assessment.⁵⁶ The food system assessment and local food forum summary, both published in 2012, identified key food system trends within the Appalachian Region and opportunities for future work. The 2015 data brief, produced by the Appalachian Sustainable Agriculture Project (ASAP), summarized key trends in the Region from 2007 to 2012.⁵⁷

Several ARC-funded reports refer to food systems as a “target” or an “emerging” industry cluster that should be prioritized for economic

49. Appalachian Regional Commission (2020, August 25). ARC’s History and Work in Appalachia. <https://www.arc.gov/arcs-history-and-work-in-appalachia/>

50. Appalachian Regional Commission (2016) “Investing in Appalachia’s Future,” The Appalachian Regional Commission’s Five-Year Strategic Plan for Capitalizing on Appalachia’s Opportunities 2016–2020.

51. EntreWorks Consulting (2018). Entrepreneurial ecosystems in Appalachia.

52. Appalachian Regional Commission (2020). Extending Our Welcome: Trends and Strategies for Tourism in Appalachia.

53. Downstream Strategies (2019). Strengthening Economic Resilience in Appalachia; Feser, E., Mix, T., White, M., Poole, K., Markley, D., & Pages, E. (2014). Economic diversity in Appalachia: Statistics, strategies, and guides for action.

54. Appalachian Sustainable Agriculture Project (2015). Agriculture and Food System Trends in the Appalachian Region: 2007–2012; Haskell, J. (2012). Assessing the landscape of local food in Appalachia. Appalachian Regional Commission, 1.; Rural Support Partners (2012). Growing the Appalachian Food Economy: A Forum on Local Food Systems and Sustainable Agriculture.; USDA et al. (2016). Local Foods, Local Places: Revitalizing Communities by Growing Local Food Economies.

55. Appalachian Regional Commission (2016). “Investing in Appalachia’s Future.”; EntreWorks Consulting (2018). Entrepreneurial ecosystems in Appalachia.; Downstream Strategies (2019). Strengthening Economic Resilience.; Feser et al. (2014). Economic diversity in Appalachia.

56. Appalachian Sustainable Agriculture Project (2015). Agriculture and Food System Trends.; Haskell (2012). Assessing the landscape.; Rural Support Partners (2012). Growing the Appalachian Food Economy.

57. Appalachian Sustainable Agriculture Project (2015). Agriculture and Food System Trends.



ADIRONDACK BLUE POTATOES. CREDIT: FOX AND HEN FARM, MENIFEE COUNTY, KY

development.⁵⁸ A 2019 ARC report documented a slight rise in employment within the food, lodging, and entertainment sector between 2002 and 2017, which demonstrates the industry's steady economic importance to Appalachian communities.⁵⁹ Most recently, in an implementation evaluation report for the Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative, food systems were considered an important set of industries to support community economic recovery as the coal industry has declined. Several projects funded by the ongoing POWER Initiative are focused on strengthening local and regional food systems.⁶⁰

With proper planning, investment in local and regional food systems can provide abundant economic opportunities. Thriving farms and food entrepreneurs create economic, social, and cultural returns for their businesses and communities. Investing in workforce development for local and regional food systems creates a skilled workforce that, in turn, boosts the community wealth, capacity, and leadership within the Region. Resilient and sustainable agriculture promises to promote the preservation and creation of natural and cultural assets into the future, while also responding to the challenges of climate change. As identified in ARC's previous work, food infrastructure investments can strengthen the food value chain with wide-ranging benefits to farmers, entrepreneurs, and the community.

58. Downstream Strategies (2019). Strengthening Economic Resilience.; EntreWorks Consulting (2018). Entrepreneurial ecosystems in Appalachia.; Feser et al. (2014). Economic diversity in Appalachia.

59. Food, Lodging and Entertainment includes bars and restaurants. The share of the workforce employed in this sector increased from 7.9% in 2002 to 9.2% in 2017. Appalachian Regional Commission (2019). Industrial Make-Up of the Appalachian Region Employment and Earnings, 2002-2017.

60. Chamberlin/Dunn LLC (2019). Success Factors, Challenges, and Early Impacts of the POWER Initiative an Implementation Evaluation.

3.

The Landscape of Agriculture and Local Food Economies in the Appalachian Region



Introduction: Agriculture and Local Foods in the Appalachian Region

Leveraging food systems for economic growth has been gaining traction across the United States, and the methods and initiatives employed must be oriented to a specific community or region. For greatest impact and efficacy, food system development in Appalachia requires close attention to the people, processes, policies, and infrastructures that create connections across food system sectors. Planning local and regional food systems for economic development requires efforts that are place-based and rooted in Appalachia's natural assets, character, economy, and heritage. The expansive Appalachian Region is home to rich and nuanced variability that must be understood as right-fit food system development initiatives are considered. Here, we outline some of the unifying characteristics of the Appalachian Region while also highlighting relevant diversity and variation across the Region, as part of the answer to the question: What will help Appalachian food systems thrive?

A Vast and Diverse Region

Home to one of the oldest mountain ranges in the world, Appalachia is characterized by its rolling and forested hills, diverse plants and animals, plentiful waterways, and pockets of underground minerals. Within the eastern United States, Appalachia stretches over 1,000 miles from northeastern Mississippi to the Southern Tier of New York. The Appalachian Region covers over 200,000 square miles and is home to over 25 million residents. The vast and diverse Region contains urban centers as varied as Pittsburgh, Birmingham, Knoxville, and Youngstown; rural areas and communities in geographies as different as the Mississippi Lowlands and the Blue Ridge Mountains; and a wide range of climate zones, microclimates, and agricultural production characteristics and conditions. The Region's tremendous range of unique community histories, food cultures, musical traditions, and even dialects reflect the Region's geographic extent.

The Region's Economy and Industry Over Time

Life and work in Appalachia have changed significantly over time, largely in response to several industry shifts over the past few centuries. Prior to industrialization, the Appalachian Region was grounded in a culture of small-scale farming communities and subsistence agriculture. Beginning with the Industrial Revolution, three primary industry cycles have left their mark on the Region: timber production, coal extraction, and tobacco cultivation.

Timber Industry

Industrial timber production in the Appalachian Region began in the late 1800s.⁶¹ Excessive early timber harvesting, particularly in the Southern and South Central ARC subregions, caused significant environmental degradation, which eventually led to the creation of national and state parks to protect these lands (e.g., Pisgah National Forest and Mount Mitchell State Park).⁶² By the 1920s, timber companies began to abandon their southern Appalachian properties and looked to the intact timberlands of Washington and Oregon.⁶³

Today, Appalachia remains the largest forested area east of the Mississippi River, with the vast majority of the Region's forested areas considered productive timberland (98%).⁶⁴ The timber industry remains a significant economic driver in the Region with considerable variation between subregions and states. West Virginia is the most forested state in the Region and third-most forested state in the nation. Alabama and Mississippi have high concentrations of timberland but the quality of wood produced is generally lower due to natural environmental conditions that reduce the dollar value of timber production in those states.⁶⁵ Four of the nation's nine largest timber producers are Appalachian states (Georgia, Alabama, Mississippi, and North

61. Downstream Strategies, West Virginia University, and The National Network of Forest Practitioners (2014). *An Assessment of Natural Assets in the Appalachian Region: Water Resources*. Appalachian Regional Commission.

62. *Ibid.*

63. Eller, R. (1985). *Land as commodity: Industrialization of the Appalachian forests, 1880-1940. The Great Forest: An Appalachian Story*. Boone, NC.

64. Downstream Strategies et al. (2014) *An Assessment of Natural Assets*.

65. *Ibid.*

Carolina).⁶⁶ Timber production covers over 26 million acres across Southern Appalachia,⁶⁷ with prices ranging from less than \$100 to more than \$800 per 1,000 board feet.⁶⁸

Coal Industry

In addition to abundant timber reserves, the Appalachian Region is home to some of the nation's most significant coal reserves. At the outset of Appalachian coal extraction, the greatest concentration of coalfields was found in the Central Appalachian Coal Basin of West Virginia and Kentucky. The Appalachian coal industry boomed over much of the 1900s but has seen a significant decline in recent years.⁶⁹ This decline has triggered a drop in the Region's coal industry employment by 54% from 2005 to 2020, with Kentucky and West Virginia experiencing the most significant losses in

employment.⁷⁰ Coal mining has degraded and contaminated water and land in Appalachia, which in many cases has prevented its use for agriculture without significant remediation efforts. Abandoned surface mines have gained recent attention as sites that can be remediated and serve as training grounds for a workforce transition away from coal mining and toward diversified agriculture.⁷¹

Coal mining now employs about ten thousand people in the Northern subregion and almost twelve thousand in the Central subregion.⁷² Today, coal producing areas within the Region include eastern Kentucky, southern and eastern West Virginia, eastern Ohio, western and central Pennsylvania, northwest Georgia, and a few counties in Tennessee and Virginia. The Northern ARC subregion now produces more coal than the Central Appalachian Coal Basin, with Pennsylvania leading production.⁷³

66. Timber Harvesting Magazine. (2015, November 30). An Inside Look At The Appalachian Timber Industry. Timber Harvesting Magazine. <http://www.timberharvesting.com/an-inside-look-at-the-appalachian-timber-industry/>

67. Here Southern Appalachia is As defined by the nonprofit Southern Appalachian Man and the Biosphere (SAMAB) ; (not the ARC-defined Southern subregion).

68. Forest Economy | Southern Appalachian Vitality Index. (2016, March 21). Southern Appalachian Vitality Index. <http://southernappalachianvitalityindex.org/employment/forest-economy>

69. Bowen, E., Deskins, J., & Lego, B. (2021). An Overview of Coal and the Economy in Appalachia: Fourth Quarter 2020 Update.

70. Ibid.

71. Moore, C. V. (2018, January 22). Turning Appalachia's Mountaintop Coal Mines Into Farms. Civil Eats. <https://civileats.com/2018/01/12/the-hopeful-work-of-turning-appalachias-mountaintop-coal-mines-into-farms/>

72. Bowen et al. (2021). An Overview of Coal.

73. Ibid.



BAGS OF PEPPERS AND OTHER VEGETABLES.. CREDIT: RURAL ACTION

Tobacco Industry

Tobacco production was a major agricultural and economic driver in Appalachia for much of the 20th century, especially for the Region's most economically distressed counties.⁷⁴ Beginning during the Great Depression, federal production restrictions and price stabilization limited how much farmers could earn on tobacco crops. These regulations supported a tobacco production sector wherein a large number of farmers grew small amounts of tobacco for a high price, a critical income source for many rural Appalachian families.⁷⁵ In 1998, tobacco was the seventh largest cash crop in the United States, with North Carolina and Kentucky producing 65% of the nation's total production. Tennessee, Virginia, South Carolina, and Georgia produced another 25% of the crop, making the Appalachian Region states the leading producers of tobacco in the nation (accounting for 90% of national production).⁷⁶

In 1998, the federal government issued the Master Settlement Agreement, a mandate requiring tobacco companies to pay \$206 billion over 25 years to cover the cost of treating tobacco-related illnesses. This contributed to tobacco companies buying less tobacco from farms. In 2004, the federal government opened tobacco production to global markets, resulting in increased competition for Appalachian tobacco growers.⁷⁷ Over the past 25 years, a significant amount of food system investment has been directed to transitioning the Region's farmers away from tobacco as an anchor crop.

From 1997 to 2012, the number of North Carolina tobacco farms dropped 97% and the amount of acreage in tobacco production dropped by 95%.⁷⁸ This drop is correlated with a simultaneous increase in vegetable production and direct-to-consumer sales (in western North Carolina, the number of farms selling direct to consumer increased 128% and direct sales revenue increased 320%). From 2002 to 2012, USDA data shows a 98% increase in North Carolina farms

selling vegetables, melons, sweet potatoes, and potatoes. The case of North Carolina represents a successful Appalachian transition from tobacco to a more diversified agricultural economy.

Agricultural Heritage and Local Foods: Place-based food cultures of Appalachia

Appalachia has a strong tradition of small-scale farming, seed saving, and rich agrobiodiversity upon which to continue building local food systems. The Region is home to numerous farmers' markets, community supported agriculture (CSA) models, and a diversity of food and agriculture entrepreneurs. The Region is characterized by small farms (compared to the national average), an outgrowth of a historic legacy of family farming, subsistence farming, and small-scale tobacco production.⁷⁹ A network of seed savers call Appalachia home, including seed companies Southern Exposure Seed Exchange and Sow True, located in Appalachian Virginia and North Carolina respectively. The Region's agricultural diversity exceeds that of any other region in the United States with over 1,500 unique varieties of fruits and vegetables grown and cultivated in the Region.⁸⁰ Among these are over 600 unique varieties of apples and over 450 varieties of beans.⁸¹

Non-Timber Forest Products (NTFPs)

One longstanding practice that contributes to Appalachian agrobiodiversity is agroforestry or forest farming. One report defines forest farming as "the intentional and sustainable cultivation of marketable non-timber forest products (NTFPs) in woodlands with suitable shade and site conditions."⁸² Cultivated NTFPs provide another form of diversified cultivation for farmers, expanding the crops they can grow in forested areas while preserving existing forestland. This is of notable significance in

79. Wood (1998). The economic impact of tobacco.

80. Todd, R. (2014, November 3). On The Trail To Preserve Appalachia's Bounty Of Heirloom Crops. National Public Radio. <https://www.npr.org/sections/thesalt/2014/11/03/360434287/on-the-trail-to-preserve-appalachias-bounty-of-heirloom-crops>

81. Ibid.

82. Association for Temperate Agroforestry. (2018, August 2). Appalachia Forest Farming Initiative. [https://www.aftaweb.org/about/what-is-agroforestry/windbreaks/138-2018-vol-24/volume-24-no-2-august-2018/237-appalachia-forest-farming-initiative.html#:~:text=Local%20AFF%20partners%20work%20with,Hydrastis%20canadensis\)%3B%20and%20culinary%20species](https://www.aftaweb.org/about/what-is-agroforestry/windbreaks/138-2018-vol-24/volume-24-no-2-august-2018/237-appalachia-forest-farming-initiative.html#:~:text=Local%20AFF%20partners%20work%20with,Hydrastis%20canadensis)%3B%20and%20culinary%20species)

74. Wood, L. E. (1998). The economic impact of tobacco production in Appalachia. Washington, DC: Appalachian Regional Commission.

75. Ibid.

76. Ibid.

77. Jackson, C., & Perrett, A. (2018). The End of Tobacco and the Rise of Local Food in the Western North Carolina. Appalachian Sustainable Agriculture Project.

78. Ibid.



BAGGING BACON AT BENTON'S SMOKY MOUNTAIN COUNTRY HAMS IN MADISONVILLE, TN. CREDIT: TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

a region where a large proportion of farmland is forested.⁸³ Co-benefits of forest farming include improving or maintaining ecological resources such as water quality, aiding in carbon sequestration (another potential future revenue stream), and protecting biodiversity. In Appalachia, there are four common types of NTFPs grown predominantly for local and regional markets: (1) wild foods such as mushrooms, herbs, berries, nuts, and spices; (2) medicinal and dietary supplements, including ginseng, black cohosh, and goldenseal; (3) floral products such as moss, grape vines, and ferns; and (4) specialty woods for handcrafted products.⁸⁴ Many of these products also have robust national and global markets.

Infrastructure

The Region's local foods infrastructure has been growing in strength over recent years, but significant gaps remain.⁸⁵ Aggregation and distribution facilities are generally insufficient for getting product to consumers in a cost-effective manner. Lack of access to investment capital and confusion in the regulatory environment are significant challenges to expanding local infrastructure.⁸⁶ Presenters at a Local Food Forum in 2012 noted the need to build "scale-appropriate" infrastructure that serves

small to midsize producers and is responsive to market demand changes.⁸⁷

Entrepreneurship and Regional Capacity

Previous research has emphasized the economic importance of food and farm entrepreneurs in the Region and documented several successful food and agricultural businesses.⁸⁸ In a 2012 food system assessment, author Jean Haskell noted a rise in community kitchens and food business incubators that have benefited the Region's entrepreneurs. Agritourism, wineries, distilleries, microbreweries, and fish farming were all noted as areas where entrepreneurs were having success.⁸⁹ Building collaborative partnerships between funders and entrepreneurs is important to expanding entrepreneurial activity within the Region's food economy.⁹⁰ Participants in a 2012 Local Food Forum emphasized the importance of entrepreneurship in continuing to grow regional capacity, or the cultivation of knowledge, skills, and attitudes necessary to sustain the Region.⁹¹ A number of networking groups, including the Central Appalachian Network, Appalachian Sustainable Agriculture Project, Appalachian Foodshed Project, and Eastern Kentucky Food Systems Collaborative, acknowledged their role in supporting capacity building within the

83. Colyer, D. (2001). Agriculture in the Appalachian Region: 1965-2000 (No. 1832-2016-148658).

84. Association for Temperate Agroforestry (2018). Appalachia Forest Farming Initiative.

85. Haskell (2012). Assessing the landscape of local food.

86. Haskell (2012). Assessing the landscape of local food.; Rural Support Partners (2012). Growing the Appalachian Food Economy.

87. Rural Support Partners (2012). Growing the Appalachian Food Economy.

88. Haskell (2012). Assessing the landscape of local food.; Rural Support Partners (2012). Growing the Appalachian Food Economy.

89. Haskell (2012). Assessing the landscape of local food.

90. Rural Support Partners (2012). Growing the Appalachian Food Economy.

91. Ibid.

Region.⁹²

Education and Training

Overall, education is considered a strength in Appalachia given that the Region is home to several of the nation's leading land-grant universities.⁹³ The Region also has culinary training programs in community colleges, technical institutes, universities, and community organizations.⁹⁴ However, a need for further education and training was identified as necessary to support new farm and food entrepreneurs. Specific topics recommended by 2012 Local Food Forum attendees included training in sustainable agriculture techniques and marketing support for farmers.⁹⁵

92. Haskell (2012). Assessing the landscape of local food.

93. Ibid.

94. Ibid.

95. Rural Support Partners (2012). Growing the Appalachian Food Economy.



CREDIT: ECONOMIC DEVELOPMENT GREATER EAST (EDGE)

Current Trends and Dynamics in Appalachian Agriculture and Local Food Economies

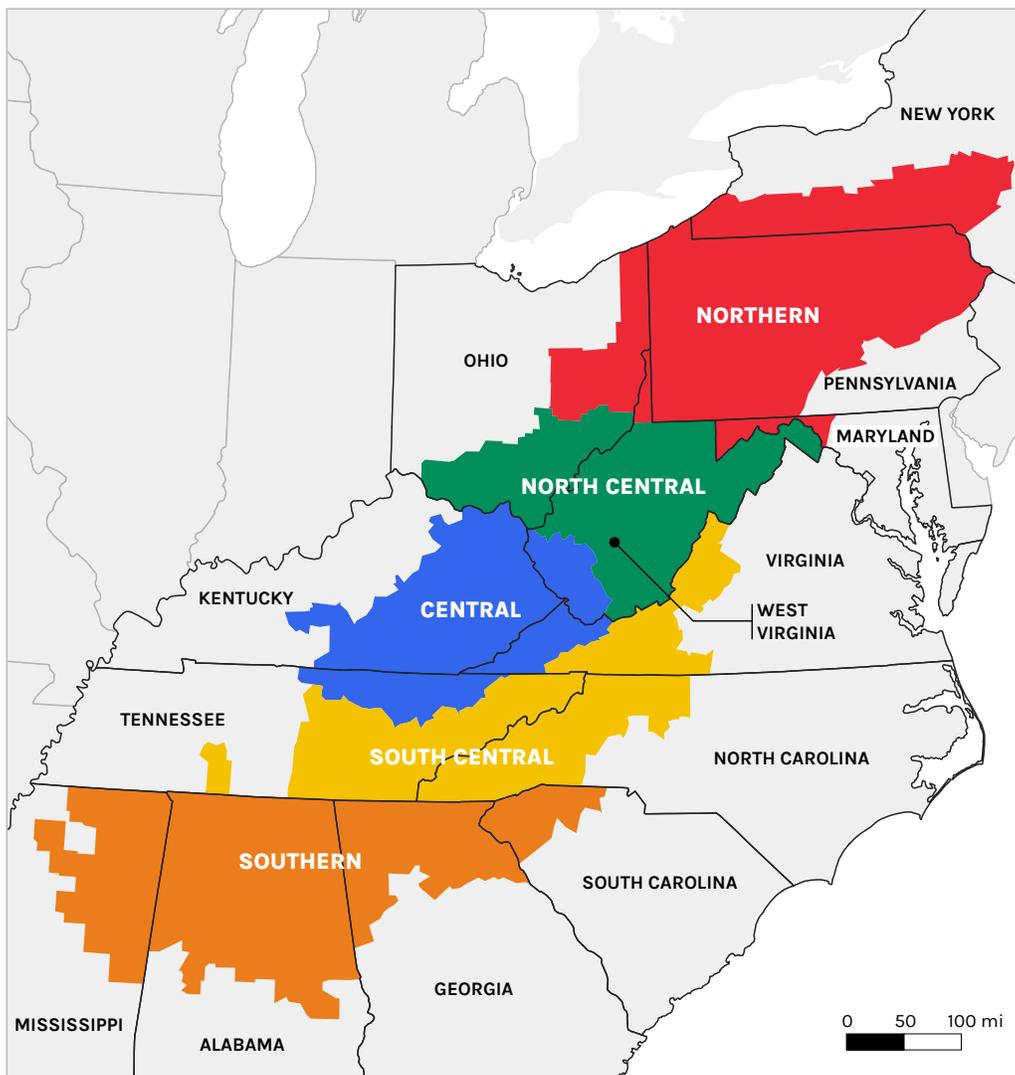
The data findings summarized on the following pages are drawn primarily from analysis of the USDA Census of Agriculture, census years 2007, 2012, and 2017. Additional data sources, such as American Community Survey demographic data and USDA registries for farmers' markets and food hubs, are incorporated as well. For a complete list of data sources utilized, see Appendix 1.

Analysis is presented for the full Appalachian Region, as well as the five ARC-defined

subregions: Northern, North Central, Central, South Central, and Southern (see inset map; an interactive county-level map of ARC subregions can be accessed at ARC's website: <https://www.arc.gov/map/subregions-in-appalachia/>). In some cases, analysis on the following pages also includes breakdown by county type or level of urbanization.

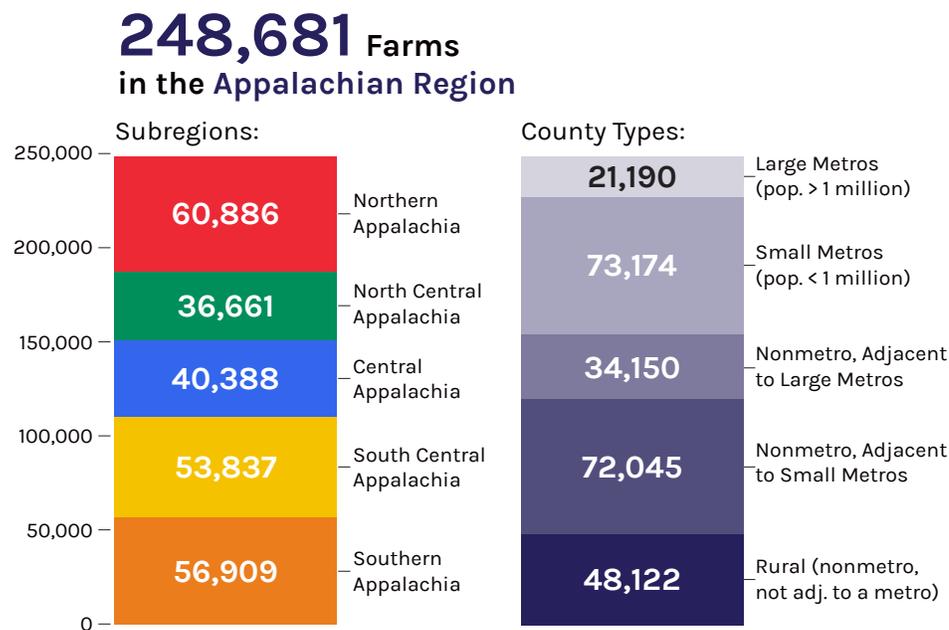
The Appendix 3 Databook includes comprehensive data tables and county-level maps for a wide range of data metrics discussed herein, while the Appendix 4 State Profiles compile key metrics at the state level for the Appalachian portion of each state in the Region.

Subregions in Appalachia



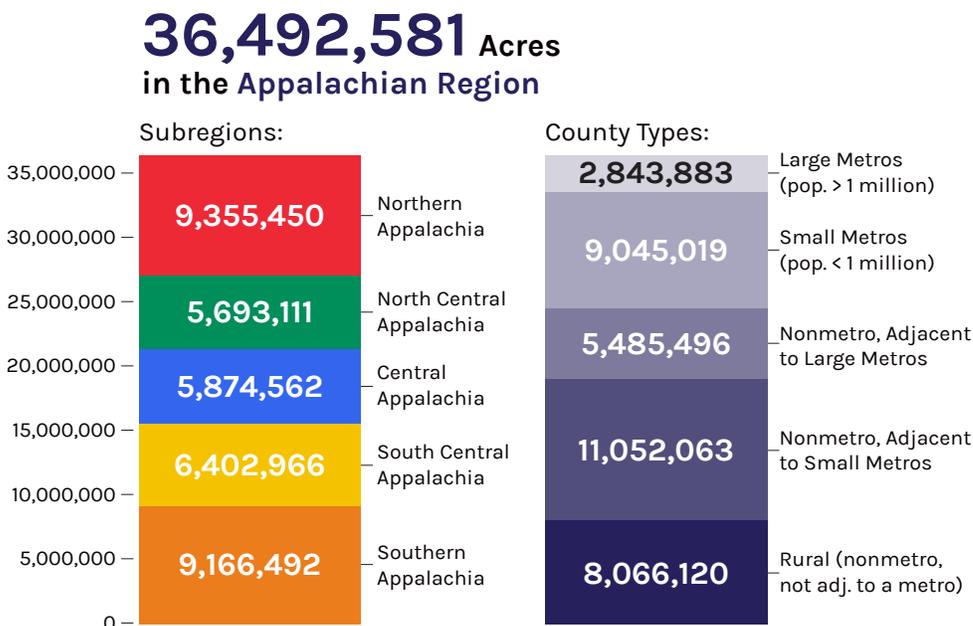
From 2007 to 2017, the Region lost farms and farmland at rates higher than the U.S. as a whole.

Number of Farms, 2017



The Appalachian Region was home to nearly a quarter million farms and more than 36 million acres of farmland in 2017. Northern Appalachia and Southern Appalachia had the highest numbers of both farms and farmland acreage among subregions, while North Central Appalachia had the lowest. Small metro areas (less than 1 million population) throughout the Region had the highest number of farms, followed closely by non-metro counties adjacent to small metros. These two county types (small metros and non-metro counties adjacent to them) also had the highest farmland acreage, and collectively accounted for 58% of all farmland in the Region.

Land in Farms (Acres), 2017

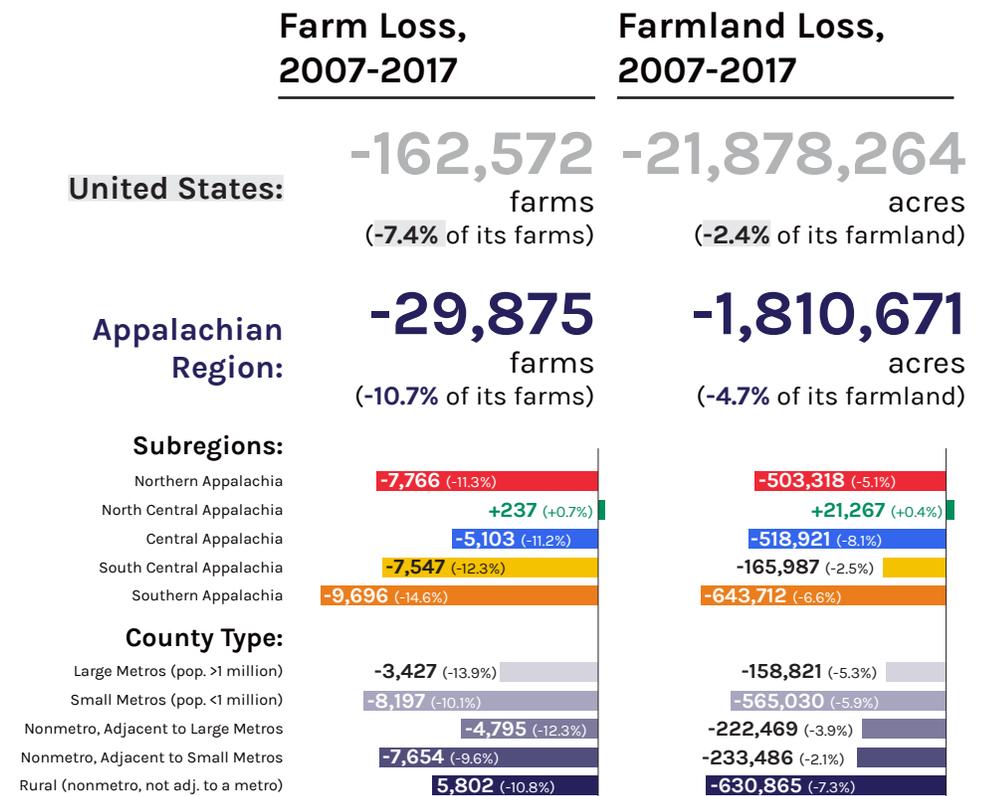


The Region lost nearly 30,000 farms and more than 1.8 million acres of farmland between 2007 and 2017. The Region's 10-year rate of farm loss (-10.7%) was nearly 1.5 times the U.S. rate, while its rate of farmland loss (-4.7%) was almost double the U.S. rate. The Region lost farms more quickly than it lost farmland, indicating the loss of smaller farms and a trend toward farmland consolidation.

While the North Central subregion actually gained a small number of farms (237) from 2007 to 2017, all other subregions lost at least 10% of their farms. Southern Appalachia lost farms at the highest rate: nearly 15%, equating to almost 10,000 farms lost. Central Appalachia lost farmland at the highest rate (-8.1%), while Southern Appalachia lost the most farmland acreage in absolute terms, almost 650,000 acres. Rural counties suffered the greatest losses of farmland, both in terms of absolute acreage and percentage lost, followed by counties in small metro areas. While small metro areas and the non-metro counties adjacent to them lost the highest absolute number of farms, the other three county types (large metro, non-metro adjacent to large metro, and rural) lost a greater share of their farms.



VEGETABLE FIELD AND HOOP HOUSE AT WOLF GAP GARDENS IN BEREA, KY. CREDIT: WOLF GAP GARDENS



FARM SIZE AND LAND COMPOSITION

The Appalachian Region is characterized by **smaller farms and lower rates of agricultural land use** compared to the United States.

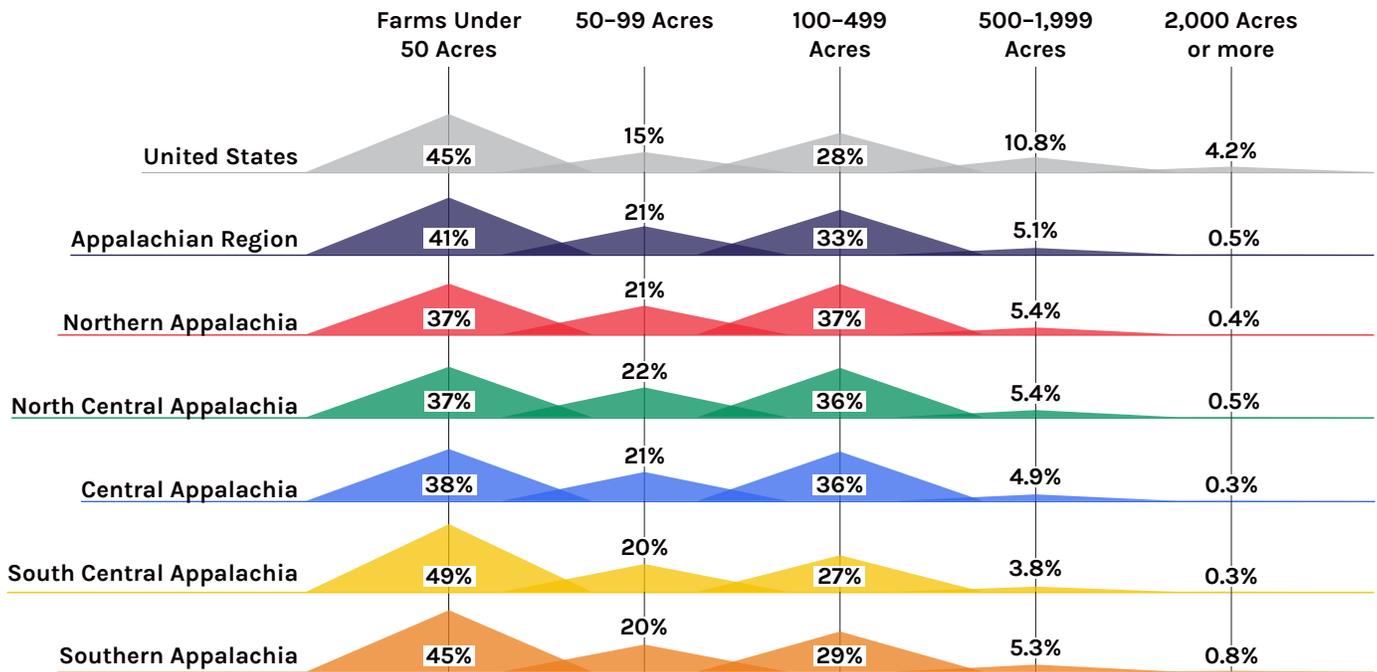
Average Farm Size



AERIAL VIEW OF FOX AND HEN FARM IN CLARK, KY. CREDIT: FOX AND HEN FARM

Appalachian farms are, on average, much smaller than U.S. farms—147 acres per farm in Appalachia compared to 441 acres per farm in the U.S. as a whole. Farms in the South Central subregion are smallest (119 acres) and those in the Southern subregion are largest (161 acres).

Percent of Farms by Farm Size

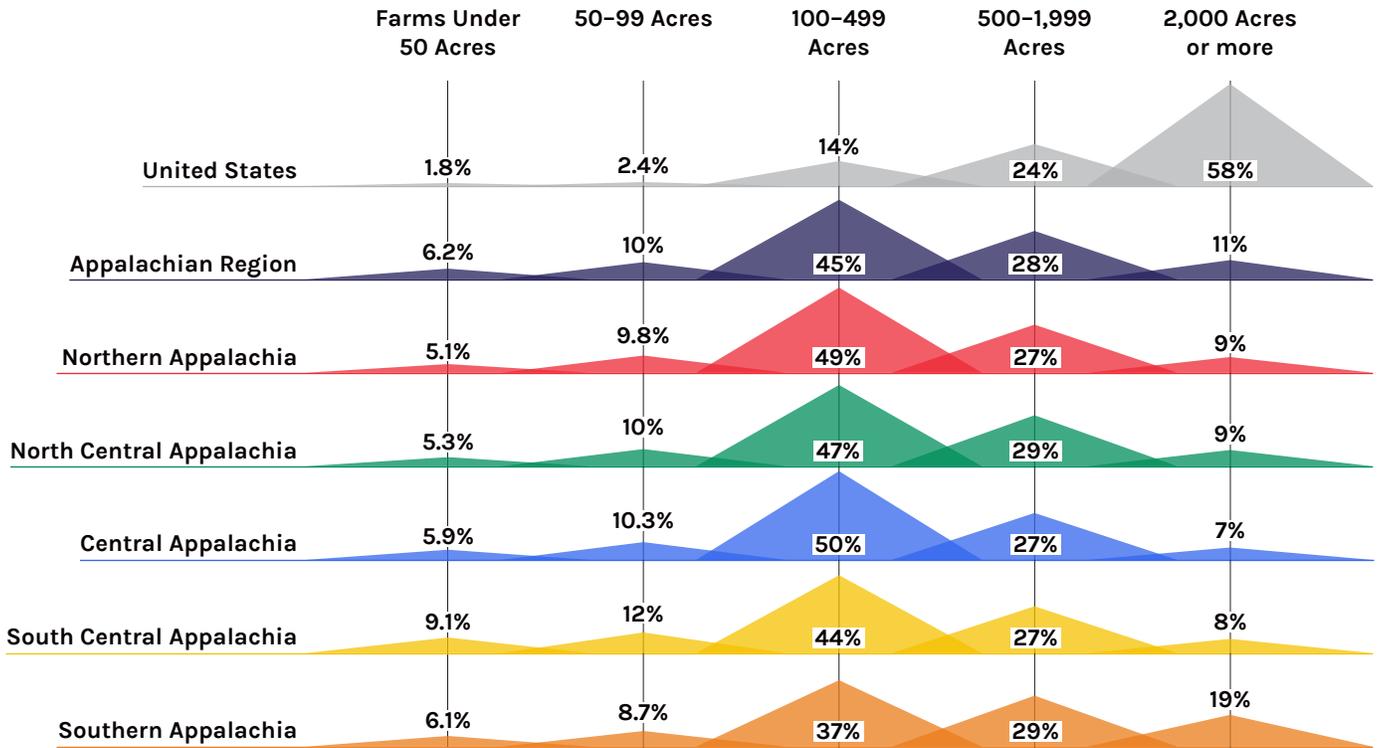


The Region has a higher percentage of 50-99 acre farms and 100-499 acre farms than the U.S., while it has a much smaller share of larger farms: just 5% of Appalachian farms are 500-1,999 acres (compared to 11% of U.S. farms) and just 0.5% of the Region's farms are 2,000 acres or more, compared to 4.2% for the United States. South Central and Southern Appalachia stand out for having a greater share of farms under 50 acres, and a smaller share of 100-499 acre farms, compared to the other Appalachian subregions.



CATTLE GRAZING: CREDIT: JOYCE FARMS

Percent of Farmland by Farm Size



Just 11% of Appalachian farmland is in farms 2,000 acres or larger – compared to over half of U.S. farmland in farms of that size.

The comparisons between Appalachia and the U.S. are even more stark when looking at the distribution of farmland by farm size. While over half of U.S. farmland is in farms 2,000 acres or larger, just 11% of Appalachian farmland is in farms of that size. Southern Appalachia has a notably greater share of its farmland (19%) in these very large farms. The plurality (45%) of Appalachian farmland is in 100-499 acre farms; this plurality holds true across all Appalachian subregions.

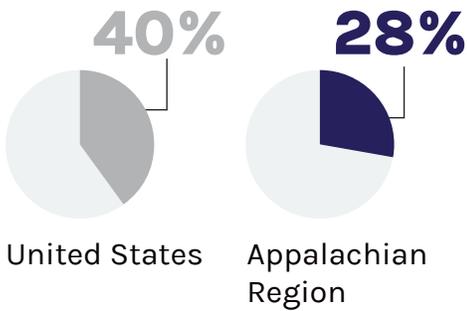


GARDEN AT FOX AND HEN FARM IN POWELL COUNTY, TN. CREDIT: FOX AND HEN FARM



TOMATO BLOSSOMS AT FOX AND HEN FARM IN POWELL COUNTY, TN. CREDIT: FOX AND HEN FARM

Percent of Land in Farms



Just over a quarter (28%) of the Appalachian Region’s land area is devoted to agriculture – a lower proportion than the U.S. at 40%. The western edges of Appalachian Ohio and Kentucky stand out (Appendix 3 Databook, Map 1.4) for having the highest percentage of land in agriculture, as the Appalachian Region gives way to the Corn Belt to the west.

Acres of farmland per capita can be considered as an indicator of the potential for agricultural self-reliance (i.e., how much land in a region is available to feed people within that same region). Consistent with its lower percentage of land in agriculture, the Appalachian Region has about half as many farmland acres per capita as the U.S. (1.42 acres per capita in Appalachia vs. 2.75 acres per capita in the U.S.).

Acres of Farmland per Capita

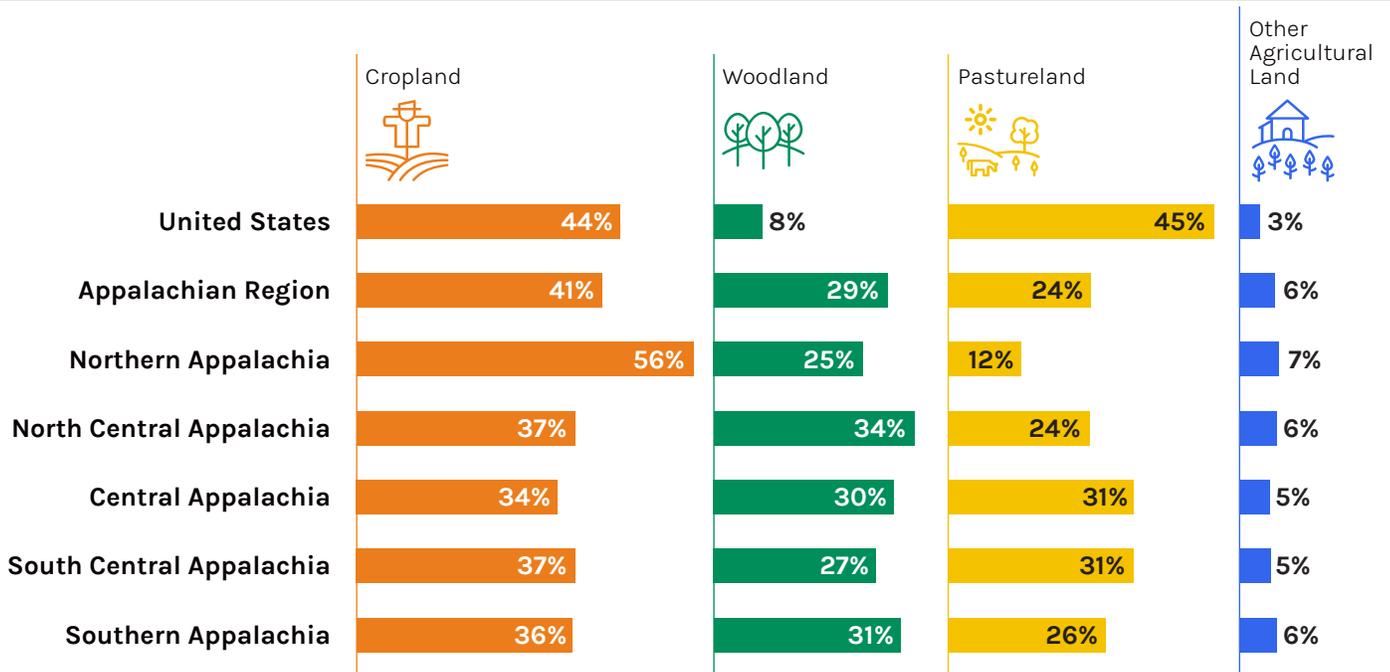


The composition of Appalachian farmland is also notably different from U.S. farmland. In particular, Appalachian farmland is distinguished by a much higher proportion of wooded farmland (more than triple the percentage of U.S. farmland), and a much lower proportion of pastureland. Northern Appalachia stands out as having the largest share of cropland and smallest share of pastureland among subregions, while the North Central subregion has the highest percentage of woodland (about a third).

The Region’s smaller farm sizes and lower rates of agricultural land use compared to the U.S. are likely driven by the Region’s rugged topography, which generally makes very large tract farming difficult or impossible. While the Region’s high share of farmland in midsize farms provides a good foundation for the development of local and regional food supply chains, these farms can face challenges in wholesale-readiness, access to capital, and economies of scale.

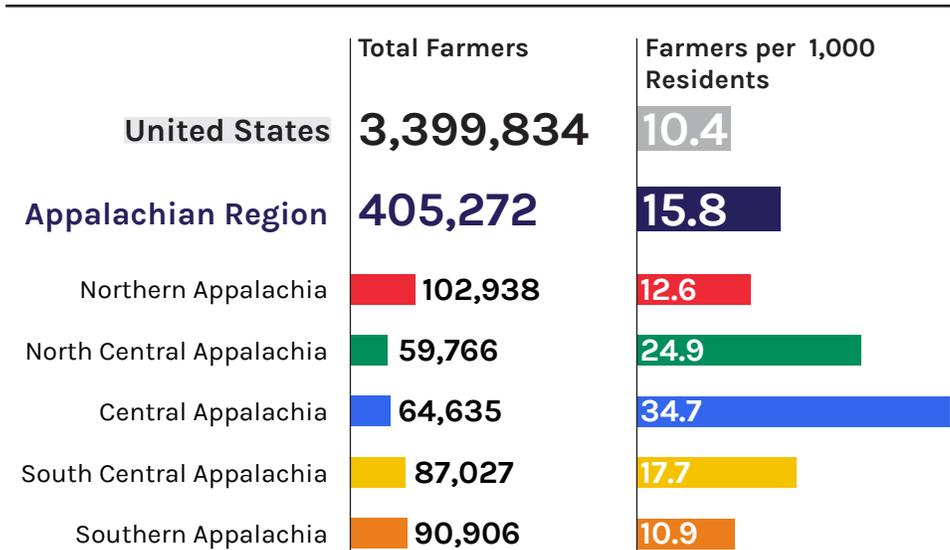
Appalachian farmland is heavily wooded—its share of woodland acreage is more than triple the share of wooded farmland in the U.S.

Farmland Composition



With over 400,000 farmers, the **Appalachian Region’s population participates in farming at a rate higher than the U.S. as a whole.**

Number of Farmers



For every 1,000 residents of Appalachia, there are 15.8 farmers, about 50% more than the U.S. overall, which has 10.4 farmers for every 1,000 residents. This gap between the Region and the U.S. as a whole is particularly striking given the Region’s lower rate of agricultural land use. Central Appalachia has the highest rate of participation in farming, with nearly 35 farmers per 1,000 residents, while Southern Appalachia has the lowest (yet still higher than the U.S.), with just under 11 farmers per 1,000

residents. These high rates of farming across the Region are a potential strength for the continued development of local food economies: farming is culturally and economically embedded as a way of life in Appalachian communities, and even those who do not farm are likely to be “closer” to farming.

Analysis of farming participation by demographic group reveals wide gaps according to race and Hispanic origin (see table on the following page). The Region is home to over 8,500 farmers who

identify as a race other than white, and over 3,500 farmers who identify as Hispanic/Latino (tabulated separately from racial group). When normalizing by number of residents in those same demographic groups, this means that while the Region has 18.4 white farmers for every 1,000 white residents, there are just 2.4 non-white farmers per 1,000 non-white residents, and 2.8 Hispanic/Latino farmers per 1,000 Hispanic/Latino residents. While these participation levels for non-white and Hispanic/Latino farmers are moderately

Farmer Demographics

	United States	Appalachian Region	North Appalachia	North Central Appalachia	Central Appalachia	South Central Appalachia	South Appalachia
Farmers Identifying as a Race Other Than White							
Total	155,490	8,541	713	649	629	1,274	5,276
Per 1,000 Non-White Residents	2.2	2.4	0.9	4.4	8.6	2.5	2.6
American Indian or Alaska Native Farmers							
Total	58,199	1,411	144	139	127	300	701
Per 1,000 American Indian or Alaska Native Residents	21.6	17.8	9.6	27.2	26.6	12.7	22.7
Asian Farmers							
Total	22,016	721	118	68	57	168	310
Per 1,000 Asian Residents	1.3	1.6	0.9	3.3	7.2	2.8	1.4
Black or African American Farmers							
Total	45,508	4,163	64	99	178	328	3,494
Per 1,000 Black or African American Residents	1.1	1.7	0.1	1.3	5	1	2.2
Hawaiian or Pacific Islander Farmers							
Total	3,018	94	16	12	4	14	48
Per 1,000 Hawaiian or Pacific Islander Residents	5.2	9.2	6.4	23.1	6.6	5	12.9
Multi-Race Farmers							
Total	26,749	2,152	371	331	263	464	723
Per 1,000 Multi-Race Residents	2.6	4.3	2.1	7.3	11	5	4.2
Hispanic Farmers (of any race)							
Total	112,451	3,571	827	509	423	909	903
Per 1,000 Hispanic Residents	2	2.8	3.2	13.9	15.2	3.6	1.3
White Farmers							
Total	3,244,344	396,731	102,225	59,117	64,006	85,753	85,630
Per 1,000 White Residents	13.8	18.4	13.8	26.2	35.7	20.4	14.4

These groups are included in "Other Than White" totals.

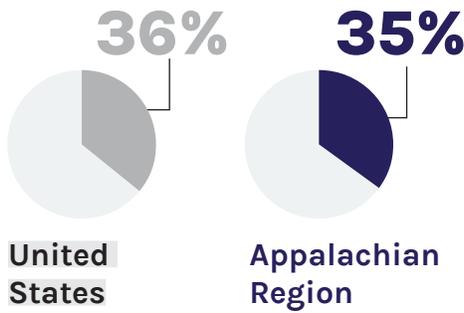
higher than those for the U.S. overall, they still indicate significant underrepresentation in farming for these groups. The North Central and Central subregions stand out for having high farming rates by Hispanic/Latino farmers compared to the other subregions.

With about 35% of its farmers identifying as female, the Region generally tracks the U.S. (at 36%) in terms of gender imbalance among farmers. This percentage is consistent across subregions.

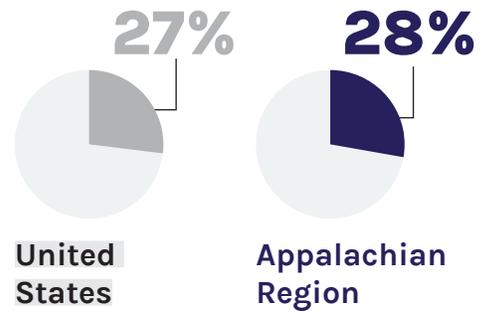
Beginning farmers (defined here as farmers with 10 or fewer years of experience) account for 28% of all farmers in the Region, compared to 27% of farmers in the U.S. as a whole. Southern Appalachia has the highest rate of beginning farmers (31%) while Northern (25%) and South Central (26%) have the lowest.

The Region's farmers are, on average, slightly younger than the U.S. as a whole, with an average age of 57.2 (compared

Percent Female Farmers



Percent Beginning Farmers



Average Farmer Age

The average farmer age is **57.5** in the United States and **57.2** in the Appalachian Region.

The average farmer age in the subregions are:

- 56.0** Northern Appalachia
- 57.2** North Central Appalachia
- 56.4** Central Appalachia
- 58.5** South Central Appalachia
- 57.7** Southern Appalachia

Farmer Age Distribution

	44 or younger	45-64	65 or older
United States	20%	46%	34%
Appalachian Region	20%	46%	34%

Subregions:

	44 or younger	45-64	65 or older
Northern Appalachia	23%	47%	30%
North Central Appalachia	21%	46%	34%
Central Appalachia	22%	46%	32%
South Central Appalachia	18%	45%	37%
Southern Appalachia	19%	46%	35%



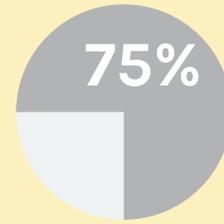
BEGINNING OF FARM SEASON. CREDIT: APPALACHIAN SUSTAINABLE DEVELOPMENT

to 57.5 for the U.S.). Northern and Central Appalachia have the Region's youngest farmers, including a larger share of farmers under age 45, while South Central Appalachia has the highest average age (58.5) and largest share of farmers age 65 or older (37%).

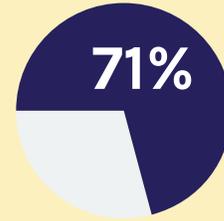
Internet Access

A lower percentage of farms in Appalachia have some form of internet access (71%) compared to the U.S. as a whole (75%). North Central and Central Appalachia have the lowest rates of farm internet access (70%).

Aside from general connectivity and basic functions important for any 21st century business, internet access is important for farms for at least two additional reasons: online sales, which more and more farms (and distributors) are utilizing for direct-to-consumer sales, and emerging farm technologies, such as precision agriculture, which utilize broadband connectivity for a range of technological applications.



of farms in the **United States** have **internet access**.



of farms in the **Appalachian Region** have **internet access**.

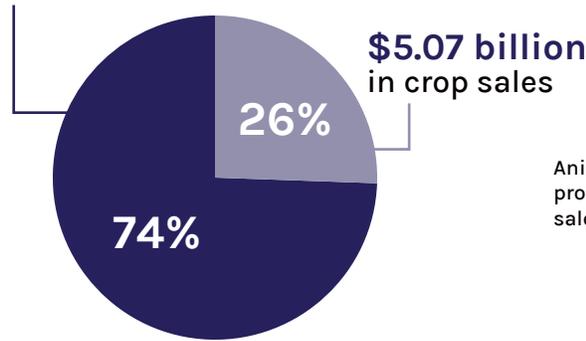
The **percent of farms with internet access** in the subregions are:

- 71%** Northern Appalachia
- 70%** North Central Appalachia
- 70%** Central Appalachia
- 73%** South Central Appalachia
- 73%** Southern Appalachia

Animal products account for a significant majority of the Appalachian Region's agriculture sales.

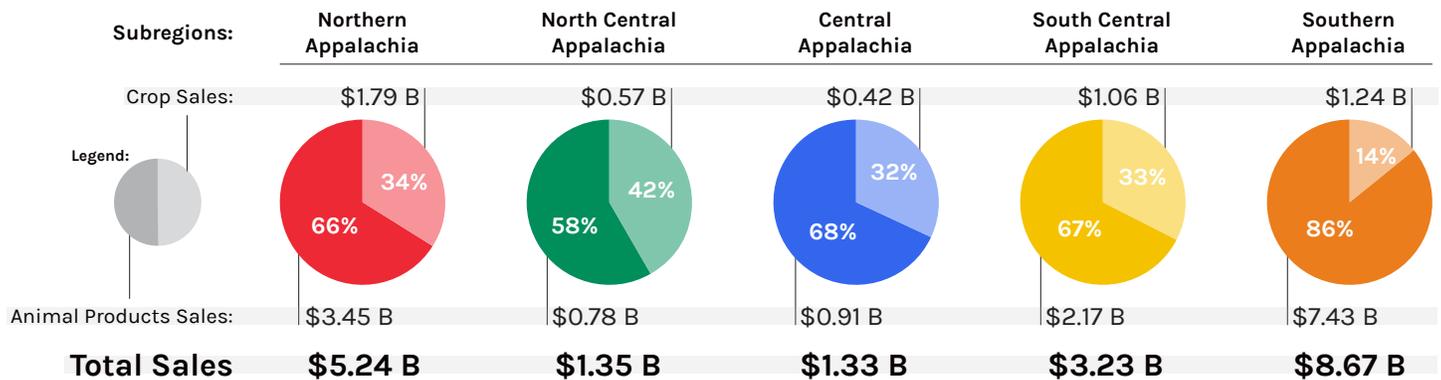
Agriculture Sales from Crops and Animals

\$14.75 billion
in animal products sales



\$19.82 billion
in total sales

in the Appalachian Region



Animal Products

Animal product sales include the sales of live animals, as well as their products, such as milk and eggs.

Appalachian agriculture sales are largely driven by sales of animals and animal products rather than crops. Nearly 75% of the Region's \$19.8 billion in agriculture sales in 2017 were from animal-based agriculture products, such as poultry, eggs,

dairy, and beef; put another way, the Region's animal product sales (\$14.7 billion) amount to almost triple its crop sales (\$5.1 billion).

This significant share of sales contrasts with the U.S. as a whole, where agriculture sales



EGGS PRODUCED AT FOX AND HEN FARM IN POWELL COUNTY, TN CREDIT: FOX AND HEN FARM

Top 3 Animal Products

Appalachian Region

 **\$9,239 M**
Poultry & Eggs

 **\$2,534 M**
Cattle & Calf

 **\$2,034 M**
Milk

Northern Appalachia

 **\$1,695 M** Milk

 **\$737 M** Poultry & Eggs

 **\$558 M** Cattle & Calf

North Central Appalachia

 **\$391 M** Poultry & Eggs

 **\$258 M** Cattle & Calf

 **\$78 M** Milk

Central Appalachia

 **\$540 M** Cattle & Calf

 **\$270 M** Poultry & Eggs

 **\$67 M** Milk

South Central Appalachia

 **\$1,240 M** Poultry & Eggs

 **\$683 M** Cattle & Calf

 **\$160 M** Milk

Southern Appalachia

 **\$6,602 M** Poultry & Eggs

 **\$496 M** Cattle & Calf

 **\$154 M** Hogs

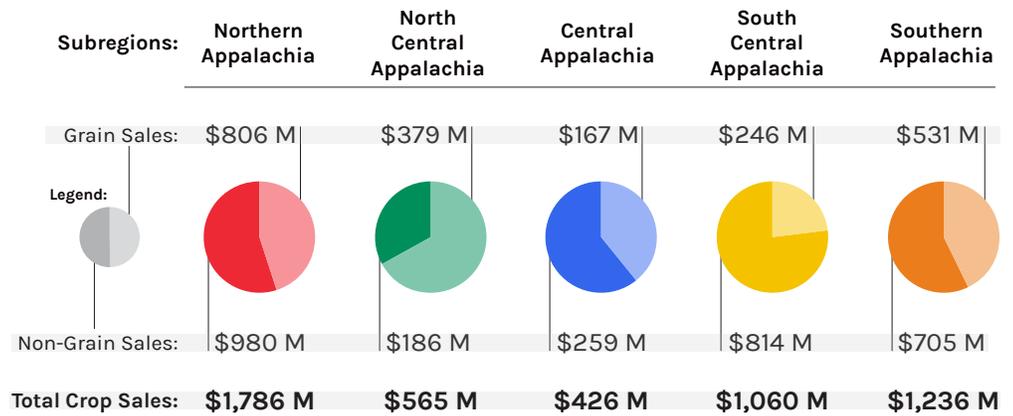
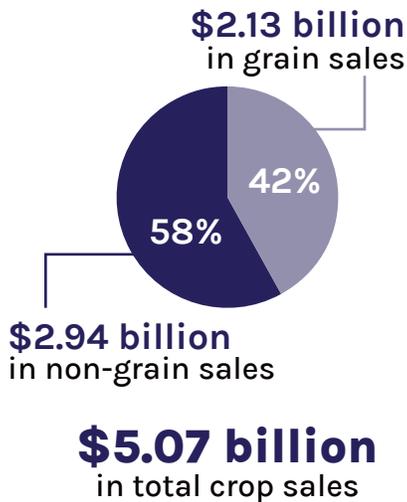
are split nearly evenly between animal products and crops. Animal products account for a majority of agriculture sales across all five Appalachian subregions. Southern Appalachia has the largest share of animal product sales (86% of total sales), while North Central Appalachia has the largest share of crop sales (42% of total sales).

Even though animal products' large share of sales holds true across the Region, that share is driven by different products in different subregions. Milk sales are dominant in Northern Appalachia, Cattle and Calf sales are the top product category in Central Appalachia, and Poultry and Eggs dominate in the North Central, South Central, and Southern subregions. In

fact, Poultry and Eggs sales in Southern Appalachia are the single largest product category by subregion, at \$6.6 billion in sales—accounting for one-third of the entire Region's total agricultural sales. Poultry and Eggs, Cattle and Calves, and Milk are the top three animal product categories for the Region as a whole, as well as in each of the five subregions

At \$6.6 billion, sales of poultry and eggs in Southern Appalachia account for one-third of the entire Appalachian Region's total agriculture sales.

Crop Sales by Grain and Non-Grain Products



(in different orders), with the exception of Southern Appalachia, where sales of Hogs (as well as Aquaculture) exceed Milk sales.

Grain crops—including cereal grains, oilseeds, and dry beans—account for 42% of crop sales in the Region. Corn and Soy are the Region’s top grain crops, with Wheat a distant third; this general pattern holds true across all five subregions, with Corn in the top spot in the Northern and South Central subregions, and Soy leading in North Central, Central, and Southern Appalachia. The Region’s top non-grain crop categories are Other Field Crops (including Hay), Horticulture, and Vegetables. Other non-grain crops that are in the top three on a subregion basis are Fruit, Tree Nuts, and Berries (North Central); Tobacco (Central); and Cotton Lint and Seed (Southern).

Top 3 Grain Products

Appalachian Region



Northern Appalachia



North Central Appalachia



Central Appalachia



South Central Appalachia



Southern Appalachia



Top 3 Non-Grain Products

Appalachian Region



Northern Appalachia



North Central Appalachia



Central Appalachia



South Central Appalachia



Southern Appalachia



*Including other field crops

Sales Overview

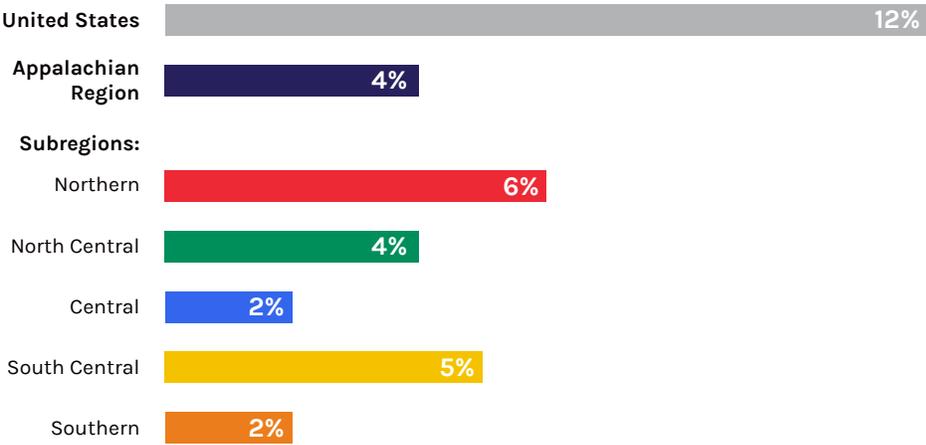
	Appalachian Region	Northern Appalachia	North Central Appalachia	Central Appalachia	South Central Appalachia	Southern Appalachia
CROP SALES						
GRAIN PRODUCTS						
Corn	\$1,029,413,693	\$504,138,897	\$152,045,788	\$68,589,847	\$115,573,059	\$189,066,102
Wheat	\$90,657,484	\$28,525,750	\$7,437,560	\$3,220,462	\$13,373,401	\$38,100,311
Soy	\$976,425,911	\$253,588,466	\$219,025,167	\$94,134,225	\$115,342,951	\$294,335,102
Sorghum	\$3,236,652	\$1,452,476	\$93,139	\$49,856	\$895,887	\$745,294
Barley	\$5,579,453	\$4,478,137	\$271,001	\$159,396	\$531,793	\$139,126
Rice	\$5,990,000	\$0	\$0	\$0	\$0	\$5,990,000
Other Grain	\$18,428,222	\$14,187,657	\$646,849	\$437,452	\$686,494	\$2,469,770
NON-GRAIN PRODUCTS						
Tobacco	\$158,280,389	\$2,592,460	\$3,564,609	\$100,362,393	\$51,760,927	\$0
Cotton Lint & Seed	\$226,031,987	\$0	\$0	\$49,413	\$1,622,752	\$224,359,822
Vegetables	\$454,623,125	\$156,698,585	\$25,600,872	\$23,617,485	\$126,736,146	\$121,970,037
Fruit, Tree Nut, and Berry	\$247,683,397	\$137,290,635	\$25,779,033	\$3,716,045	\$49,480,002	\$31,417,682
Horticulture (Nursery, Greenhouse, Floriculture, Sod)	\$839,267,851	\$216,244,374	\$45,689,773	\$27,871,538	\$368,954,997	\$180,507,169
Cut Christmas Trees & Short Term Woody Crops	\$118,548,373	\$21,543,564	\$1,387,398	\$282,798	\$94,216,822	\$1,117,791
Other Field Crops Incl. Hay	\$899,650,451	\$445,409,000	\$83,679,315	\$103,409,095	\$120,902,845	\$146,250,196
ANIMAL PRODUCTS SALES						
Poultry & Egg	\$9,239,458,143	\$736,605,189	\$390,734,614	\$270,337,898	\$1,239,557,058	\$6,602,223,384
Cattle and Calf	\$2,534,278,807	\$557,744,780	\$257,633,171	\$539,607,441	\$683,283,152	\$496,010,263
Milk	\$2,033,773,456	\$1,695,274,770	\$78,418,613	\$67,334,812	\$159,785,175	\$32,960,086
Hogs	\$540,638,485	\$327,621,237	\$30,519,881	\$4,959,346	\$23,157,334	\$154,380,687
Sheep & Goats (Incl. Wool, Mohair, & Milk)	\$54,429,169	\$21,083,025	\$9,267,301	\$6,622,411	\$11,350,211	\$6,106,221
Equine	\$85,049,912	\$31,050,262	\$8,681,847	\$13,920,514	\$15,798,967	\$15,598,322
Aquaculture	\$162,712,301	\$16,340,303	\$4,641,009	\$1,356,883	\$26,537,982	\$113,836,124
Specialty Animals	\$97,535,246	\$67,239,435	\$2,810,566	\$2,476,195	\$14,323,548	\$10,685,502



FARM STAND IN UNICOI COUNTY, TN. TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

Fresh fruits and vegetables are typically the anchor and leading-edge products of developing local and regional food systems. While fruit and vegetable sales account for about 12% of total U.S. agriculture sales, they account for just one-third of that (4%) for the Appalachian Region, indicating room for growth. Northern Appalachia has the highest share of fruit and vegetable sales (6%) while the Central and Southern subregions have the lowest, with fruit and vegetable sales accounting for just 2% of their total agriculture revenue.

Fruit and Vegetable Sales as a Percentage of Total Agriculture Sales

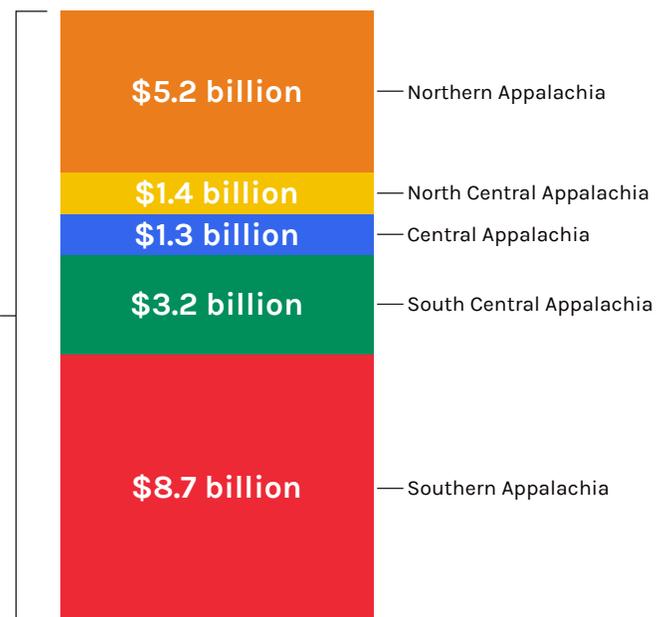


The Appalachian Region's farms generated nearly **\$20 billion in sales in 2017**, with sales growth that outpaced the U.S. from 2012 to 2017.

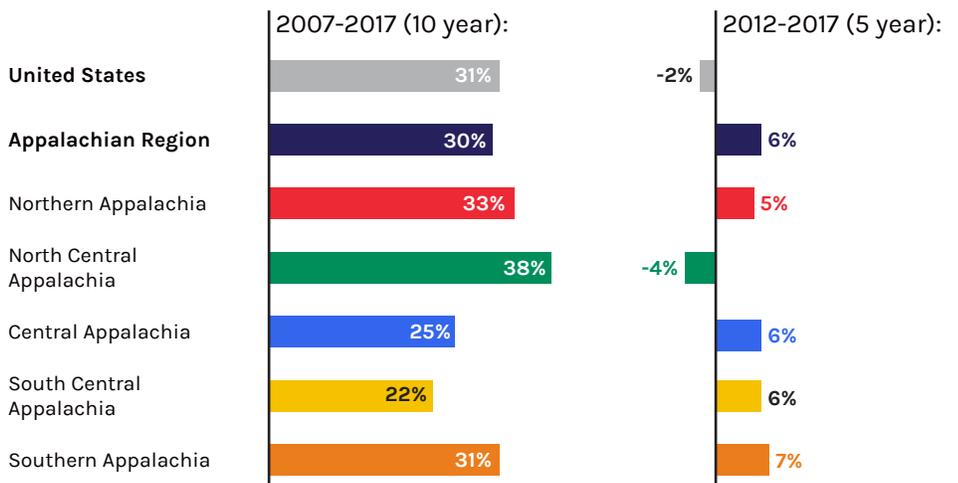
Revenue from sales of agricultural products in the Appalachian Region totaled \$19.8 billion in 2017—a 6% increase from 2012 (a period during which total U.S. sales shrank by 2%), and a 30% increase from 2007. Southern Appalachia (\$8.7 billion) and Northern Appalachia (\$5.2 billion) led the Region in sales, while North Central Appalachia saw the largest relative increase in sales from 2007 to 2017, with growth of 38%. Notably, when evaluating by county metro type, small metro counties and nonmetro counties adjacent to small metros accounted for 59% of all agricultural sales in the Region.

2017 Agriculture Sales

Appalachian Region:
\$19.8 billion
 in agriculture sales

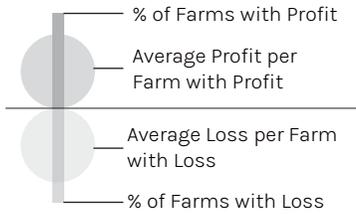


Sales Growth



Farm Net Profits and Losses

Legend



39% of farms in the Appalachian Region had net profits.

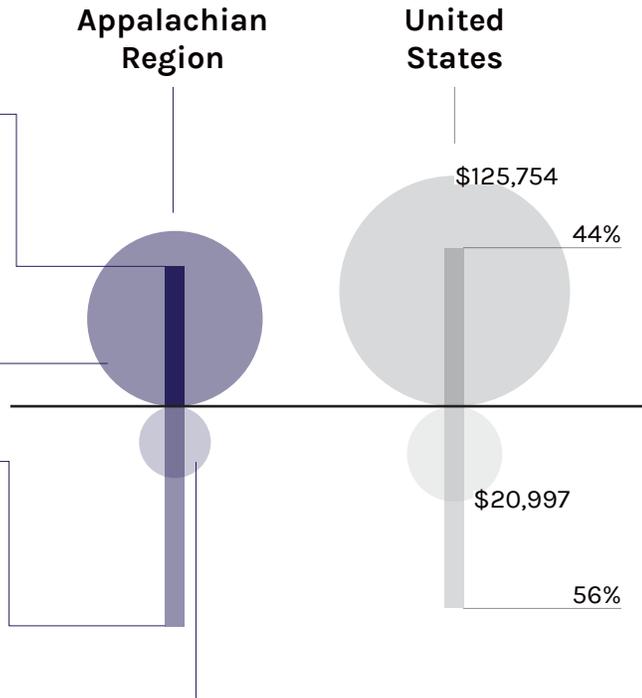
Of those farms that had profits, the average profit per farm was **\$72,398.**

61% of farms in Appalachian Alabama had net losses.

Of those farms that had losses, the average loss per farm was **\$11,754.**

Appalachian Region

United States



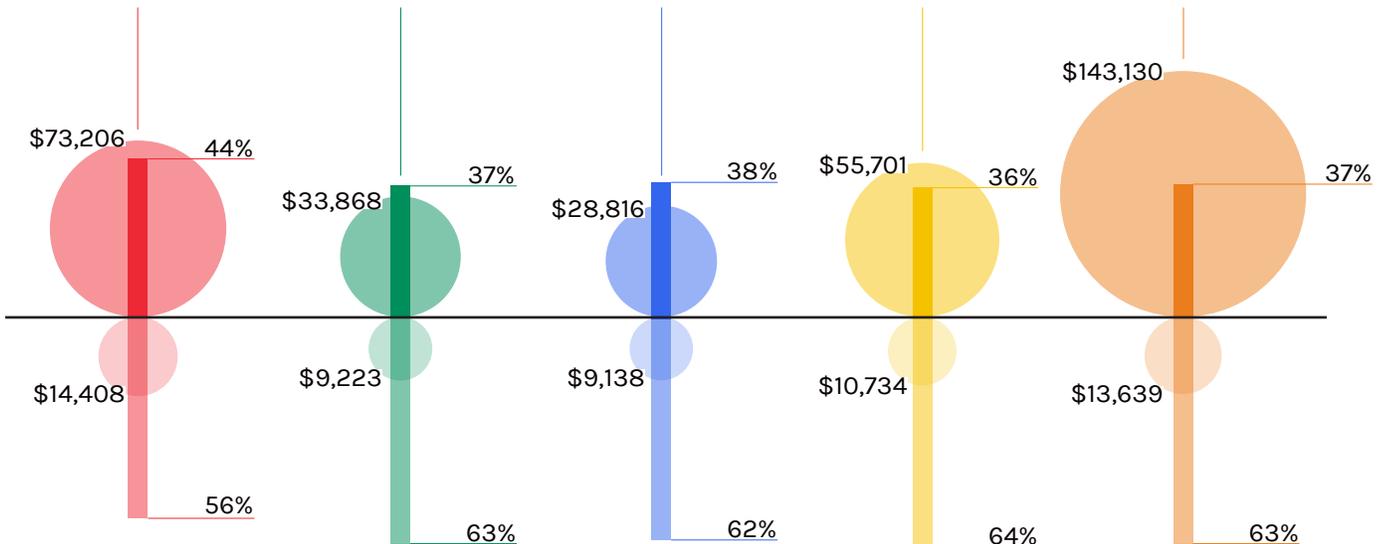
Northern Appalachia

North Central Appalachia

Central Appalachia

South Central Appalachia

Southern Appalachia





CREDIT: ECONOMIC DEVELOPMENT GREATER EAST (EDGE)

Small metro areas and their adjacent counties accounted for almost 60% of all agricultural sales in the Region.

Agriculture Sales by County Type, 2017

\$1.6 B	Large Metros (pop. >1 million)
\$5.0 B	Small Metros (pop. <1 million)
\$3.7 B	Nonmetro, Adjacent to Large Metros
\$6.6 B	Nonmetro, Adjacent to Small Metros
\$2.9 B	Rural (nonmetro, not adjacent to a metro)

The Appalachian Region had a smaller share of profitable farms compared to the U.S. as a whole: 39% of Appalachian farms had net profits, compared to 44% of U.S. farms. Northern Appalachia had the highest share of profitable farms (44%). Average per-farm profits among these farms was also lower for the Region (\$72,398 per farm) compared to the U.S. (\$125,754 per farm). The Central and North Central subregions had lower per-farm profits than the other subregions, at \$28,816 and \$33,868 per farm respectively, while Southern Appalachia stood out for its high per-farm profitability (\$143,130). At the same time, Appalachian farms with net losses had smaller losses than their U.S. counterparts: these Appalachian

farms lost, on average, just under \$12,000 per farm, compared to per-farm losses of nearly \$21,000 for U.S. farms.

It is worth noting here that net cash profits/losses do not capture the full financial picture of farm operations. According to a USDA study from 2018, which evaluated national data from 2015, while just 43% of farms reported net cash profits that year, additional factors such as tax-loss benefits and asset appreciation pushed the share of farms with positive annual returns up to 70%.

The Region’s **local food economies vary widely** in their level of development. Potential for growth may be slowed by **limited supply in vegetable and fruit production.**

Retail Direct Sales in the Appalachian Region

7.3% of farms in the **Appalachian Region** participated in **retail direct sales** and made

\$242 million.

That’s **1.2%** of the **Region’s total agricultural sales.**

It’s also **\$9.44** in per capita sales.

Wholesale Direct Sales in the Appalachian Region

1.2% of farms in the **Appalachian Region** participated in **wholesale direct sales** and made

\$250 million.

That’s **1.3%** of the **Region’s total agricultural sales.**

Retail Direct Sales and Wholesale Direct Sales in the United States and the Appalachian Region

	Retail Direct (Direct to Consumer)				Wholesale Direct		
	% of Farms	Total Retail Direct Sales	Share of Total Ag. Sales	Sales Per Capita	% of Farms	Total Wholesale Direct Sales	Share of Total Ag. Sales
United States	6.4%	\$2,805 M	0.7%	\$8.57	1.4%	\$9,036 M	2.3%
Appalachian Region	7.3%	\$242 M	1.2%	\$9.44	1.2%	\$250 M	1.3%
Subregions							
Northern Appalachia	11.1%	\$126 M	2.4%	\$15.44	2.2%	\$130 M	2.5%
North Central Appalachia	7.1%	\$24 M	1.8%	\$9.94	1.0%	\$7 M	0.5%
Central Appalachia	4.7%	\$11 M	0.9%	\$6.15	0.6%	\$7 M	0.5%
South Central Appalachia	7.3%	\$55 M	1.7%	\$11.27	1.3%	\$48 M	1.5%
Southern Appalachia	5.0%	\$26 M	0.3%	\$3.08	0.7%	\$58 M	0.7%

Value-Added Products, Agritourism, and Organic Sales

	Value-Added Products		Agritourism		Organic
	% of Farms	Sales	Revenue	Revenue per Capita	Share of Total Ag. Sales
United States	1.6%	\$4,043 M	\$949 M	\$2.90	1.9%
Appalachian Region	1.7%	\$164 M	\$50 M	\$1.95	1.6%
Subregions					
Northern Appalachia	3.0%	\$77 M	\$16 M	\$1.96	5.2%
North Central Appalachia	1.3%	\$6.1 M	\$4.2 M	\$1.76	1.0%
Central Appalachia	1.0%	\$4.9 M	\$1.8 M	\$0.99	0.2%
South Central Appalachia	1.8%	\$46 M	\$14 M	\$2.90	0.4%
Southern Appalachia	1.0%	\$29 M	\$14 M	\$1.66	0.1%

The USDA Census of Agriculture tracks a number of data indicators that relate to the development of local food supply chains. **Retail direct, or direct-to-consumer sales,** measure sales that occur directly between farms and consumers, such as through farmers' markets, farm stands, and community supported agriculture (CSAs). **Wholesale direct sales** measure sales from farms to local restaurants, retailers, institutions, or food hubs. Sales of **value-added products** processed on-farm, such as jams, sauces, or cheeses; as well as **revenue from agritourism,** can also indicate aspects of the development of local food economies.

As a whole, the Appalachian Region in 2017 measured somewhat lower than the U.S. in several of these indicators, though it overperformed in retail direct sales, in terms of

farm participation, share of total sales, and sales per capita. Its lower metrics in wholesale direct sales as a share of total sales suggests there may be potential for growth in building stronger local and regional supply chains for wholesale sales.

This regional data obscures substantial variation in these indicators among the five subregions. Northern Appalachia led all subregions and outperformed the U.S. on virtually all of these indicators, suggesting that it is home to some of the most mature local food economies in the Region, likely driven by the high demand of adjacent urban centers along the Eastern seaboard. The North Central and South Central subregions generally follow in the next tier, followed by Central Appalachia and then Southern Appalachia. As is illustrated by the general agricultural sales data (see Agricultural Products

finding, p. 48), Southern Appalachia's agricultural economy is substantially driven by poultry and egg production, with relatively little economic activity devoted to retail direct sales, for example. In some cases, the differences are stark: retail direct sales in Northern Appalachia were eight times the amount of Southern Appalachia's, as a share of total agriculture sales.

Organic sales, which often track with the growth of local food economies, are consistent with these trends. In terms of organic sales as a share of total agriculture sales, Northern Appalachia led the Region and substantially outperformed the U.S.

Vegetable and Orchard Acreage per 1,000 Population



United States



Appalachian Region



Northern Appalachia



North Central Appalachia



Central Appalachia



South Central Appalachia



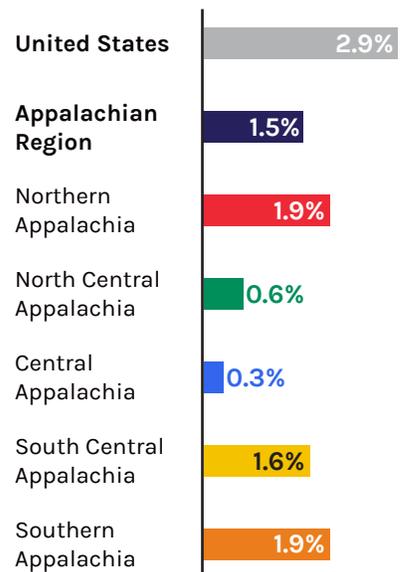
Southern Appalachia



FARM STAND IN UNICOI COUNTY, TN. TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

Although local and regional food economies include all varieties of edible products, fresh fruits and vegetables are typically the early and anchor products in building more localized supply chains. The Appalachian Region had less orchard and vegetable acreage—per capita and as a percent of all cropland—than the U.S. as a whole, with per capita acreage about one-fourth that of the U.S., and cropland percentage about half that of the United States. Central Appalachia had the most limited orchard and vegetable acreage by these measures. These indicators suggest that continued local food economy growth in the Region as a whole, and the Central subregion in particular, may be hindered by insufficient supply of fruits and vegetables.

Percent of Cropland in Vegetable/Orchard Acreage



Farmers' markets, on-farm markets (or farm stands), and food hubs all play an integral role in facilitating direct retail and direct wholesale transactions. On a per capita basis, the Region has more USDA-registered farmers' markets than the U.S., while a lower percentage of its farms have on-farm markets compared to the United States. Notable subregional variations on these metrics include Central Appalachia with a very high number of farmers' markets for its population, while Northern Appalachia leads in on-farm markets.

Because food hubs play a mid-supply chain function in linking farms to consumers, this analysis quantifies food hubs in reference to both population and farms. The Region tracks closely with the U.S. in both metrics (with slightly fewer food hubs per farm, but more food hubs per residential population). Central and Southern Appalachia have the lowest number of food hubs by both measures.

Number of Farmers' Markets

For every 1 million residents, there are:

4.2 USDA-registered farmers' markets in the United States and

4.9 in the entire Appalachian Region.

The number of USDA-registered farmers' markets per 1 million residents for the subregions are:

- 3.8** Northern Appalachia
- 4.6** North Central Appalachia
- 16.6** Central Appalachia
- 5.3** South Central Appalachia
- 3.4** Southern Appalachia

Number of On-Farm Markets

For every 10,000 farms, there are:

7.8 USDA-registered on-farm markets in the United States and

6.7 in the entire Appalachian Region.

The number of USDA-registered on-farm markets for 10,000 farms for the subregions are:

- 11.0** Northern Appalachia
- 6.5** North Central Appalachia
- 2.2** Central Appalachia
- 6.7** South Central Appalachia
- 5.4** Southern Appalachia

Number of Food Hubs

For every 1 million residents, there are:

0.8 USDA-registered food hubs in the United States and

1.1 in the entire Appalachian Region.

The number of USDA-registered on-farm markets for 1 million residents for the subregions are:

- 1.5** Northern Appalachia
- 2.1** North Central Appalachia
- 0.5** Central Appalachia
- 1.4** South Central Appalachia
- 0.2** Southern Appalachia

For every 10,000 farms, there are:

1.2 USDA-registered food hubs in the United States and

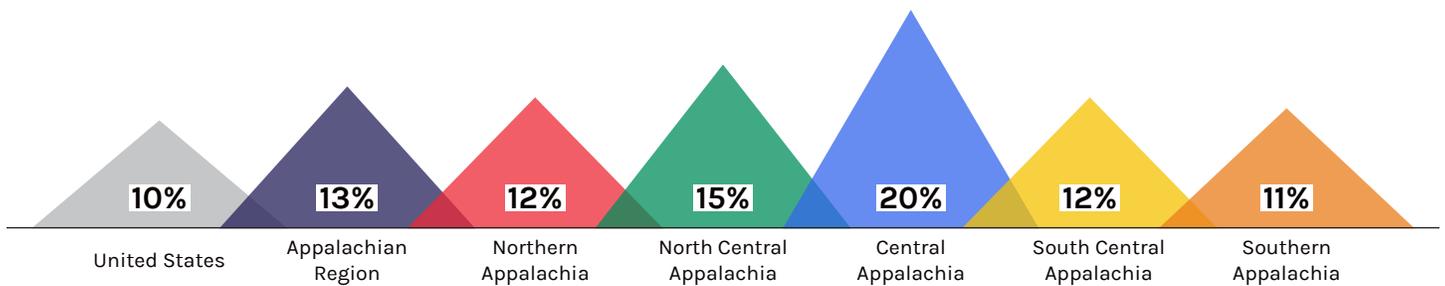
1.1 in the entire Appalachian Region.

The number of USDA-registered food hubs per 10,000 farms for the subregions are:

- 2.0** Northern Appalachia
- 1.4** North Central Appalachia
- 0.2** Central Appalachia
- 1.3** South Central Appalachia
- 0.4** Southern Appalachia

The Appalachian Region appears to have **room for growth in capturing SNAP dollars** for the Region's farmers and food economies.

Percent of Households on SNAP



JOHNSON CITY FARMERS MARKET IN JOHNSON CITY, TN. CREDIT: TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

SNAP benefits, formerly known as food stamps, are a vital source of food security for many households and families across the United States. The Appalachian Region has a higher rate of household SNAP usage (13%) than the U.S. as a whole (10%), with Central Appalachia having a household SNAP rate as high as one in five households.

Farmers' markets and farm stands can become authorized to accept SNAP dollars, allowing low-income residents to purchase more locally produced foods, while also improving local farm viability by allowing farmers to capture more revenue through these SNAP dollars. The Appalachian Region has a lower rate of SNAP



FARM STAND IN UNICOI COUNTY, TN. TENNESSEE DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

Number of SNAP Authorized Farmers' Markets

For every 100,000 households that rely on SNAP benefits, there are:

22 farmers' markets that accept SNAP in the United States and

17.8 in the Appalachian Region.

The number of farmers' markets that accept SNAP for every 100,000 households that rely on SNAP are:

- 17.1** Northern Appalachia
- 25.3** North Central Appalachia
- 19.9** Central Appalachia
- 24.3** South Central Appalachia
- 10.2** Southern Appalachia

acceptance at farmers' markets than the U.S. as a whole, on a per-SNAP-household basis: for every 100,000 households receiving SNAP benefits, Appalachia has 17.8 farmers' markets that accept SNAP, compared to 22 for the U.S. overall. While the North Central and South Central subregions have higher rates than the United States, Southern Appalachia has just 10.2 SNAP farmers' markets per 100,000 SNAP households—less than half the U.S. rate.

The USDA tracks the dollar value of SNAP redemptions at farmers' markets and direct-marketing farmers (individual farm business that are authorized to accept SNAP through farm stands, for example). Although this data is released only at the state (not county) level, a high-

level analysis of Appalachian state SNAP redemptions indicates likely dynamics in the Region. Appalachian states (in aggregate) have a lower rate of redemptions per SNAP household compared to the U.S. as a whole: \$1.38 per SNAP household in Appalachian states, vs. \$1.82 in the United States. New York and Pennsylvania stand out for having very high redemption rates per SNAP household, while Alabama, Georgia, Kentucky, North Carolina, Ohio, Tennessee, and West Virginia all have redemption rates under \$0.60 per household, or about one-third the U.S. rate. These trends also largely hold true when looking at redemptions per farmers' market/direct-marketing farmer (rather than per SNAP household).

SNAP Redemptions at Farmers' Markets (FMs) and Direct Marketing Farmers (DMFs) in 2019

	Total SNAP Redemptions at FMs and DMFs	FM/DMF SNAP Redemptions per SNAP Household	FM/DMF SNAP Redemptions per SNAP FM/DMF
United States	\$22,679,787	\$1.82	\$6,197
All Appalachian States	\$6,200,194	\$1.34	\$5,905
Appalachian States			
Alabama	\$92,103	\$0.38	\$2,047
Georgia	\$265,733	\$0.57	\$3,163
Kentucky	\$71,885	\$0.30	\$1,141
Maryland	\$164,415	\$0.84	\$3,355
Mississippi	\$200,837	\$1.24	\$5,150
New York	\$2,953,033	\$3.27	\$13,242
North Carolina	\$249,442	\$0.53	\$2,626
Ohio	\$245,204	\$0.47	\$2,250
Pennsylvania	\$1,377,339	\$2.56	\$14,199
South Carolina	\$162,123	\$0.70	\$2,702
Tennessee	\$146,069	\$0.44	\$2,518
Virginia	\$219,058	\$0.96	\$2,235
West Virginia	\$52,953	\$0.49	\$1,765

In summary, compared to the U.S. as a whole, fewer of the Region's farmers' markets accept SNAP benefits, and SNAP-enrolled households in the Region spend fewer of their SNAP dollars at farmers' markets or directly with farmers. These dynamics suggest that targeted investment in local market channels, along with education to encourage the use of SNAP dollars for local foods, could help direct more of these federal benefit dollars to local farmers.

States in the Appalachian Region have a lower rate of SNAP spending at farmers' markets and direct marketing farmers than the U.S. as a whole.

4.

Opportunities to Strengthen the Appalachian Region's Local Food Economies



Introduction

The following pages describe seven broad opportunity areas for strengthening Appalachian food economies, accompanied by case studies of relevant initiatives. These opportunities were identified through analysis of quantitative demographic, economic, and agricultural production data; qualitative assessments and reflections shared by stakeholders in the Region; and perspectives and input from the project advisory committee. Each opportunity profile describes ways in which the strengths and assets of the Appalachian Region can be leveraged to overcome challenges and develop

more robust local food economies. The case studies accompanying each opportunity represent best practices and promising models for pursuing the potential of each opportunity area. These cases highlight farm businesses, nonprofits, funding sources, and other organization and programs—within and outside Appalachia and both large and small—that can serve as instructive examples. The case studies are not intended to provide a comprehensive inventory of all potential relevant approaches, but rather to shine a light on exemplary initiatives, and in so doing, to inspire innovations by stakeholders across the Region in the years to come.



HOMESTEAD CREAMERY FARM MARKET IN BURNT CHIMNEY, VA. CREDIT: HOMESTEAD CREAMERY INC.

**FARMER TRAINING, LAND ACCESS,
AND FARMLAND PRESERVATION**

Support the long-term viability of Appalachian agriculture through farmer training and land access and preservation.

Farmers and farmland are the foundation of the Appalachian agricultural and food economy. Support for farmers at all career stages—but especially young and beginning farmers—is key to addressing the challenges posed by an aging farmer population and losses in both farm numbers and farmland acreage. Specific opportunities include building and expanding programs that train farmers, support land access, and keep farmland in agricultural use.

Challenges: Farm and Farmland Loss and Aging Producers

From 2007 to 2017, the rates of decline in farm numbers and farmland acreage in Appalachia exceeded national rates. Each Appalachian subregion lost over 10% of its farms, with the exception of the North Central subregion, which experienced a slight increase in farm numbers. The Appalachian Region lost 4.7% of its total farmland during the same period, almost double the rate of loss seen at the national level (2.4%). There was a slight increase in farmland acreage in the North Central subregion. While losses in farmland and farms are worthy of concern, the Region’s rate of farm loss slowed from 2012 to 2017 compared to the five years preceding 2012.

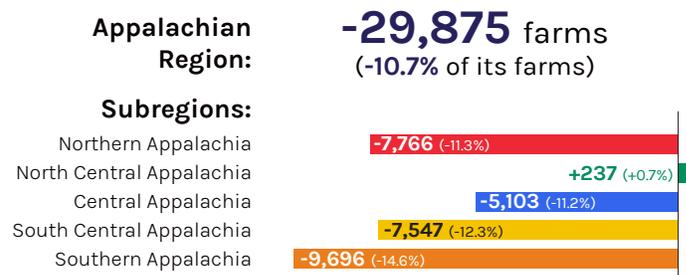
The current trajectory of farmland and farm loss is accompanied by an aging agricultural workforce. The average age of Appalachian farmers is 57, just below the national average of 58. Across the U.S., the average age of agricultural sector workers is the oldest of all industries for which the Bureau of Labor Statistics collects data. This raises concern for the future of the agricultural workforce across

the U.S., including in Appalachia.

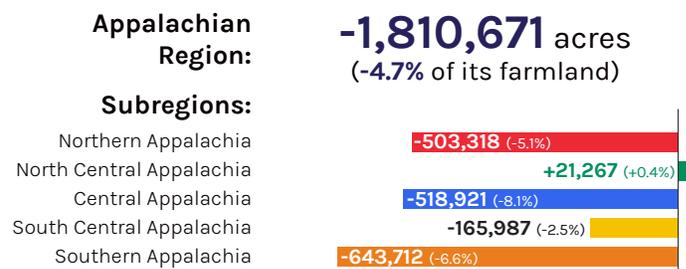
The agricultural workforce is older than that of many other industries, in part, because younger and beginning farmers face a range of barriers to launching new farm enterprises. These hurdles include challenges in accessing land, technical and business training, and connections to markets. One stakeholder who works with beginning farmers described land access as the most significant challenge. The results of the 2017 National Young Farmers Coalition national survey echo this challenge: both aspiring and active young farmers ranked land access as the primary factor inhibiting their ability to farm.⁹⁶ In many areas of Appalachia, and particularly near

96. 30% of aspiring farmers and 17% of current farmers ranked land access as the most significant challenge to farming.
<https://www.youngfarmers.org/wp-content/uploads/2018/02/NYFC-Report-2017.pdf>

Farm Loss from 2007-2017



Farmland Loss from 2007-2017



New American Sustainable Agriculture Project (NASAP)

Launched in 2009, the New American Sustainable Agriculture Project is a program of the food-focused nonprofit Cultivating Community based in Maine. The largest land-based farmer training program in Maine, NASAP trains refugee and immigrant farmers at their two incubator farms in Lisbon and Falmouth. NASAP provides land access, food security, and training for program participants, many of whom were farmers in their nations of origin. Cultivating Community also operates Fresh Start Farms, a food hub that distributes produce grown by NASAP participants to customers throughout Central and Southern Maine. Over 20 farmers are typically enrolled in the NASAP program each year growing produce on a total of 28 acres. In 2020, farmers sold over \$200,000 worth of produce to CSA members, farm stands, and wholesale markets.

population centers, the high price of farmland prevents beginning farmers from renting or purchasing land. On the other hand, proximity to urban centers can also offer farmers higher-margin consumer markets. In other areas, the principal concern is accessing high-quality farmland. For beginning farmers who lease land, short-term or tenuous lease agreements can limit investments in land and farm businesses.

Farm loss, while a challenge for many Appalachian communities, may be most acute for farmers who face systemic disadvantages. Black and Native American producers, in particular, have been historically dispossessed of agricultural land through a range of practices such as discriminatory loan servicing, loan denial, and tax assessment fraud, made worse by a lack of access to legal services. Such discriminatory practices are documented in the *Pigford v. Glickman* class action discrimination suit between the USDA and black farmers, settled in 1999. Land dispossession⁹⁷ and other discriminatory practices have contributed to low rates of Black participation in farming across the U.S., including Appalachia. Black Appalachians farm at a significantly lower rate than White residents: there are 1.7 farmers per 1,000 Black residents compared with 18.4 farmers per 1,000 White residents. Similarly

⁹⁷The act of taking land or property away from a person or group.

Farms fully or partly owned by the operator:

96% : Appalachian Region

93% : United States

to the *Pigford v. Glickman* case, the *Keepseagle v. Vilsack* class-action lawsuit alleged the USDA had discriminated against Native American farmers and ranchers in loan programs and servicing of loans from 1981 to 1999. The lawsuit settlement created a \$680 million compensation fund, \$80 million in debt relief, and additional tax relief for Native American producers. The settlement also created a fund that is currently being distributed by the Native American Agriculture Fund (NAAF), which provides grants for business assistance, agricultural education, technical support, and advocacy services that specifically support Native farmers and ranchers. Organizations across the U.S. have emerged to address



CURRENT APPRENTICE CRAIG ALLEN AT COUNTRY SUNRISE CREAMERY. CREDIT: PASA SUSTAINABLE AGRICULTURE

systemic disadvantages faced by Black, indigenous, immigrant, and other farmers of color with land preservation, land access, capital access, farmer training, and other supports. Organizations including NAAF, Center for Heirs' Property Preservation, National Young Farmers Coalition, New American Sustainable Agriculture Project, and the Southeastern African American Farmers Organic Network (SAAFON) are among the many organizations working to increase equity and opportunity in agriculture within and outside of Appalachia.

Effective and Innovative Strategies

Preserve Existing Farmland

Appalachia exceeds the national average in rates of farms owned by the operator. Given the combination of high farm ownership and an aging farmer population, a significant amount of agricultural land will be changing hands in the coming decades. Connecting beginning and existing farmers with opportunities to acquire available farmland will be key to keeping land in agriculture. Farm link programs, often coordinated by nonprofit organizations, connect landowners and retiring farmers with farm seekers, and are one important tool to keep farmland in agricultural use.

Certain policies increase the likelihood that farmland remains in agriculture. For example, present-use value tax policies ensure that land is assessed based on agricultural land use, rather than development potential. These policies can keep taxes manageable for farmers in regions experiencing development pressures. In the words of one North Carolina stakeholder, "present-use value is the single greatest policy for farmland preservation in western North Carolina. Without it, everyone would sell their farm."⁹⁸ Through Pennsylvania's Clean and Green Program, counties can reassess property taxes

⁹⁸. Conversation with a North Carolina stakeholder.

"Present-use value is the single greatest policy for farmland preservation in western North Carolina. Without it, everyone would sell their farm."

Center for Heirs' Property Preservation

The Center for Heirs' Property Preservation is a 501c3 organization based in Charleston, South Carolina, and serves a 22-county area in the South Carolina Lowcountry. The Center works to protect "heirs' property and promote its sustainable use to provide economic benefit to historically under-served families." The term "heirs' property" refers to possessions and assets transferred to multiple family members as an inheritance when there is no will or estate plan. According to the Center for Heirs' Property Preservation, in the Lowcountry, "heirs' property is more commonly owned by African American families, however this form of landownership occurs whenever the law is not well understood; when proper legal steps are not taken to prevent it, and when people can't afford an attorney to help them." When multiple family members inherit agricultural land, but do not have the resources or interest to keep the land in production or do not agree on how to use the land, the farmland can be lost. Further, agricultural land use can be limited when there is not a clear title. As the Appalachian farmer population continues to age, the potential for land loss without clear succession planning is an increasing concern.

The Center for Heirs' Property Preservation provides three main services:

1. Resources and education to reduce the amount of property passed down through inheritance without a will or estate plan.
2. Legal services to assist with property title issues, including title searches and preparing legal documents, court filings, and proceedings.
3. Education, resources and assistance for landowners to manage forested lands more strategically, for increased economic benefit.

From the Center's founding in 2005 to the present, nearly 800 clients have received full legal services to resolve title issues, and just over 500 families have benefited from the Center's forestry education services.

on qualifying farm or forest acreage in return for landowners agreeing to forgo development on their land. To date, about 9.3 million acres have been enrolled in the Clean and Green Program.⁹⁹

Other important policies for farmland preservation programs include conservation easement programs that involve an entity (nonprofit, government, or other) purchasing a conservation easement from a farmer in exchange for the farmer agreeing to limit

⁹⁹. https://www.agriculture.pa.gov/Plants_Land_Water/farmland/clean/Pages/default.aspx

nonagricultural uses of their land, including development. One example of a conservation easement program is the Pennsylvania Agricultural Conservation Easement Purchase Program, which enables state and county governments to purchase conservation easements from farmers. Through the program, over 550,000 acres of prime farmland in Pennsylvania have been approved for easement purchases from over 5,000 farms.

Support Access to Farmland

Both public and private efforts can improve access to high quality farmland for beginning farmers. Initiatives can take many forms, including government or private investment in agricultural easements, which are voluntary legal agreements that restrict the use of land to agriculture and keep prime farmland in agricultural use. Such easements can prioritize lease terms that reflect the needs of land-based businesses, including multi-year leases that provide farmers with some security to invest in the land and facilities. Other initiatives that facilitate affordable land access include programs that connect farmers with landowners. Many such programs exist in Appalachian states, including FarmLink or Farmland Finder programs in Georgia, New York, North Carolina, Pennsylvania, South Carolina, Tennessee, and West Virginia.

Meet Market Opportunities

Consumer preference for local and source-identified foods has shown a continuous, multi-decade growth trajectory within and beyond Appalachia. Meeting growing demand for local products can expand the economic value captured by producers for their products. Specific opportunities for local marketing vary significantly across the Region and with the unique context of a producer and their operation. One stakeholder highlighted the importance of cultivating a culture of entrepreneurship among farmers, rather than instructing producers to grow a specific new crop.

One area of opportunity that appears consistent across Appalachian subregions is the expanding production of fruits and vegetables, products

Southeastern African American Farmers Organic Network (SAAFON)

The Southeastern African American Farmers Organic Network (SAAFON) is a network of Black farmers across the Southeastern United States “committed to building kinship and community among Black farmers and resourcing their enterprises.” The Georgia-based organization was founded by Cynthia Hayes and Dr. Owusu Bandele in 2006 to provide the training and resources needed for the farmers in their network to attain Organic certification and associated market premiums. Over the years, the organization has moved away from facilitating and training their farmer network to attain Organic certification as they found that farmers continued to face barriers to success even after Organic certification. Limited access to resources and community among SAAFON’s farmers motivated the organization to reorient their work to facilitating a network of like-minded farmers, providing direct farmer support, and advocacy. The majority of SAAFON’s farmer network consists of small and heritage Black farmers who are committed to ecological and sustainable production methods. The organization’s 55 core member farmers extend across Alabama, Florida, Georgia, Louisiana, Maryland, Mississippi, South Carolina, Tennessee, Virginia, and the U.S. Virgin Islands. The organization continues to provide a variety of services to their network, including business planning and marketing support.

that are often in high demand by consumers who favor local products. In Appalachia, fruit and vegetable sales constitute just 4% of total agricultural sales, compared with 12% for the U.S. as a whole. Among producers with prime farmland, there may be opportunities to expand or initiate fruit and vegetable production. Farmer training programs are most commonly offered by nonprofits or educational institutions. Within Appalachia, Pasa Sustainable Agriculture and Sprouting Farms offer training programs for new farmers to develop the skills to grow food and run farm businesses. Adjacent to Appalachia, the Center for Environmental Farming Systems, a partnership between North Carolina State University, North Carolina A&T, and the North Carolina Department of Agriculture, has partnered with Robeson Community College and the University of North Carolina at Pembroke (UNCP) to launch the Native American Sustainable Agriculture and Food Systems Apprenticeship. The apprenticeship program

aims to increase participation in agriculture by youth from the Lumbee Tribe, the most populous tribe east of the Mississippi River. While farmer technical assistance can aid farmers to shift or expand production, it is also important to support and encourage farmers to identify and pursue market opportunities.

“Farmer training efforts must grow a farmer into a market opportunity rather than simply growing a new farmer.” – A food hub director in North Central Appalachia.

Expanding fruit and vegetable production and sales may require targeted training that supports producers to obtain Good Agricultural Practices (GAP) certification, a USDA audit program that demonstrates compliance with food safety standards and is often required to serve wholesale markets. Cooperative Extension and agriculture nonprofits often provide this technical assistance to help farmers attain GAP certification.

Finally, each Appalachian subregion has a smaller share of organic sales than the U.S. as a whole, with the exception of the Northern subregion where organic sales far exceed the national share. Organic agriculture is associated with improved farm profitability and presents a market opportunity for many producers.¹⁰⁰ Technical and financial assistance are often supportive for producers who wish to attain organic or other certifications, such as Non-GMO Project Verified or Animal Welfare Approved, that provide producers a market premium for their products but can be expensive and require significant administrative work to achieve. Private businesses, nonprofits, and government agencies can offer services to support producers with production transitions.

Organic sales as share of total agriculture sales:

1.9% : United States

1.6% : Appalachian Region

5.2% : Northern Appalachia

100. Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. *Nature plants*, 2(2), 15221.

Langemeier, M., & Fang, X. (2020). Comparison of conventional and organic crop rotations. *farmdoc daily* (10): 103. Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign. <https://farmdocdaily.illinois.edu/2020/06/comparison-of-conventional-and-organic-crop-rotations.html>. Accessed October 15, 2021.

FARMER TRAINING THROUGH APPRENTICESHIP: PASA SUSTAINABLE AGRICULTURE APPRENTICESHIP PROGRAMS



ASHLEY (CHECKED SHIRT) WITH HOST FARMER TREY (SUNGLASSES) AND THE CREW AT TWO GANDER FARM. CREDIT: PASA SUSTAINABLE AGRICULTURE

KEY PROJECT STATS

Diversified Vegetable Apprenticeship

Founded: 2018

Program Outcomes:

- Apprentices: 17 have entered the program
 - Currently Enrolled: 10
 - Graduates: 3
 - Post-graduation careers: 2 farm owners, 1 farm manager

Hours of Training:

- Total: 3,000 hours
 - On the Job: 2,748 hours
 - Technical Instruction: 216 hours

Program Duration: 18 Months

Pennsylvania Department of Labor and Industry (DLI) Registered

Dairy Grazing Apprenticeship

Founded: 2010 in Wisconsin, 2016 in Pennsylvania

Program Outcomes:

- Apprentices: 20 have entered the program
 - Currently Enrolled: 8
 - Graduates: 3
 - Post-graduation careers: 1 dairy herd manager, 1 cheese business owner, 1 took over the family farm

Hours of Training:

- Total: 4,000 hours
 - On the Job: 3,700 hours
 - Technical Instruction: 300 hours

Program Duration: 2 Years

U.S. Department of Labor (DOL) Registered

Pasa Sustainable Agriculture, a Pennsylvania-based sustainable agriculture association, administers two apprenticeship programs for aspiring farmers in the region. The Diversified Vegetable Apprenticeship and Dairy Grazing Apprenticeship programs are each registered with the Pennsylvania Department of Labor and Industry, which provides apprentices an industry-recognized credential upon graduation. Both programs build on the time-tested model of formal apprenticeships that pair an experienced mentor with an apprentice to prepare skilled workers for the trades. The two programs combine paid on-the-job training with technical instruction to prepare apprentices with the skills, experience, and knowledge to own or manage agricultural operations. Host farmers are required to pay apprentices at least the federal minimum wage but most are paid more depending on the host farm. Room, board, and health benefits can constitute a portion of apprentice pay. Technical instruction is intended to convey management-level technical information through webinars, conferences, and farmer-mentor training sessions.

Diversified Vegetable Apprenticeship

The Diversified Vegetable Apprenticeship welcomed its first apprentices in the spring of 2018, after two years of program planning and design. To enroll in the program, both prospective apprentices and mentors submit applications to Pasa. Because of the extended, 18-month commitment on both sides, the Diversified Vegetable Apprenticeship program manager is careful not to force matches between approved apprentices and mentors. The matchmaking process includes a farm tour, a half-day of work with the farmer, and a meal with the farm crew. Both apprentices and mentors can provide input into whether the potential match is a good fit. Throughout the apprenticeship, the Diversified Vegetable Apprenticeship program manager checks in frequently with apprentices to make sure their goals are being met and they are experiencing the professional growth necessary to set themselves up for success after the apprenticeship. Farmer mentors are asked to train the apprentices as they would any other



APPRENTICE JESSICA WHITE AT JESSICA WHITE AT CAMPHILL VILLAGE KIMBERTON HILLS. CREDIT: PASA SUSTAINABLE AGRICULTURE

farm manager and provide progressive wage increases for the apprentice over time. In return, farmer mentors expect to have a motivated and hardworking employee.

Dairy Grazing Apprenticeship

The Dairy Grazing Apprenticeship was originally founded in Wisconsin in 2010 by a group of dairy farmers looking for a model to train management level dairy employees. The Dairy Grazing Apprenticeship is the first farming apprenticeship registered through the U.S. Department of Labor. In 2016, Pasa started offering the program in Pennsylvania. Similar

to the Diversified Vegetable Apprenticeship, apprentices and dairy farmers apply to the program. A panel of national mentor graziers reviews farmer applications. Apprentices are vetted through an online portal and then a contract is signed between a farm and apprentice. The mentor grazier pays the apprentice a minimum of the federal hourly minimum wage.

KEY TAKEAWAYS

Farmer training efforts that emphasize on-the-job training provide apprentices with a better idea of life as a farmer.

On-the-job training provides a critical opportunity for apprentices to learn about the day-to-day work of farming, which cannot be captured solely through traditional coursework. Apprenticeship is a relatively low-risk way for apprentices to decide whether or not they want to be farmers. The most common reason apprentices leave the Dairy Grazing Apprenticeship is concern about the challenges of running a profitable dairy farm. Farmer training programs that emphasize on-the-job training offer a significant incentive to mentors as they provide skilled and motivated employees.

Facilitating compatible matches between apprentices and mentors is critical.

Because apprentices and mentors commit to work together for 18-24 months, a good fit is key. An in-person visit to the farm, including, for example, a working interview and a meal with the farm crew, can help both parties determine whether there is a good match. An engaged program coordinator can help to identify whether the needs and goals of the

apprentices and mentors are in alignment. Pasa's Diversified Vegetable Apprenticeship offers a probationary period before the first 750 hours where either the apprentice or host farm can walk away if the partnership isn't working. The most common reasons apprentices leave the Diversified Vegetable Apprenticeship are challenges related to communication, delegation, and differing expectations between apprentices and host farmers.

Apprenticeship programs are one important tool for training the next generation of farmers, but not a silver bullet.

Apprenticeship programs like those offered by Pasa play an important role in training the next generation of farmers, especially those who are relatively new to agriculture. The most successful apprentices are typically those with some prior experience with farming such as an internship or pre-apprenticeship program. Graduates of apprenticeship programs still face a range of barriers to starting their own farm operations, including access to land, capital, and markets. Apprenticeship programs can be one important and effective component of an ecosystem of farmer support services, which can also include land link or land access programs, technical assistance, and business planning.

Pursue innovative funding and financing models that open new streams of capital for local food businesses.



ACRE FARM. CREDIT: STEWARD

Throughout the Region, scale-appropriate funding strategies are necessary to launch new initiatives, propel existing enterprises toward economic sustainability, and provide ongoing support for programs at the foundation of thriving regional food economies. Infrastructure investments, broadly defined to include both “hard” equipment and facilities and “soft” training and coordination, are paramount to advancing the local food economy. The clear need for investment presents an opportunity to identify and create innovative funding mechanisms.

Challenges to Local Food Funding

One primary challenge to effective investment in the Region is a mismatch, or perceived mismatch, between the needs of farms and food businesses and available funding mechanisms. For example, grant-launched initiatives may lack a clear “next step” when seeking investment to grow operations. The current funding landscape in the Region does not necessarily include best-fit funding partners for these early-stage enterprises, even those with a strong customer base and steady revenue growth.

Farmers and other food business operators perceive traditional bank loans as inflexible and high-risk. Venture capital investment can be unattractive to farmers due to the expected pace of growth and loss of equity in the farm business. A stakeholder commented that farm loan agencies seem to primarily serve commodity corn and soy producers and offer limited lending products suited to the needs of diversified fruit and vegetable growers. Finally, stakeholders report that there are opportunities to better target Community Development Finance Institutions' (CDFIs) products and services to the very specific business models and growth needs of farm and food businesses. One example of a CDFI service targeted for farm business is offered by the Seneca Nation of Indians Economic Development Company (SNIEDC), a certified Native CDFI in Appalachian New York. SNIEDC administers an Agriculture Loan Program that is intended to be used by farm businesses for equipment and supplies. Farmers who receive a loan are eligible to participate in the Agriculture Loan Forgiveness program, which forgives the final two years of a loan upon successful completion of SNIEDC's Agriculture Business Courses. Beyond CDFI's, many farming operations have access to loans from the Farm Credit System, USDA Farm Service Agency (FSA), and other USDA programs which, according to one stakeholder in the Region, can be well-suited to diversified farm operations.

A second key challenge can be broadly described as "readiness." Stakeholders in the Region expressed that many farmers and food business owners are averse to creating debt or "asking for help" to build or sustain their business. The willingness and confidence to engage with funders and investors are essential components of readiness. To take on traditional forms of debt, a business must have a strong credit rating, collateral, and a deep understanding of what investment is needed to meet growth goals. Stakeholders report that business operators who might benefit from funding also need training in and support for navigating opportunities to obtain private, nonprofit, and public funds. Small Business Development Centers (SBDCs), anchor institutions for

supporting local economic development, do not always have a comprehensive understanding of the range of funding opportunities available for farmers and food businesses. Many agriculture nonprofits and extension services across the Region fill this gap by working to support farmers and food entrepreneurs in their pursuit of grants and loans from a range of sources.

Effective and Innovative Strategies

There are clear opportunities to identify and establish funding strategies targeted to Appalachian food and farm businesses, and to partner with financial institutions in the Region to tailor products for a developing food economy. To be sure, best-fit investment models will vary across the Region and across individual food and farm enterprises. However, engaging new investors in funding partnerships has broad potential. Further, technical assistance, training, and support for first-time grant or loan applicants could broaden the impact of existing funding and investment streams, and would benefit early-stage enterprises and established business operators alike.

New Sources of Community Capital

Community-supported investment expands the breadth of local food financing to include community-based, collaborative risk-sharing alongside more transactional relationships between borrowers and lenders, or operators and investors. Food system stakeholders across the Region highlighted the opportunity to leverage the commitment of individuals who are

Council of Development Finance Agencies' Food Systems Finance Resource Center

Funded by the W.K. Kellogg Foundation, the [Council of Development Finance Agencies \(CDFA\)'s Food Systems Finance Resource Center](#) is an online portal that provides resources and highlights innovative food system funding practices across the United States. The CDFA strives to identify creative "out of the box" financing options for farmers and local food entrepreneurs. Their online portal includes online trainings, webcasts, publications, case studies, and a myriad of other resources for financing local foods.

Steward

Steward is a Certified B Corporation and non-banking financial institution that uses an impact lending model to support local sustainable agriculture projects across the United States. The company's goal is twofold: to provide financial capital to food producers and to create opportunities for individuals to back local food economies. Steward's model expands the geography of community-supported investment by providing a platform for farm and food businesses to connect with individual values-based lenders. The company is in the process of obtaining a micro-lending license and Community Development Financial Institution (CDFI) certification.

Steward's community of lenders is committed to advancing sustainable agriculture. Supporters can contribute to a project no matter the location, whether it is in their community or across the country. The company provides capital for on-farm and food hub infrastructure, processing facilities, and other local food business needs.

The loans Steward offers are generally less rigid than bank loans and other more traditional funding mechanisms. Interest rates are between 5% and 10%, and are determined based on the degree of risk the project, or loan, entails. Larger infrastructure projects have lower interest rates, usually between 5% and 6%, because borrowers generally have access to more collateral. Loan amounts range from \$10,000 to over \$1 million, and repayment plans are determined individually for each loan. Steward is working toward offering larger loans, in the range of \$5 to \$20 million. Repayment begins six months after disbursement in most cases, but the grace period ranges from one to 12 months. Steward offers flexible repayment options.

Producers apply to Steward with a business plan and rationale for funding that describes how the loan will improve the economic resiliency of their operation or increase sales, for example. Steward prioritizes projects that focus on regenerative agriculture, sustainable methods, human-scale and appropriate

operations, and equitable practices. In order to be approved, applicants must demonstrate the means or the collateral to support repayment.

Once a project is approved, the lending opportunity is released to supporters via Steward's online platform. At this stage, lenders can contribute to an opportunity with a transfer of funds. When the full capital request has been secured from lenders, the project "sells out" and Steward issues a loan to the farmer. Upon repayment, lenders receive repayments that they can withdraw or re-loan to another project.



FISHEYE FARMS. CREDIT: STEWARD

already "invested" in the success of a farm or food business, typically as loyal customers, by inviting them to become investors.

Relationships are at the heart of community-supported investment. Enterprises that build brand awareness and ongoing connection with customers are likely to have the greatest success cultivating community-level investors. Farm and food businesses can lay the foundation for brand awareness and customer connections by selling directly to consumers at farmers' markets, farm shares, or community supported agriculture (CSA); highlighting producers on local restaurant menus; or hosting pop-up or community events like farm-to-table

dinners. In the short term, this funding model may have the greatest potential for success in Appalachian communities with robust consumer support for local food producers.

Impact investing models broaden the "community" of investors. The Council of Development Finance Agencies describes impact investing as "investments made... with the intention to generate social and environmental impact alongside a financial return." Farmer and food entrepreneurs can look to impact investing models as a potential source of financing with greater flexibility than some grants, bank loans, or other traditional

Slow Opportunities for Investing Locally

The Slow Money Institute is a national nonprofit that works through self-organized local groups to “catalyze the flow of capital to local food systems, connecting investors to the places where they live and bringing money back down to earth.”

Slow Opportunities for Investing Locally (SOIL) is a Slow Money Institute initiative that guides the operations of four local groups in Colorado, each of which aggregates member contributions to provide zero percent interest loans to local food and farm businesses in their communities. **Current and future Appalachian Slow Money groups could adopt SOIL’s donation-to-loan model for supporting farm and food businesses.**

The Colorado SOIL groups operate revolving loan funds. When loans are repaid, the funds are recycled into new loans that support local farm and food businesses. Contributors provide tax-deductible donations that fund local SOIL groups and, through their donation, become voting members. The minimum contribution is \$250 for any community member except farmers who pay a reduced rate of \$25. In total, the four groups have more than 250 contributing members, with individual donations ranging from \$25 to \$50,000. To date, the

Colorado SOIL groups have provided over \$700,000 in loans to more than 40 farms and food businesses.

SOIL accepts loan applications on a rolling basis throughout the year, and each application is first reviewed by the local group’s executive committee. Applicants must describe their business, including its financial status; propose a loan size and repayment period; and provide references. If an executive committee determines that the applicant is an appropriate loan candidate—for example, an organic farm or small food enterprise serving local markets with a strong loan application—donor-members vote on the application at the next monthly member meeting. A majority of members must support the application for a loan to be made. Loan size and repayment period are determined on a case-by-case basis dependent on the needs of the applicant and the capacity of the local SOIL group. Loans have been used to purchase infrastructure and equipment such as coolers, tractors, and harvest and washing equipment, and to make improvements to roads and worker housing.

One Appalachian stakeholder emphasized that any local group that plans to adopt a program rooted in SOIL’s model should “ground truth” their loan terms, ensuring that terms are either equivalent to or improve upon existing funding mechanisms.

forms of financing. Impact investors, in turn, can explore the food and agricultural sector as a promising and values-aligned opportunity for investment.

State Investments in Local Foods

State investment in food and farm enterprises is an important component of the funding landscape in the Region. Through partnerships with land grant universities, local and regional nonprofits, and the Cooperative Extension Service, states often have the capacity to pair grantmaking with business planning and technical assistance. Ensuring that these partners, as well as Small Business Development Center staff, and farmers and food entrepreneurs themselves, are familiar with grant and loan programs in their state is an important step to increasing financing opportunities.

COMMUNITY-SOURCED INVESTMENT: GOSHEN HOMESTEAD CREAMERY



ASSORTMENT OF GOSHEN HOMESTEAD DAIRY PRODUCTS. SOURCE: DWAYNE MCINTYRE OF CREDIT HOMESTEAD

KEY PROJECT STATS

Total project cost: Approx. \$100K, including a \$25K investment by the McIntyres

Total amount raised: \$75K

- Herdshare members: \$50K
- Extended family: \$25K

Total number of Herdshare member investors: 8

Profitability

- Year 1: Loss
- Year 2: Nearly break even (within \$1-2k of profit)
- Year 3: Projected profit

Equity

- McIntyres own 60% of the company
- Extended family owns 15%
- Herdshare member investors own 25%

Size of the dairy

- Current: Milking 12 cows, for 30 gallons of milk per day
- Projected growth: Aiming to cap at 25 cows

Dwayne McIntyre of Goshen Homestead in southwest Virginia successfully utilized a community-sourced investment strategy to fund the construction of a new Grade A microdairy with its own LLC. Dwayne turned to customers of Goshen Homestead's Herdshare program, a variation on a subscription model, to ask for a modest equity investment in the microdairy. Upon conceiving of this investment model, Dwayne wrote a detailed business plan, pitched investors, received the necessary funds, and broke ground on the microdairy, all in a matter of months.

The Story

The McIntyre family owns and operates Goshen Homestead, a diversified farm in Elk Garden, Virginia. The McIntyres grow and sell a variety of animal products, including pastured chicken and turkey, eggs, and products from a grass-based dairy. Goshen's grass-based dairy has been in operation for the better part of a decade, providing fresh, raw milk to members of its Herdshare program. Virginia law allows

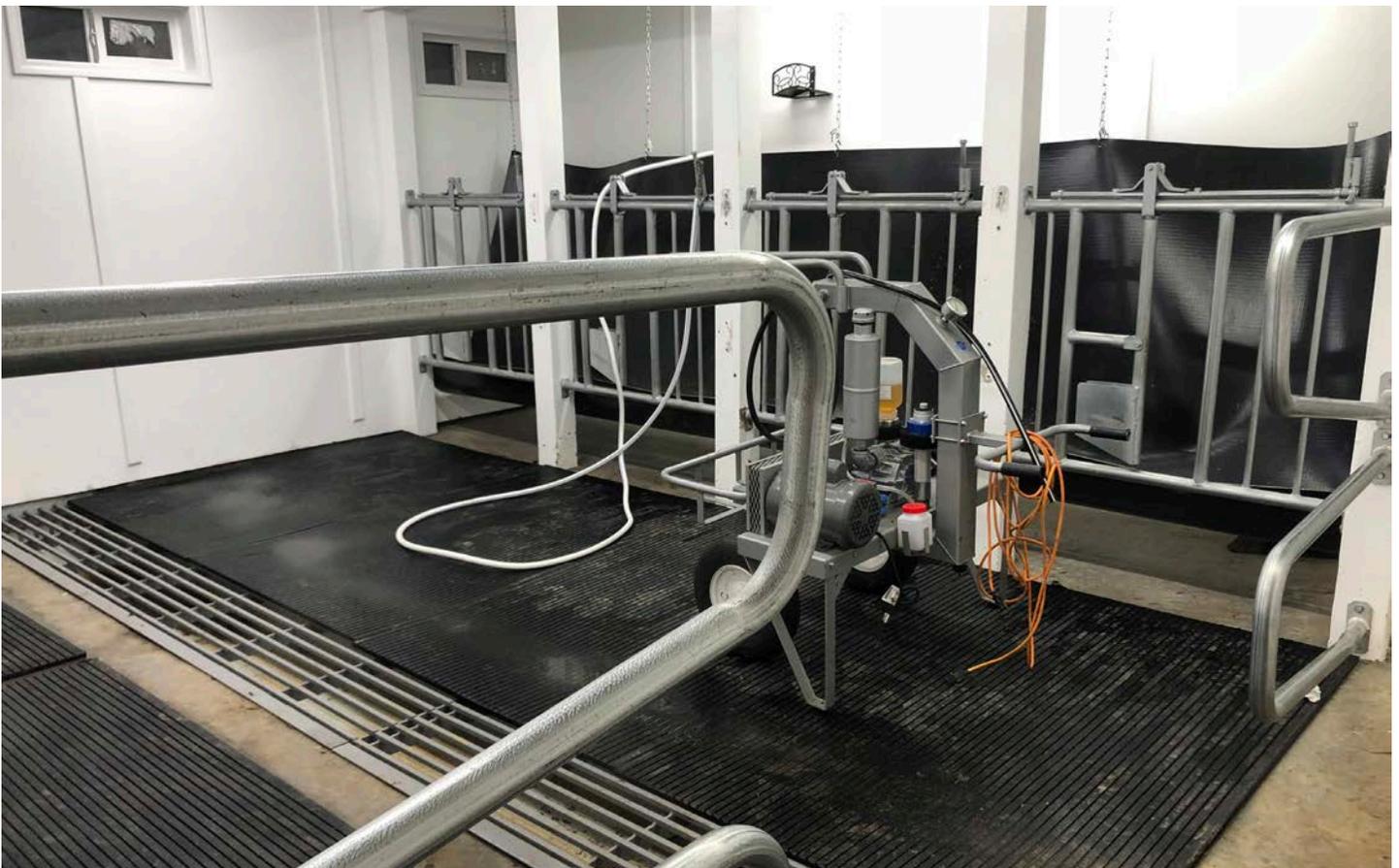
consumption of unprocessed milk from an animal that an individual owns or owns a stake in. Through the Herdshare program, Goshen legally provides raw milk directly to customers who have bought into herd ownership with a modest purchase fee and monthly “boarding fees.”

For years, the McIntyres dreamed of building a microdairy where they could pasteurize milk for sale to local retail stores. Building a regulation-compliant microdairy is a significant capital investment. The McIntyres knew that funding the project was out of their budget and believed that traditional funding options were too risky. About five years into offering the Herdshare program, Dwayne had a chance conversation with a friend who described his experience raising money directly from individual investors. According to Dwayne, the friend’s story was an “aha!” moment for him and inspired Goshen Homestead’s fundraising model.

With this new investment model in mind, Dwayne crafted a business plan for the project. Given the family’s longstanding interest in

starting a microdairy, the McIntyres had years of research to draw on that would serve as the basis for writing a business plan. In a little over a month, Dwayne completed the business plan and made a pitch to family and established Herdshare members. The pitch consisted of one-on-one conversations during which he walked potential investors through the business plan. Reception was overwhelmingly positive, and reaffirmed that the microdairy was a worthwhile endeavor. Within weeks, Dwayne had received the investment he needed to begin breaking ground.

Now in its third year, the microdairy is projected to run a profit by the end of the year. Strong early demand for local dairy is evidenced by the microdairy rarely sitting on excess product in their inventory. Despite early success, the McIntyres plan to organically grow their business, within their means. In Dwayne’s words, “growing too fast can crumble you.”



THE MICRODAIRY AT GOSHEN HOMESTEAD. CREDIT: DWAYNE MCINTYRE OF GOSHEN HOMESTEAD



THE MICRODAIRY AT GOSHEN HOMESTEAD. CREDIT: DWAYNE MCINTYRE OF GOSHEN HOMESTEAD

Equity Investment

The microdairy is a separate legal entity from the farm. In the investment arrangement, each percent share of the company was valued at \$2,000. Eight Herdshare members invested a total of \$50,000, which accounts for 25% ownership of the LLC. Most Herdshare members invested about \$5,000 each, with a couple of members investing more. The McIntyres' extended family invested approximately \$25,000 for an ownership stake just under 15% of the business. The payout matches the percentage of ownership by each investor. After the business begins making a profit, investors will receive the proportion of the annual profit that corresponds to their ownership share. While neither the investors nor McIntyres expect to get rich off the microdairy, in the words of Dwayne, "it could be a nice thing in the next five to ten years."

Sales Channels

The McIntyres sell milk from the microdairy at the weekly Abingdon Farmers Market, the Goshen Farm Store, and to eight local health food stores. Each sales channel brings in about the same amount of weekly revenue. They sell the same volume at the weekly farmers' market as they do each week through health food stores. The McIntyres are hoping to grow sales in the coming years by finding additional retail outlets and diversifying their product offerings.

Conditions for Success

Tight-knit Community With Financial Means

This investment model requires a supportive community with community members that have the financial means to invest without requiring immediate returns on their investment. As Dwayne says, "the foodie community is key." Leveraging a community of individuals who care about local farms and knowing where their food comes from was essential to Goshen's model.

“If this was on a whim, it would have taken years to make this work, but I had put in the research and planning. The way people reacted, it took me back a little bit. It was a good idea.”

Business savvy

Dwayne did the research and had the expertise to draft a highly accurate business plan. “To the penny, my business plan was exactly right. I don’t have any business degrees, but I’m a QuickBooks junkie and love accounting. With farming, I love the financial organization. I felt comfortable showing potential investors the business plan and articulating it. If this was on a whim, it would have taken years to make this work, but I had put in the research and planning. The way people reacted, it took me back a little bit. It was a good idea.”

Construction skills

Dwayne built the dairy himself over the course of several months, which decreased the cost of the project.

Avoiding overinvestment

None of the investors would suffer a significant loss if the microdairy didn’t succeed.

KEY TAKEAWAYS

Community-sourced investment models can share risk as well as profit.

This funding arrangement worked for Goshen Homestead primarily because it’s a shared-risk partnership. If the project were to fail, the McIntyres would not lose the farm.

Shared values and expectations about the pace of growth are key to community-sourced investment.

The McIntyres are working with patient capital. The investors are people who want to make a profit but have reasonable expectations on the timeline and scale of the returns. The investors are motivated by more than simple returns: they also want to help fill a need for a local, value-aligned product that didn’t exist before.

When conditions are in place, capital may be raised quickly.

Goshen Homestead secured investment quickly with a strong business plan and strong network of customer-supporters.

STATE INVESTMENT IN FARM AND FOOD ENTERPRISES



APPALACHIAN HARVEST BOX TRUCK. CREDIT: APPALACHIAN SUSTAINABLE DEVELOPMENT

IN THIS SECTION

- **Western North Carolina Agricultural Options**
- **Kentucky Office of Agricultural Policy**
- **Pennsylvania Department of Agriculture**

State funding support, through grants and loans, represents another relatively flexible funding stream for Appalachian farms and food businesses. Because state funding programs are often connected to the Department of Agriculture or Cooperative Extension Service, funding recipients may have access to technical assistance and business support services alongside a grant or loan. For example, both the Kentucky Center for Agriculture and Rural Development (KCARD) and Western North Carolina Agricultural Options (WNC AgOptions)

leverage state funding to bundle business development services with technical assistance for grants and loans. This assistance is key to ensuring that Appalachian stakeholders have access to these financial resources. The following case studies highlight exemplary programs in three Appalachian states: North Carolina, Kentucky, and Pennsylvania. To be sure, the program profiles that follow do not capture the full extent of state support for farms and food businesses in these three states, nor do they include programs in other states in the Region. Rather, these programs illustrate a diverse set of financing and administration mechanisms that farmers and food business can consider and stakeholders outside these states can examine as models for replication or reimagination.

Western North Carolina Agricultural Options

Western North Carolina Agricultural Options (WNC AgOptions) launched in 2004, funded

by the North Carolina Tobacco Trust Fund Commission (NCTTFC). Since 2012, WNC AgOptions has been managed by WNC Communities, a non-profit organization based in Asheville, North Carolina. WNC AgOptions disburses NCTTFC-funded grants to farmers across 20 western North Carolina counties. Farmers can apply for \$4,000 or \$8,000 and remain eligible to win grants for up to three grant cycles. The opportunity to apply for grant money across multiple cycles allows farmers to expand previously funded projects.

Originally, farmers who had produced tobacco or farmed land that was once in tobacco production were given priority in grant-making, although all farmers are eligible to apply. While supporting the transition from tobacco is a priority, current requirements are less stringent, and grants are disbursed with the more general goal of supporting farm businesses. In 2021, grant applicants were awarded funds across 11 topic areas: agritourism, beekeeping, berries, building, cattle and beef, equipment and supplies, expansion, greenhouse, livestock, processing and production, and vegetables. A total of \$219,000 was disbursed to 38 grant recipients. These categories vary from year to year, depending on the nature of grant applications.

Partnership with North Carolina Cooperative Extension

According to leadership at WNC Communities, North Carolina Cooperative Extension is the backbone of WNC AgOptions. The two organizations partner to provide training, technical assistance, and mentorship to grant recipients. Cooperative Extension staff members are allocated work hours to support WNC AgOptions programming and education. Extension agents make up 80% of the WNC AgOptions Steering Committee. The other 20% is composed of members of the Appalachian Sustainable Agriculture Project (ASAP), representatives of the North Carolina Department of Agriculture & Consumer Sciences (NCDACS), and agribusiness owners.

All WNC AgOptions applicants work with a

county extension agent to submit their grant requests. In addition to providing technical consulting, extension agents help applicants identify farm needs and create a business plan. Each application includes a recommendation from the extension agent. The application review board comprises between 30 and 35 Cooperative Extension staff members, representatives from ASAP, local Soil and Water Conservation Districts, NCDACS, and other local leaders. The board considers 100-120 applicants each year, and generally awards 35-45 grants.

The WNC AgOptions Steering Committee provides an orientation for grant recipients as well as three to six workshops throughout the year, covering topics that range from business planning to soil health to marketing.

Opportunities and Challenges

Awareness of Programs and Reaching Farmers of Color

Most western North Carolina farmers learn about WNC AgOptions through Cooperative Extension. WNC Communities is working to broaden awareness about the funding opportunities by posting flyers in local seed and supply stores and social media promotion. There will be applications available in Spanish for the first time during the 2022 grant cycle. WNC Communities is also working with several organizations that represent farmers of color to reach more applicants from diverse communities.

Relationship Management

The NCTTFC, the sole WNC AgOptions funder, is directed by state legislators who renew the WNC AgOptions funding allocation annually. WNC Communities works to maintain strong relationships with state lawmakers and to advocate for the funding needs of the program. In practice, this includes keeping the NCTTFC informed and involved with the grant-making process, providing extra reporting, and organizing farm visits for NCTTFC leadership to see grant-supported projects.

Kentucky Office of

Agricultural Policy

The 1998 Master Settlement Agreement (MSA) ruling prompted the establishment of the Kentucky Governor's Office of Agricultural Policy—an office within the Department of Agriculture—which administers the Kentucky Agricultural Development Board (KADB) and the Kentucky Agricultural Finance Corporation (KAFC). Both organizations provide grants, incentives, and low-interest loans to farmers and agribusinesses.

Just under \$40 million in MSA dollars was appropriated for agriculture in fiscal year (FY) 2020. Nearly \$3.5 million was directed to the KY Division of Conservation and \$500,000 supported the pandemic-related Farms to Food Banks program. The bulk of the appropriation, almost \$36 million, was distributed through the Office of Agricultural Policy as grants and loans to state and county projects.

The KADB's mission is to “invest funds in innovative proposals that increase net farm income and affect tobacco farmers, tobacco-

impacted communities, and agriculture across the state.” In FY 2020, the KADB approved over \$27 million for about 230 state- and county-level projects and programs. The Board administers the Kentucky Agricultural Development Fund (KADF), which supports multi-county, multi-producer projects with state funding. Larger-scale KADF-supported projects include the Grain and Forage Center of Excellence at the University of Kentucky; the Meat Processing Investment Program; and the On-Farm Water Management and On-Farm Energy Efficiency Incentives Programs, both of which support farmers to improve land and natural resource conservation

For smaller scale projects, producers apply for county-level funding directly to locally-administered county councils. The KADB does the final review of funding applications deemed high priority by county councils. County-level programs include cost-share assistance; support for young farmers; and assistance to community organizations to purchase high-cost equipment to lease to local products.



CREDIT: DEBBIE PHILLIPS, RURAL ACTION

The Kentucky Office of Agricultural Policy oversees two additional loan programs that support small and mid-scale producers. The Kentucky State University (KYSU) Center for the Sustainability of Farms and Families (CSFF) partners with KADF and KADB to provide Small Scale Farm Grants that support aquaculture and aquaponics, organic certification, value-added production, food production in food insecure areas, farmer education, and agroforestry. The Kentucky Highlands Investment Corporation SOAR Loan Fund provides low interest loans intended to support small-scale producers to increase production in order to sell at commercial scale.

Finally, the Kentucky Agricultural Finance Corporation (KAFC) partners with lenders across the state to provide producers and processors access to below-market financing. Participating loans can fund up to half of project costs. KAFC loan programs are available for agricultural infrastructure, value-added processing, beginning farmers, diversification of farming operations, and large animal veterinary practices.

Pennsylvania Department of Agriculture

Pennsylvania Farm Bill

In 2019, Pennsylvania adopted the first state Farm Bill in the nation. The Pennsylvania Farm Bill, modeled after the Federal Farm Bill, allocates a share of the state budget to support agricultural programs. The Pennsylvania Farm Bill directed \$37.2 million to agriculture between 2019 and 2021.

The PA Farm Bill supports agriculture in six priority areas:

1. Resources for agricultural business development and succession planning
2. Building a strong agricultural workforce
3. Reducing regulatory burdens and strengthening the agricultural business climate
4. Increasing processing capacity

5. Creating new market opportunities and investing in organic production
6. Protecting Pennsylvania agriculture

In support of these priorities, the Pennsylvania Department of Agriculture operates 12 grant programs that support the following: youth and agriculture, business development, poultry and livestock, conservation, dairy investment, farm to school, farm vitality, organic production, urban agriculture, very small meat processing, natural resource management, and specialty crop cultivation.

Pennsylvania Fresh Food Financing Initiative COVID-19 Relief Fund

During the peak of the COVID-19 pandemic, the Pennsylvania Department of Agriculture managed the Fresh Food Financing Initiative COVID-19 Relief Fund, disbursing \$10 million in Coronavirus Aid, Relief and Economic Security (CARES) Act funding to grocery stores, meat processors, urban farms, independently owned businesses, and non-charitable food sources. The one-time funding injection assisted the agricultural and food business sector to weather the economic effects of the global pandemic. The entirety of the fund was distributed to 150 programs within three months.

Grant recipients were limited to Pennsylvania direct-to-consumer for-profit businesses, nonprofits, or cooperatives that serve low-to-moderate income customers with affordable, high quality fresh produce, meat, and dairy products, and other healthy grocery items. Projects that source products from Pennsylvania producers were prioritized for grant support. Grant applications illustrated a high demand for infrastructure, particularly cold storage.

This emergency funding was modeled after Pennsylvania's Fresh Food Financing Initiative, a public-private program launched in 2004. The program provides one-time grants and loans to grocery store operators and other food retailers to increase access to healthy, affordable grocery options in under-resourced communities.

KEY TAKEAWAYS

States offer flexible funding opportunities for Appalachian farmers and food businesses.

States can play a meaningful role in providing a range of funding mechanisms and resources for Appalachian farmers and food businesses

Technical support can be embedded in state funding programs.

Collaborative state initiatives that engage state departments of agriculture and other executive agencies, the Cooperative Extension Service, public universities, and non-profit organizations can provide funding tied to accountability, training, technical assistance, and additional modes of support.

Targeted state funding can shepherd agricultural transition.

The Master Settlement Agreement and related support streams provided new sources of agricultural funding in many Appalachian states. This funding incentivized farmers to transition production to new products and markets, and has bolstered the local food economy in the Region. This supported, incentivized transition from tobacco can serve as a model for a transition to more climate-resilient agricultural practices.

Enhance the efficacy of the Region's distribution networks through strategic regional collaboration.

Strategic regional collaboration can mitigate the need for high-cost new infrastructure, and has the potential to deliver economic benefits by expanding market access and improving distribution efficiencies. Aggregating produce grown in the Region can increase the volume and consistency of products, creating a better match between regional supply and wholesale demand. Notably, this opportunity builds on a regional strength and inclination for collaboration. Whether operating at the community level or across an Appalachian subregion, stakeholders described a collaborative environment between food system organizations and individuals.

Challenges to Distribution

Local and regional food distribution in Appalachia can be challenging due to a number of factors, some unique to the Region and others common across the United States. Specific challenges in Appalachia stem from a relatively dispersed producer base, smaller-scale production volumes, mountainous topography, fewer major highways, and disconnection from major markets (i.e., large urban centers). Each of these obstacles can increase the cost of food distribution, leading to higher prices for consumers. In many cases, local and regional produce is not price-competitive with commodity products distributed through national, vertically integrated supply chains that minimize costs through economies of scale. Strategic value chain collaborations, or values-based food supply chain partnerships and transactions, can reduce distribution costs, expand coverage area, and make local and

Key Terms

Agricultural commodities: Undifferentiated agricultural products, generally produced and distributed in large volumes. Commodity products differ from many of the products that flow through local or regional value chains, where source identification, farm branding and identity, and production practices all serve to differentiate products and add market value.

Vertically integrated supply chain: A supply chain in which one enterprise owns or manages the infrastructure, processes, and relationship from production to distribution. Vertically integrated supply chains often increase operational efficiencies and decrease product costs.

Food hub: A facility with a dedicated business management structure that facilitates the aggregation, storage, processing, distribution, and/or marketing of regionally produced foods. Some food hubs are structured as mission-driven non-profits while others are for-profit enterprises.

regional products more price competitive at market.

Effective and Innovative Strategies

Leverage Existing Assets and Resources

Appalachia has significant food system assets and resources. The Region tracks with the U.S. in terms of the number of “registered” food hubs—food hubs that have voluntarily signed up for inclusion in the USDA’s local foods directory—when normalized to both the population and the number of farms in the Region. Food hubs facilitate regional wholesale transactions from farmers directly to retail outlets, restaurants, institutions, and other buyers, referred to here as “wholesale direct sales.”⁹⁶ While the Region’s

⁹⁶ The value of all products, including value-added products, produced and sold for

On Food Value Chains

“A new model of organization is beginning to pop up in the agribusiness sector that seeks to merge social mission objectives with core business operating principles. Known as food value chains, these business arrangements are distinguished by their commitment to transparency, collaborative business planning and exchange of market intelligence and business knowhow among chain partners, and their interest in developing business strategies and solutions that yield tangible benefits to each participant in the system. External factors that have contributed to the rise of food value chain enterprises in recent years include the growing segmentation of the consumer market, escalating demand for specialized, highly differentiated food products—even at higher price points—and the increasing appeal of food items that are produced in accordance with desired social or environmental welfare standards. The advent of low-cost communications technology has made possible new collaborative approaches to business management and oversight that operate according to a set of shared operational and ethical principles, founded on the idea of maintaining steady and open communication among all chain partners.”

From *Food Value Chains: Creating Shared Value to Enhance Marketing Success*. USDA, May 2014.

food hub infrastructure roughly tracks with the U.S. (in terms of number of food hubs), the Region’s wholesale direct sales are lower than the national average: the wholesale direct share of total agricultural sales is 1.3% in Appalachia

human consumption directly to retail markets, institutions, or food hubs for locally or regionally branded products. Example buyers include supermarkets, restaurants, caterers, independently owned grocery stores, food cooperatives, K-12 schools, colleges or universities, hospitals, workplace cafeterias, prisons, food banks, etc. (Definition from USDA Census of Agriculture 2017, Appendix B.)



MEAL PREP IN CENTRAL KITCHEN AT ATHENS FOOD VENTURE CENTER. CREDIT: ACENET

Wholesale Direct Sales

Wholesale direct sales as a share of total agricultural sales are:

1.3% in the **Appalachian Region**
and
2.3% in the **United States**.

compared to 2.3% nationally. Only the Northern subregion exceeds the national average. The Northern subregion ranks the highest among Appalachian subregions for fruit and vegetable sales, direct-to-consumer retail sales, value-added product sales, and organic sales, as a proportion of total agricultural sales. Together, these indicators suggest that local food supply chains within the Northern subregion are relatively well developed, which is likely related to close proximity to major urban markets, including Boston, New York City, and Philadelphia.

The food hubs currently operating in the Region are an important foundation of infrastructure, knowledge, and experience upon which to develop more robust supply chains and increase wholesale direct sales in the Region. Identifying, leveraging, and growing both physical infrastructure, like trucks and warehouse space, and “soft” infrastructure, such as relationships and networks, is an important next step to building regional supply chains. One stakeholder suggested developing comprehensive maps of

regional food system assets, including farms, distributors, processing and storage facilities, technical assistance providers, and other sources of knowledge and expertise. These food system asset maps could assist value chain participants in identifying existing assets.

Collaboration and partnership offer an opportunity to strategically use existing resources and assets in organizations and communities, which requires significantly less capital investment than building an entirely new mid-scale supply chain infrastructure. For individual farmers or distributors, collaborative infrastructure and equipment sharing could provide an alternative to investing in refrigerated trucks or cold storage capacity, which can be cost prohibitive. Accessing cold storage, for example, can unlock market opportunities, allowing farmers to sell wholesale instead of, or in addition to, direct-to-consumer sales. Strategic partnerships can connect producers in areas of high production with consumers in areas of lower production for a given product (e.g., connecting vegetable growers in Northern Appalachia with consumers in Central Appalachia). These examples illustrate how collaborative efforts can expand the use of existing assets to increase access to distribution networks and provide economic benefits for Appalachian producers.

Fund Value Chain Coordination to Strengthen Regional Collaboration

One critical element of effective regional collaboration is value chain coordination activities, including organizing producers and wholesalers to access new markets, technical assistance, event organizing, and catalyzing innovative ideas. In well-coordinated value chains, there is sufficient trust and transparency for farmers to know how much to grow for a given market and for buyers to be assured of corresponding product availability. A working relationship and active communication between producer and buyer reduces risk for both parties. At the regional level, demand forecasting and production planning can enable Appalachian producers to optimize local food sales within the Region. Specific coordination

On the Impacts of Value Chain Coordination

“Do we fully understand the economic impact of value chain coordination? Typically, we might look at increased farm sales, number of new customers, new jobs created or maintained, etc., to begin evaluating their benefit to local economies. What about other indicators, such as acres of farmland preserved because farms found a way to stay competitive in the marketplace and increase revenue? Or, how many trucks were removed from traffic (saving time, reducing emissions, and degradation to transportation infrastructure) due to shared aggregation and distribution? What about the ton of food waste diverted to institutional buyers instead of ending up in landfills? Studying the impact of value chain coordination on our local food economy would deepen our understanding and strategies of how we plan and finance endeavors to effect positive change in our future food system.”

From *Taking a More Holistic Approach to Food Hub Feasibility: Measuring the Impact of Value Chain Coordination*. Ag Innovations, July 2019.

mechanisms include buyers' groups and contract growing. Value chain coordination activities are also important for linking smaller producers to larger supply chains, increasing both the diversity of product offerings and local foods supply for wholesalers and retailers.

Value chain coordination responsibilities can be carried out by a range of entities, including government agencies, nonprofits, and businesses. For example, Indiana University was awarded a USDA Local Food Promotion Program grant, which funded four new value chain coordinator positions housed at a city government office, two nonprofits, and a private business. Depending on the host organization, value chain coordination activities may involve creating new roles or expanding existing roles.

While coordination is essential for efficient value chains, individual businesses may not have the capacity or perceive an immediate market incentive to implement coordination activities themselves. Numerous stakeholders in the Region emphasized the importance of prioritizing investment in value chain coordination activities that build food system and workforce capacity at the local and regional levels.



KT OF KT'S ORCHARDS, HARVESTING HONEY. CREDIT: KT'S ORCHARDS

Targeted Physical Infrastructure Investments

While strategic collaboration and value chain coordination are important to improve the utilization of existing infrastructure, there are cases where targeted investment in additional infrastructure may be necessary. Physical infrastructure investments should be aligned with community-identified needs to ensure community buy-in and utilization. Finding synergies between asset users can increase utilization rates, efficiencies, and prospects for financial sustainability. For example, the construction of a new food pantry could also serve as a community aggregation point. Stakeholders across the Region expressed a

need for additional processing, cold storage, and aggregation infrastructure to bring local and regional farm products to regional markets. Determining whether a specific infrastructure project should be constructed requires a thorough planning process that includes evaluation of existing assets, feasibility assessment to understand the potential impacts and financial sustainability of the project, and consideration of different ownership structures.

A COLLABORATIVE FOOD HUB: TURNROW APPALACHIAN FARM COLLECTIVE



BOX TRUCK UNLOADING. CREDIT: TURNROW APPALACHIAN FARM COLLECTIVE

KEY PROJECT STATS

Total Sales 2017-2020: \$1.4 million

- 2017 Sales: \$155,000
- 2018 Sales: \$220,000
- 2019 Sales: \$325,000
- 2020 Sales: \$700,000*

2020 Revenue

- Total: \$1.3 million
- Sales: \$700,000
- Grants: \$600,000

Number of Farmers and Value-Added Producers Served: 140+

Number of Customers Served

- 994 direct-to-consumer (retail, or B2C) customers in 2020
- 120 wholesale (B2B) customers between October 2019 and October 2020

Number of Aggregation Sites across WV: 7

Number of Refrigerated Trucks: 4

*Turnrow leadership attributes the dramatic growth in sales for 2020 to the COVID-19 pandemic. In addition to a few large wholesale orders, online sales increased as local residents sought alternatives to going to the grocery store before many stores started offering delivery or curbside pickup. Turnrow projects that 2021 sales will approximate 2020 sales but not grow significantly.

Turnrow Appalachian Farm Collective is a West Virginia food hub that aggregates local agricultural products and manages logistics, sales, and distribution to non-profits, institutions, business, and direct retail customers throughout West Virginia, southern Virginia and the Washington, D.C. area. Turnrow launched in 2017 as a collaborative venture among nine nonprofit, government, and farm partners. The partnerships that constitute the food hub are informal, with roles and responsibilities vis-à-vis specific grants outlined in Memoranda of Understanding (MOU). Direct ownership and management of all food hub assets (e.g., staff, buildings, trucks, software licenses, computer hardware, warehouses, and cold storage facilities) are distributed among the partners. Upon formation, each partner organization contributed existing assets and capacity to support food hub activities and capacity that would not have been possible for a single organization to execute without significant financial backing. Sprouting Farms, a

Turnrow's partner organizations each contribute assets and capacities to enable food hub functions that would not have been possible for any individual partner organization to execute on their own.

West Virginia non-profit, manages Turnrow's finances and provides the largest share of staff. The food hub serves individuals and wholesale customers through their online farmers' market and wholesale sales channels.

Turnrow was established to "connect farmers from different corners of West Virginia through a vision of a more equitable and just food system that serves West Virginia communities."

Sales Channels

Turnrow's sales are divided into two sectors: business to consumer (B2C) and business to business (B2B). B2C sales are facilitated through Turnrow's online farmers' market, which allows producers to list their products as they become available, with prices and inventory. In 2020, meat and vegetables were the leading sales categories, with baked goods, value-added products, and eggs as lower volume sales categories. A large share of the producers who sell directly to consumers using Turnrow's platform are part-time farmers—"farming is their 3rd job"—or value-added producers.

Through their online market, Turnrow does not take ownership of the product. They allow each farm business to curate the selection of products available through the online market and set their own pricing. Turnrow collects 20% of all online farmers' market sales to cover expenses associated with administration, aggregation, and distribution. Online farmers' market transactions are automated through the online market system. The B2C channel accounted for about 40% of total sales in 2019 and 2020. Online sales fluctuate due to changes in product availability and consumer demand. For example, during summer 2021, online farmers' market sales decreased due to

competition with in-person farmers' markets for both customers and product.

For B2B sales, Turnrow purchases product from producers and sells to wholesale customers with a 20% markup. Wholesale producers are required to meet packing and food safety guidelines in accordance with regulations and buyer specifications. To support producers with packing and food safety compliance, Turnrow has a production manager who provides farmers with one-on-one technical assistance. Wholesale sales require production agreements between the producer and food hub that outline both product volume and price point. A small core, or approximately 10% of the network of farmers that sell product to Turnrow, are midsize to large-scale operations, with the remainder of the producers generally farming part-time or at a much smaller scale.

Wholesale sales accounted for about 60% of total sales in 2019 and 2020. Wholesale sales break down into the following market categories: institutions (schools, hospitals, food access, and universities), grocery and corporate accounts (grocery stores, catering, food service suppliers, etc.), and specialty wholesale (restaurants, boutique grocers and retailers, events, etc.). Turnrow serves a diverse range of markets to hedge against volatility in any given market category. The food access market channel (food banks, etc.) accounts for nearly one-third of B2B sales and is Turnrow's most lucrative and easiest market to serve. The food banks, educational programs, and other buyers (e.g., pop-up markets and childcare centers) in this category have minimal packing requirements and often request a mix of fresh products at a particular weight, rather than ordering specific items. On the other hand, because this market channel is primarily grant-funded, Turnrow finds it is difficult to predict how revenue will change as grant cycles begin and end. Of the wholesale market categories, Turnrow finds that specialty wholesale accounts (e.g., restaurants, retail stores) are the most challenging to work with given the product specifications of chefs and store managers and the frequent staff turnover in the sector.



PRODUCE BOXES ON DOLLY. CREDIT: TURNROW APPALACHIAN FARM COLLECTIVE

Distribution Logistics

Each week, Turnrow partners aggregate product from their West Virginia subregions. Drivers of four refrigerated trucks meet at a small facility in the center of the state to exchange product, then return to their home regions. Products are stored overnight in Turnrow's seven small warehouse facilities and delivered the following day. Turnrow's collaborative model is evident in this approach to distribution, which leverages staff, trucks, and warehouse facilities held by Turnrow partners. While aggregating product from small and midsize producers to serve wholesale buyers is a core function of food hubs, it can also present a challenge. To meet demand, Turnrow partners source product from farmers throughout the state; finding additional production that tracks with Turnrow's growth trajectory proves more challenging each year. According to one of Turnrow's co-directors, the food hub needs to add more large farms to their network and source larger volumes from current, core producers in order to meet demand and approach financial sustainability. Logistics and

Key Partners in Turnrow Appalachian Farm Collective

- Sprouting Farm
- Refresh Appalachia
- Kanawha Institute for Social Research & Action/ Paradise Farms
- Garrett Growers
- New Roots Community Farm
- Blue Acre Aquaponics
- West Virginia University Center for Resilient Communities
- Appalachian Sustainable Development
- Grow Ohio Valley

distribution efficiencies make large volume purchases more cost effective, which can contribute to the financial sustainability of the food hub model.

Funding Model

Turnrow's funding model is collaborative in nature with partner organizations contributing financing, equipment, and infrastructural resources. The initiation of the food hub included significant public investment, primarily from ARC and the USDA, with additional support from the U.S. Department of the Interior and foundation grants. A large portion of Turnrow's operational budget is currently supported by grant funding, which is a challenge because staff capacity can be strained by ongoing grant applications and reporting requirements alongside day-to-day food hub operations. With their current sales revenue, Turnrow can manage weekly cash flow, repair infrastructure, and pay for some operating expenses such as gas, insurance, packaging, and fees. The food hub is now looking to acquire investment capital that will allow the organization to focus on business management and efficiency to improve the financial independence of the organization and reduce reliance on grant funding.

KEY TAKEAWAYS

A collaborative model lowers barriers to entry for a new food hub venture.

The collaborative food hub model allows several organizations that offer some food hub functions to contribute resources and assets to grow operations and capacity. Leveraging existing assets enables the distribution of local food at a scale that could otherwise only be achieved by a food hub with significant financial resources.

While it offers some benefits, the collaborative food hub model also brings distinct challenges.

Establishing alignment among the founding partners was an initial challenge: for the food hub to succeed, each organization must prioritize their shared mission. Even with a common goal, Turnrow leadership and staff are stretched thin between food

hub operations and responsibilities at their “home” organization. Each partner contributes different resources and functions that reflect their organization’s core work and capacity, which can also be a challenge to balance. Securing flexible investment is also an ongoing challenge faced by many food hubs.

Building local food supply is necessary for growth.

Aggregating sufficient product to meet demand is another ongoing challenge. Turnrow aims to source more product from existing farmers in addition to establishing relationships with additional large growers. To achieve financial sustainability goals, Turnrow aims for \$3.5 million in sales. As a bright spot, through their experience with Turnrow, large producers have adopted a collaborative approach to supporting the growth of smaller farmers by building the market for local products.

Eastern Food Hub Collaborative

Founded in February 2020, the Eastern Food Hub Collaborative is a network of food hubs across the eastern United States. The network grew out of a several-day convening intended to connect the region’s food hubs, build trust, and imagine what value a food hub collaborative could provide. The meeting produced a memorandum of understanding (MOU) that outlined a shared commitment regarding common goals, values, principles, and best practices formally defining the Eastern Food Hub Collaborative. Organizing principles outlined in the MOU include the following: (1) voluntary and open membership; (2) active economic participation by members (i.e., engaging in transactions, including one-way trade); (3) open and transparent information sharing; and (4) concern for community and public awareness of resilient food systems. The purpose of the Collaborative is “to improve market opportunities for farmers and increase equitable access to good food by leveraging food hub collaboration, best practices, financially sustainable transactions, and transparency.”

To date, the Collaborative comprises 14 hubs, extending from South Carolina to Maine. Notably, two of the member hubs, Turnrow Appalachian Farm Collective and Appalachian Sustainable Development, are located within Appalachia.

Collaboration between hubs within the network varies greatly depending on hub-specific priorities and needs. This includes trade partnerships for some hubs and resource and knowledge sharing for others. The Collaborative has a shared online platform for communicating opportunities for trading goods or posing general operational questions (e.g., How do other food hubs compensate drivers, or how have other hubs updated mask requirements in response to an ever-changing pandemic?).

The Opportunity for Networking Food Hubs

The Collaborative provides member food hubs the opportunity to expand both producer networks and market access. Each member hub has relationships with producers and buyers that can be leveraged through partnerships with other hubs to offer unique products, help meet order volumes, extend seasonal product availability, and/or expand distribution capacity. In the future, collaboration between hubs with overlapping or adjacent service geographies might make it possible for a micro-network of hubs to serve high-volume institutional contracts that may have been out of reach for one individual food hub.

In 2019, the network’s food hubs collectively represented nearly \$27 million in annual sales of local food sourced from more than 600 independently owned farms and producers.

FARM AND FOOD BUSINESS INCUBATION: ACENET FOOD VENTURES CENTER AND FOOD AND FARM ENTERPRISE CENTER



THERMAL PROCESSING ROOM AT ATHENS FOOD VENTURE CENTER. CREDIT: ACENET

KEY PROJECT STATS

2018 Revenue: \$1,117,000

Dedicated Food Facilities:

- 1996: 9,000 sq ft
- 2021: 30,000 sq ft

Food and Farm Clients:

- 1996: 40
- 2021: 150+
- Total: 400+

Founded in 1985, the Appalachian Center for Economic Networks (ACEnet) is a community-based economic development organization working to strengthen the economy of Appalachian Ohio. A large portion of the organization's work is dedicated to improving opportunity for the region's food sector entrepreneurs. ACEnet's food sector work focuses on providing food business incubation and support services for small food enterprises, processing entrepreneurs, and farmers through

the Food Ventures Center located in Athens and the Farm and Food Enterprise Center in nearby Nelsonville, Ohio.

The Food Ventures Center was founded in 1996 as one of the first rural kitchen incubator programs in the United States. In the early 1990s, ACEnet identified a need for food enterprise infrastructure after serving farmers, farmers' markets, and foodservice operators since the organization's formation. At that time, the kitchen incubator model was a new strategy for rural development and required years of planning before opening the Food Ventures Center. ACEnet's planning efforts included developing the business model, site selection, building renovation, and securing capital, which allowed the center to hit the ground running and accommodate 40 farm and food businesses in its first year of operation. The Food Ventures Center provides new and expanding food entrepreneurs with the facilities and equipment to grow their businesses without the high overhead costs for purchasing or renting

dedicated facilities, equipment, and required licenses. Furthermore, the co-location of food microenterprises allows entrepreneurs to share resources, experiences, and occasionally jointly purchase materials for their businesses. Over the course of 25 years, ACEnet has supported over 400 farm and food businesses—impact made possible, in part, by the addition of the Farm and Food Enterprise Center in Nelsonville in 2006, which increased ACEnet’s programmatic capacity for nurturing growing food businesses.

ACEnet offers business support, market access, regulatory training, capital access, and workforce development services to complement its food business incubation equipment and facilities offerings. Business support services include business counseling, workshops, and webinars. Regulatory support helps clients to navigate and comply with the often complex regulations required to operate a food business. The organization also provides workshops, one-on-one assistance, and connections to buyers to support businesses with their marketing needs. Many of the businesses that ACEnet serves have capital needs. The organization commonly provides technical assistance and one-on-one support to access capital, and in recent years, ACEnet has established a microgrant program to provide additional support for their client food businesses. Workforce development services include skill-building workshops for food safety and manufacturing to better position local residents for workforce reentry and simultaneously support businesses in finding skilled workers.

Athens Food Ventures Center

The Food Ventures Center is a shared-use commercial kitchen located in Athens, Ohio. The 12,500-square-foot facility houses a central kitchen, dry packaging room, thermal processing room, and warehouse. Equipment available in the central kitchen runs the gamut: including stainless steel prep tables, a fermentation room, and commercial scale electric mixers. The thermal processing room is typically used to produce jams, preserves and other products that require heating before packaging. Walk-in coolers, freezers, and storage

space are available in the warehouse with access to several drive-up loading docks. On average, 65 food entrepreneurs rent or pay for services at the Athens facility annually.

Nelsonville Food and Farm Enterprise Center

Purchased in 2006, the 98,000-square-foot mixed-use Nelsonville facility goes beyond food enterprise support to include a shared-use woodworking center. The primary uses of the Food and Farm Enterprise Center are for processing, bottling, storage, and distribution. The facility includes an Ohio Department of Agriculture (ODA) licensed and inspected vegetable prep and processing room and an ODA-licensed and inspected meat processing room. Eight drive-up loading docks are used for moving product in and out of the facility. Approximately 15 to 18 food and farm enterprises use the Nelsonville facility annually for meat processing, vegetable micro-processing, flash freezing, produce grading, labeling, packaging, warehousing, and regional distribution.



POTATO GIVEAWAY. CREDIT: ACENET

Funding Model

ACEnet's work is funded by a combination of grant funds, rent, and fees for services. Federal, state, and foundation grants are the primary source of funding, comprising 50% of total revenue. Funding ACEnet's food sector work involves securing large grants through the ARC-funded Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative, many USDA programs, the Small Business Administration, and a wide range of public funding from state and local governments. Local, regional, and national philanthropy partners have also made considerable grant contributions to grow

ACEnet's food sector services. The second largest revenue stream (about 35% of total revenue) is rent from tenant businesses at their facilities. ACEnet staff also provide contract services supporting other rural communities to assess and design facility models. Fees for services offered to food enterprises and consulting services each constitute less than 10% of the organization's total revenue.

About two-thirds of the organization's grant revenue typically goes to support food and farm business support programs.

KEY TAKEAWAYS

The combination and integration of food business resources has been critical to the success of ACEnet's incubation programs.

In the words of ACEnet's Director of Programs, Leslie Schaller, when designing a program, "It shouldn't be 'build it and they will come'. Infrastructure is essential but you can't rely solely on infrastructure being the primary leverage point." Beyond providing the physical space for equipment and production, ACEnet also provides a range of business support, market access, regulatory advisement, capital access, and workforce development services. Providing affordable facilities with complementary business support services creates an ecosystem of support that increases the chances of success for entrepreneurs.

Expansion of facilities and services has occurred incrementally over a period of years in response to the needs of clients and other local businesses.

ACEnet's growth has been successful and sustainable because its expansion of facilities and services has grown organically in response to the needs expressed by their

food business clients. ACEnet has four staff members who are consistently visiting the facilities and arranging one-on-one meetings to ensure clients' needs are met and to ask them for their "wishlist of equipment." Before expanding programming or equipment capacity, staff host a series of workshops and interviews with their food business clients to determine whether an investment should be made.

Cultivating beneficial partnerships over a period of decades has benefited the financial stability of ACEnet.

ACEnet emphasizes the importance of collaboration with mission-aligned organizations to both the success of their work and financial stability. Collaboration with partner organizations has been key to developing a diversified funding stream. The organization commonly partners with other organizations on grant opportunities, sometimes taking the lead on a project and other times partnering as a sub-awardee. These partnerships have helped ACEnet develop a network of advocates who support the organization. ACEnet credits their membership in the Central Appalachian Network (CAN) as important to the organization's success.

EmPOWERing Mountain FOOD Systems

EmPOWERing Mountain Food Systems (EMFS) is a four-year project focused on expanding opportunities for food and farm businesses in southwestern North Carolina. The project is funded by ARC, North Carolina State University Cooperative Extension, and the Cherokee Preservation Foundation. The team is hosted by the Eastern Band of Cherokee Indians Cooperative Extension office and coordinated in partnership with the Center for Environmental Farming Systems at North Carolina State University. The program connects food and farm businesses with small grant funding opportunities up to \$3,000 and matching funding for certain loan packages. Workforce development and technical training are provided in partnership with the Small Business Centers at three community colleges. The EMFS project has invested over \$95,000 for loan cost share, COVID supply chain relief, and equipment and supplies. The EMFS project has also leveraged private investment totaling \$873,000 (as of November 2021) from Partner Community Capital and farmers investing in their businesses. Leveraged private funds have primarily supported the development of supply chain and on-farm infrastructure, including cold storage, high tunnels, and processing equipment for meat and dairy.



EASTERN BAND OF THE CHEROKEE INDIANS FARMER JOHN DUGAN WITH THE CLIMATE-CONTROLLED TRAILER HE RECEIVED. CREDIT: EMFS

Build and strengthen supply chain networks and partnerships supporting animal-based agriculture.

Animal agriculture is a key driver of the Appalachian food economy and leads the Region’s agricultural sales. Poultry and eggs are the top farm products in the Region by sales, followed by cattle and calves, milk, corn, and soy. There is an opportunity to build on this strength to contribute to a more resilient, robust, and thriving local food economy. Promising models in animal agriculture use sustainable and humane production practices to make farming operations more climate resilient and create niche markets. Collaborative development of processing, storage, transportation, and systems infrastructure have the potential to position meat supply chains to retain more economic value in the Region.

Animal Agriculture

Animal agriculture refers to the production of beef, pork, poultry, and other meats as well as eggs, dairy, and other animal products.

Animal Production Assets in Appalachia

Animal and animal product sales comprise nearly 75% of agricultural sales in the Appalachian Region, compared with about half of all U.S. agricultural sales. Southern Appalachia leads the Region’s animal product sales, driven by a high concentration of poultry and egg production. Dairy products drive sales in the Northern subregion, which has the second highest animal product sales in Appalachia. Cow-calf sales lead the meat sector in Central Appalachia. Operators of cow-calf farms or

Top 5 Agricultural Products in the Appalachian Region



ranches keep a permanent herd of cows to produce calves for sale. Calves are raised, usually on pasture, until they reach 400 to 600 pounds, then sold to a feedlot or cattle stocker, usually outside Appalachia, where they grow to a processing weight of about 1,100 pounds. Although these product sectors account for major portions of the Region’s agriculture sales, their products do not necessarily contribute to or move through local or regional supply chains; for example, much of the poultry production in Southern Appalachia is connected to national supply chains, feeding consumers far beyond the boundaries of the Region.

Smaller-scale animal agriculture producers, many of whom focus on niche products, sell directly to consumers in the Region in addition to grocers and large wholesalers serving mid-scale supply chains.

Many Appalachian animal farmers use regenerative agricultural practices in conjunction with grazing and breed selection. Some heritage breeds have characteristics particularly well-suited for grazing, foraging, “putting on weight,” and maintaining health without the use of medications and grain supplements. However, breed selection involves

Regenerative Agriculture and Bioregionalism

Regenerative agriculture builds soil health over time while sequestering atmospheric carbon through the implementation of specific agricultural practices. Regenerative practices manage soil in accordance with the following soil health principles: maintain soil cover, minimize soil disturbance, promote plant diversity, maintain a continuous living root, and integrate livestock. Common regenerative agricultural practices include cover cropping, rotational grazing, and reduced or no-till farming.

Several stakeholders identified the characteristics of the Appalachian bioregion—its microclimates and ecosystem—as assets for meat production. A bioregion refers to an area of land bounded with natural features like mountains or streams. Appalachia's high elevations and cool summers create the conditions for high-quality pasture, making it well-suited for grazing-based animal agriculture. One stakeholder suggested that bioregionalism offers benefits beyond creating more resilient and sustainable food production systems: community and consumer education about the unique qualities of agriculture in the Appalachian Region can raise interest and awareness about farming, and grow a loyal clientele.

trade-offs, and some Appalachian producers prioritize ease of handling over regional suitability.

Challenges to the Appalachian Animal Agriculture Sector

Meat supply chains are complex, with substantial infrastructure and regulatory requirements from production through processing, distribution, and sales. In Appalachia, the most significant challenge to growing robust regional meat supply chains is the availability of processing facilities. Animal processing refers to the function of turning an animal into an edible product, from slaughter to butchery to packaging and storing. Stakeholders indicate insufficient capacity for small-scale animal processing in the Region, and data supports this impression when benchmarking against the U.S. as a whole. For example, for every 1,000 farm operations (of any size) with poultry sales, the U.S. has 4.6 small or very small poultry processing facilities, while the Appalachian Region has half that (2.3 facilities per 1,000 poultry farms). The gap is even wider for beef: while the U.S. has 9.5

Number of Poultry Processing Facilities

For every 1,000 farm operations (of any size) with poultry sales, there are:

4.6 small or very small poultry processing facilities in the **United States** and

2.3 small or very small poultry processing facilities in the **Appalachian Region**.

Number of Beef Processing Facilities

For every 1,000 farm operations (of any size) with cattle sales, there are:

9.5 small or very small beef processing facilities in the **United States** and

1.3 small or very small beef processing facilities in the **Appalachian Region**.

small or very small beef processing facilities per 1,000 farms with cattle sales, Appalachia has just 1.3. Strained processing capacity means longer distances between farmer and processor, higher transportation costs, difficulty scheduling processing appointments, and more complicated supply chain logistics.

Appalachian meat producers need dependable processing facilities to strengthen regional supply chains. Well-planned, strategically located meat processors have the potential to close a gap in the supply chain, retaining the economic value of a larger share of the animal production cycle in the Region through job growth and returns to Appalachian businesses. While there are clear benefits to growing meat processing capacity in the Region, realizing those benefits through a new processing facility requires significant planning and, in the words of one stakeholder, “due diligence” in securing market relationships to ensure that processing volumes are sufficient for financial viability.

In addition to processing capacity, challenges to growing robust meat supply chains in the Region include regulatory compliance, labor sourcing, and educating consumers.

Processing facilities often require expert assistance in developing and maintaining food safety protocols and precautions including, for example, Hazard Analysis and Critical Control Point (HACCP) and Sanitation Standard Operating Procedures (SSOP) plans. Cooperative Extension, nonprofits, and independent consultants provide these services, but access is limited due to inadequate dissemination of information about available assistance and necessary funding.

Growing or diversifying production to meet consumer demand can increase regulatory compliance challenges, particularly when producers do not have sufficient training or resources to navigate and address requirements. Because some regulatory reporting is completed per animal, increasing

production requires more administrative time for record keeping. At the farm level, increasing production scale can create pressures that may lead producers to use less sustainable practices.

Finally, regulatory requirements vary significantly across states. For example, some Appalachian states allow on-farm poultry processing up to a maximum number of birds per year for in-state sales. The maximum ranges across states from a few thousand birds to as many as 20,000. Other states require all animals be processed at a state- or federally-inspected facility. The Cooperative Interstate Shipping Program, managed by the USDA, allows animal products processed at some state-inspected facilities to be transported across state lines and internationally (which generally requires federal inspection). While this program creates some efficiencies, it also adds a layer of complexity to understanding the processing landscape.

Improved training, higher wages, and consistent, year-round work could address some of the



CREDIT: HICKORY NUT GAP

labor challenges in the meat processing sector. Due to reproduction and growth patterns, there are processing “seasons” for many species, including poultry, rabbits, goats, and sheep. This seasonal pattern presents labor challenges. Employees may not return season after season or may require a training refresh when returning to the job. Diversified processors that work with a variety of animals, and particularly larger animals such as cattle and hogs that have a much slower growth rate and a more year-round birthing cycle, tend to offer year-round employment opportunities, which can aid in securing a dependable, well-trained workforce.

Finally, consumer education is a key component of growing regional animal agriculture. Increasing the visibility of animal agriculture and raising consumer awareness about animal welfare practices are crucial to building consumer engagement with the local food economy.

Effective and Innovative Strategies

Expand the Capacity of Infrastructure in the Region

Expanding the capacity of the Region’s animal processing infrastructure can increase producers’ ability to meet market demand. Animal farmers in the Region operate at a range of scales. Some large-scale farming operations slaughter and process animals in their own facilities, often for wholesale markets. Others offer diversified products through community supported agriculture or farmers’ markets and typically operate at a smaller scale, sending animals to be processed off-site and return packaged for sale. Both wholesale and retail customers expect consistent, familiar cuts of meat and high-quality standards for packaging, food safety, and presentation. Increasing the availability of animal processing facilities alongside regional coordination and communication between processor and producer could help increase processing capacity and build a consistent schedule and volume of clients for local and regional processors.

Wholesale customers generally require higher

volumes, and aggregation across farms can be an effective way to meet wholesale demand. Additional cold storage and distribution infrastructure would strengthen these mid-scale supply chains. Stakeholders suggested that local economic development leaders examine existing infrastructure to determine which facilities could be rehabilitated to address gaps in meat distribution and storage. One potential strategy for growing infrastructure capacity is building a network of satellite storage and distribution facilities around a central processing site. Several meat sector stakeholders identified this as a viable option for the Region. (See Value Chain Coordination Opportunity on page 86.)

Consensus from stakeholder conversations points to the need for a feasibility study to investigate options for investing in new or renewed animal agriculture sector infrastructure. Targeted research could inventory existing infrastructure and other community assets that might support processing and distribution, and identify partnerships to anchor the development of regional supply chains that retain the economic value of animal processing and animal products in the Region.

Support Regulatory Compliance

Effective training and support for navigating federal regulations is essential for successful local and regional animal agriculture. The USDA and the Food and Drug Administration (FDA) regulations for meat production and processing are complex. Stakeholders noted that federal compliance accounts for a large amount of administrative work and day-to-day business operations. Regulatory compliance becomes particularly demanding when businesses diversify their product mix or sales volumes, or when new regulations are implemented for existing products. In some cases, regulatory requirements are prohibitive and result in producers either reorienting their business model to comply or ceasing production altogether. With technical assistance, business owners may learn strategies to navigate federal requirements with greater ease and confidence.

SUPPLY CHAIN PARTNERSHIP: MARKSBURY FARM MARKET AND HICKORY NUT GAP



CREDIT: HICKORY NUT GAP

Strong relationships and trusted partnerships can provide a foundation for successful local food businesses. Marksbury Farm Market, a meat processor and supplier based in eastern Kentucky, and Hickory Nut Gap, a regional meat producer and retail brand in western North Carolina, share a focus on animal welfare, food safety, and regenerative agriculture. These businesses work together as supply chain partners and trusted colleagues to produce high-quality, local meats in the Appalachian Region and along the East Coast.

Marksbury Farm Market

Marksbury Farm Market, established in 2010, is a meat processor based in Lancaster, Kentucky. In addition to distributing their own branded products through a farm store, restaurant, and wholesale channels, Marksbury provides third-party processing services to beef, pork, and lamb producers who sell meat under their own brands. Wholesale distribution of branded Marksbury Farm products and fee-for-service processing comprise most of Marksbury Farm Market's revenue.

Marksbury consistently partners with 10 to 15 anchor producers who raise animals for their wholesale product line. In addition, they occasionally source animals from up to 100 additional farmers each year, to process and sell under the Marksbury Farm brand. All of the farmers who produce meat for Marksbury's brand are located in Kentucky. Marksbury Farm products are sold at Whole Foods, independent and cooperative grocery stores, restaurants, and other food businesses across Kentucky, Tennessee, Ohio, Indiana, and Pennsylvania, and distributed through Sysco, US Foods, and Wal-Mart.

About 80% of Marksbury's fee-for-service processing business is supported by a dozen farms. Marksbury processes the animals and packages the meat, which is then distributed by the producers under their own brands. One-off customers provide the additional 20% of fee-for-service income. Marksbury works with producers from Kentucky, Ohio, Pennsylvania, West Virginia, Virginia, the Carolinas, Georgia, Alabama,

Indiana, Missouri, and South Dakota.

In 2020, Marksbury stopped processing poultry due to costs and changes to their business model during the COVID-19 pandemic.

Conditions for Success

Marksbury's leadership cites the relationship with Whole Foods as a major milestone for their success. In 2009, Whole Foods began implementing new standards for sourcing animal products with a focus on purchasing meat from animals raised on pasture and without antibiotics. As Marksbury Farm Market already had these practices in place, and at a relatively large scale, they were able to ramp up production to meet Whole Foods' purchasing requirements, and started selling through Whole Foods in 2013. Preparing to process and sell product to a large, national retail chain opened the door to additional large-scale commercial relationships with wholesale buyers and distributors, such as Kroger and Chipotle Mexican Grill.

One of Marksbury's founders identifies the grassroots enthusiasm for local meat in the early 2000s—spurred by books like *The Omnivore's Dilemma* in 2007 and films like *Food, Inc.* in 2008—as motivation for consumers to begin exploring the implications of their food choices. This upsurge in interest and demand for sustainably produced meat aligned with Marksbury Farm Market's launch in 2010, and provided a foundation for early success in the direct-to-consumer market. The company's leadership reports steady demand for locally produced meats over the past decade alongside the “mainstreaming” of consumer interest in some environmentally sustainable and humane practices.

Challenges and Learnings

The wholesale business took five years to become solvent and produce operating cash flow. The fee-for-service processing business took three years to produce cash flow, and the retail business remains a break-even enterprise 11 years later. Owners say their business is not a “build it, they will come” model. Instead, it is a “hunt them down, market your product, comply

with regulatory demands, build relationships, manage the shortcomings, adapt, change, be resilient” model.

Whole animal utilization is another challenge faced by Marksbury and businesses across the meat sector. Identifying market outlets for every part of an animal is key to profitability in the meat sector. About 20% of the animal is easily sold as premium cuts and ground meat. Identifying sales channels for the remaining products, like organ meat, hides, bone, and blood is key to driving down costs.

Chickens are no longer processed at their facility because the volume needed to compete with conventional chicken producers on price and supply is too demanding. This volume pressure, exacerbated by the COVID-19 pandemic, led the company to refocus on species that generate the greatest income: pork, lamb, and beef. Consumers expect relatively low prices for pork, while production costs are volatile due to the fluctuating grain market. Pork sales comprise 10% of Marksbury's wholesale market. Lamb processing carries some risk because of lower and more variable customer demand. Beef, on the other hand, is the most reliable and financially rewarding. According to Marksbury, investments in raising and processing beef are associated with greater financial returns than other forms of animal agriculture and meat processing.

Hickory Nut Gap

Hickory Nut Gap Meats, located 20 minutes outside of Asheville, North Carolina, was born out of Hickory Nut Gap Farm in 2000. As a fourth-generation farmer, the owner of Hickory Nut Gap Farm wanted to “make the food system better,”

Owners say their business is not a “build it, they will come” model. Instead, it is a “hunt them down, market your product, comply with regulatory demands, build relationships, manage the short comings, adapt, change, be resilient” model.



CREDIT: HICKORY NUT GAP

by producing high-quality, pasture-raised, ethical and sustainable meat. Implementing new production standards and “whole animal” utilization practices, Hickory Nut Gap Meats sells pasture-raised pork and 100% grass-fed beef to Asheville businesses and directly to consumers through CSAs, home delivery, and on-farm pickup. Hickory Nut Gap Meats also distributes products regionally through Whole Foods, US Foods, Sysco, Inland Seafood, and Ingles Market. The business works with farmers and distributors across the Carolinas, Georgia, Tennessee, and Kentucky to aggregate product to sell under their brand.

One of the owners of Hickory Nut Gap Meats cites the cooler mountain ecosystem, which is well-suited for pasture, and a community of open-minded farmers as the two greatest assets for local food in the Appalachian Region. They identified business expertise and the ability to scale profitability as key capacities for advancing the local food—and local meat—economy in the Region.

Regenerative Agriculture

Both Hickory Nut Gap and Marksbury Farm Market practice regenerative agricultural practices. Hickory Nut Gap emphasizes fostering a connection to the land, land stewardship, and educating customers about the role of land in meat production. In their own words, Marksbury Farm Market works to support the “four main constituents in the U.S. meat market: animals, environment, farmer, and consumers” by practicing a “grass to plate” grazing strategy. Marksbury is focused on first building soil health, which has broad environmental benefits and improves the nutritional value of the pasture where animals graze.

The Marksbury Farm Market and Hickory Nut Gap Partnership

These two businesses started collaborating in 2014, brought together when Hickory Nut Gap Meat sought regulatory guidance from Marksbury. The business owners recognized common approaches to their business models

and philosophies, and an opportunity to work together to strengthen both enterprises. The companies agree that successful production of animals for regional markets requires weathering challenges, cultivating resilience to business ebbs and flows, continual learning, and building relationships with fellow producers and distributors.

Hickory Nut Gap and Marksbury Farm Market work in tandem, remaining in close counsel and seeking advice and input from one another before making major business decisions about growing operations or making changes in supply chain management. They work together to synchronize product standards, which helps to streamline both wholesale and direct-to-consumer sales. Because of their working relationship, both businesses can thrive in a complex sector.

KEY TAKEAWAYS

Partnerships and relationships are critical for successful regional meat supply chains.

Trust and strong relationships among businesses with common values and practices are key to securing a sustainable, local meat economy. This is especially true for animal farmers and meat processors. Strong partnerships support successful growth.

Successful small-scale animal agriculture business models must be both environmentally and economically resilient.

Practices rooted in regenerative agriculture, animal welfare, and bioregionalism are as important as building a strong business, managing regulatory compliance and being willing to weather the challenges of local meat production.

Successful growth requires scaling up to meet the demand of committed wholesale buyers.

Both Marksbury Farm Market and Hickory Nut Gap successfully scaled up their production with the clear expectation of reliable market channels to distribute product. Both companies also navigated regulations and managed increased production to meet the demands of large, wholesale buyers.

Foothills Pilot Plant

The Foothills Pilot Plant in Marion, North Carolina, operated from 2012 to 2017. Foothills' trajectory offers insights into the challenges of establishing and staffing a niche meat processing facility.

The Foothills Pilot Plant was created as a nonprofit meat processing facility through a collaboration between the Independent Small Animal Meat Processing Association, the McDowell Economic Development Association, McDowell County Government, the North Carolina Department of Agriculture and Consumer Services, NC State University's College of Agriculture and Life Sciences, North Carolina Agricultural and Technical State University, and a community of independent growers and meat producers.

Interest in a potential new plant emerged in 2002 when a group of 15 to 20 small animal farmers came together with a need for more proximate processing infrastructure. In 2005, the Golden Leaf Foundation financed a feasibility study for a small-scale animal production facility to meet the needs of North Carolina producers. The study found that the most unmet demand for a facility was in western North Carolina and identified 38 farmers who did not have adequate access to small-animal processing infrastructure—the closest pastured poultry processors were located in South Carolina and Kentucky. The Appalachian Regional Commission, NC Rural Center, and the Golden Leaf Foundation provided funding to establish a poultry processing facility on the site of a former shooting range. Though meat processing facilities typically work with multiple species, in response to the specific needs identified by local producers, the Foothills Plant only processed poultry. The decision to only process poultry at Foothills was made by the group of small animal farmers who came together in 2002. The group identified poultry processing, specifically, as an outstanding need in western North Carolina. Most of Foothills' customers were small-scale farmers who brought a couple hundred birds to process at a time. In 2013, the plant's most successful year, Foothills provided services to over 180 farmers and processed more than 70,000 birds. The plant ultimately closed in 2017 due to a series of challenges related to facility and personnel management, as well as labor sourcing.

Challenges

The Foothills Pilot Plant needed to process 700 to 800 animals each day at a rate of \$5.15 per animal to break even, and the plant had a maximum capacity of 1,000 animals per day. To achieve profitability, poultry plants must process significantly higher animal numbers than processors that handle larger animals. According to a stakeholder interview, it was estimated that the processor would need to process 1,200 or more birds to match the profit of three to five larger animals (e.g., beef or pork). Increasing the number of animals processed at a facility increases the workload of managing USDA regulatory compliance, and creates additional challenges related to communication, coordination, and scheduling.

In addition to volume-related profitability challenges, the Foothills case highlights several other considerations for viable processing. Pastured poultry is a seasonal business, with processing needs during just eight months of the year. It is difficult to hire and retain qualified employees on a seasonal basis. The plant had enough clients to operate only one eight-hour shift per day, as opposed to other processing facilities that operate multiple daily shifts. This not only limited the overall utilization of the plant, but also required workers to manage all preparations, slaughtering, processing, packaging, and general maintenance in one shift per day.

The plant faced additional infrastructure-related challenges. First, maintaining processing infrastructure and equipment, which is costly due to significant wear and tear, was a challenge, particularly with seasonal limitations on revenue. Further, the Foothills Pilot Plant was located on a relatively small, donated site which limited the possibilities for expansion. Stakeholders also highlighted the overall management of the Foothills Pilot Plant and lack of alignment about maintaining the plant's status as a nonprofit as factors that led to the plant's closure in 2017.

Policy Impacts

According to one founder of the Foothills Pilot Plant, the overall experience was a “net positive” for animal processing policy in North Carolina. The plant closed immediately before the 2017 turkey processing season. Turkey farmers appealed to the North Carolina Department of Agriculture & Consumer Sciences (NCDA&CS) to allow on-farm turkey processing for direct-to-consumer sales, and the NCDA&CS made an emergency decree for this special allowance, which remains in place. This action increased the visibility of direct-to-consumer and small-scale meat processing needs among members of the state legislature.

Key Takeaways:

The diversification of multi-species processing models insulates against the volatility and challenges posed by any single species.

The Foothills Pilot Plant was established to address a particular need for poultry processing. However, due in part to the regulatory requirements for processing a large number of animals plus the lower profit margins for poultry processing, the plant was not able to generate enough revenue from poultry processing alone. Combining poultry with beef, pork, and other large animal processing mitigates financial risk for processors.

Year-round employment opportunities and strong management are key to consistent, successful operations.

Diversifying the services offered for processing multi-species animals leads to more consistent year-round employment opportunities for processing plants. To complement this, investment in training, leadership, and business development for management would also be beneficial and point to a more successful management model.

BREED SELECTION FOR SUSTAINABILITY AND MARKET ADVANTAGE



POULET ROUGE CHICKEN. CREDIT: JOYCE FARMS.

IN THIS SECTION

- **Homestead Creamery**
- **Joyce Farms**

Finding a niche within small-scale meat and animal production allows producers to harness a market advantage for their products. Thoughtful and specific breed selections can lead to a broader market, scalability of product, and overall success of the small-scale animal producer. The following case studies illustrate innovative breed selection as a route to meet market opportunities. As with any new market or product, consumer education is needed to build interest and demand. Meat and animal product producers should consider this aspect of marketing when developing and refining business plans, value propositions, and product lines.

Homestead Creamery

Homestead Creamery is a regional family-owned dairy distributor located in Franklin County, Virginia. The business began in 2001, co-founded by two local dairy farmers after the county published an economic development plan. The plan prioritized the creation of new businesses to stimulate the local economy of the county. The two farmers were inspired by the plan, and decided to invest in the launch of a new creamery business.

Homestead Creamery started as a cooperative, filling orders from direct customers. Since its launch, the business has continued to grow, expanding sales and adding products like flavored milk, custard, and eggnog. In 2019, Homestead Creamery expanded their facility, nearly tripling the processing space.

Homestead Creamery sources milk from six farms located within a 15-mile radius of the Creamery. Cows are provided fresh pasture to

graze, locally grown feed, exercise in between milking, and cooling fans and sprinklers during milking. Once milk arrives at the creamery, it is pasteurized and homogenized before being bottled in glass bottles.

Homestead Creamery distributes to just under 100 small local retailers as well as larger regional grocery stores such as Kroger, Earth Fare, Fresh Market, and Whole Foods, up and down the east coast from Maryland to Florida. Homestead Creamery provides home delivery to local customers and has a retail location and cafe at the creamery. Homestead produces over 25,000 gallons of milk per week and offers a line of 15 different flavors of A2A2 milk and 22 flavors of ice cream also made with A2A2 milk. A2A2 milk refers to milk that contains only one type of protein: A2 beta-casein.

Innovation in A2A2 Milk

According to the USDA's Economic Research Service (ERS), from 1975 to 2019, there was a 43% decline in gallons of fluid milk consumed per

capita. A leading cause for this decline is the growing number of cases of lactose intolerance reported among consumers. Many consumers also began switching to non-dairy milk alternatives, such as plant-based milks made from soy, almond, oat, and other grains and nuts.

Homestead Creamery saw an opportunity to increase their product offerings to meet the growing market demand for more digestible dairy products. A2A2 milk, which is sourced from cows who have two A2 beta casein genes, is considered better for overall human health as it is more readily digestible. Milk produced by the more common A1A2 cows, who only have one A2 beta casein gene, is associated with many cases of lactose intolerance. Homestead Creamery began producing A2A2 milk in 2018, and as of 2021, all milk processed by the Creamery comes from A2A2 cows. Since making the switch to A2A2 cows, Homestead Creamery has seen a steady increase in its customer base and works to educate consumers on the benefits of A2A2 milk.



HOMESTEAD CREAMERY A2A2 MILK. CREDIT: HOMESTEAD CREAMERY INC.



CATTLE GRAZING. CREDIT: JOYCE FARMS

Joyce Farms

Poultry is a primary agricultural output in the Region, but most Appalachian poultry is produced for national and global commodity supply chains. Joyce Farms' production model, on the other hand, demonstrates one approach to creating a market opportunity with a unique poultry breed raised with environmentally sustainable practices.

Joyce Farms is a third-generation family-owned and operated poultry, beef, and pork producer with a poultry processing facility located in Winston-Salem, North Carolina. Joyce Farms partners with farms across North Carolina and Georgia to raise their animals. Joyce Farms slaughters and processes all poultry at their facility in Winston-Salem. The company has two product lines: Heritage, which focuses on "old-world, slow-growing" breeds, and Naked, or "raised with nothing added ever." Both product lines—Heritage and Naked—are sold under Joyce Farms' brand. Over the last 50 years, Joyce Farms has sold primarily through wholesale channels to chefs and specialty retailers across the United States. The business also sells directly to consumers through an online store with home delivery options.

The focus at Joyce Farms is producing high-quality meats with environmental stewardship, animal welfare, and food safety as guiding principles. Joyce Farms processes animals raised without medications or artificial

ingredients in feed. Heritage breed animals are raised on farms that use regenerative practices to build soil quality, sequester carbon, and increase biodiversity. Joyce Farms' Heritage Poulet Rouge Fermier Chicken is certified by the Global Animal Partnership Animal Welfare Program, a third-party animal welfare certifier that works across North America.

Heritage Poulet Rouge Chicken

The Heritage Poulet Rouge Fermier Chicken or "Poulet Rouge" is a derivative of a French heritage chicken variety. Joyce Farms' chose this "naked neck" heritage breed for its health hardiness as well as its meat flavor profile. Joyce Farms owner, Ron Joyce, visited France in 2003 to learn more about raising birds under the French Label Rouge Program, which is a set of strict production, animal care, and breed standards upheld by French producers. Joyce Farms' Poulet Rouge chickens are raised on North Carolina farms with similar quality standards. According to Joyce Farms, these practices also improve the taste and quality of

Naked-Neck Poultry

Naked-neck chickens have fewer feathers, which can make them more tolerant to heat in warmer climates, like those in the southern United States. Naked breeds are usually featherless around the neck and the vent, keeping them cool and helping to prevent disease and health issues. Because they do not need to expend as much energy regulating body temperature, naked breeds generally produce more meat.

meat and increase production yields.

Through their “Honest with Nature” program, Joyce Farms partners with growers to implement regenerative agricultural practices. Specifically, Joyce Farms works with its farm partners to avoid all chemicals and use no-till methods, diverse cover cropping, rotational grazing, and appropriate animal integration (or, no over-grazing) to build and maintain soil health.

KEY TAKEAWAYS

Niche animal breeds yielding unique products can support business growth and expansion when they are matched with niche market demand.

Both Homestead Creamery and Joyce Farms identified subtle, yet significant, differences in animal breeds, and leveraged niche products to grow their businesses.

Partnerships with like-minded farmers can support the growth of recognized and trusted food brands.

Aggregating animals from a network of local (Homestead) and regional (Joyce) producers to be marketed under a unified brand allows businesses to increase production and meet wholesale and direct-to-consumer demand.

Producers and processors that center business models around animal, human, and environmental health also see economic benefits.

Homestead Creamery and Joyce Farms are successful businesses placing innovation and health at the forefront of animal production. In addition to unique breed selection for niche markets and sales channels, Homestead and Joyce prioritize regenerative agriculture and animal welfare, citing these practices as key components differentiating their products as more sustainable choices.

Elevate the Region’s unique identity through distinct Appalachian crops and products and place-based regional branding.



AMERICAN GINSENG ROOT. CREDIT: AMY SHUMAKER

Farms, Forests, and a Way of Life: Appalachian Assets and a Foundation for Innovative Strategies

Both Appalachian residents and people outside the Region associate Appalachian culture and identity with independence, self-reliance, resilience, connection to the land, and a focus on community. Purchasing decisions reflect these values, which also appeal to consumers outside of the Region. Stakeholders shared that there is

untapped potential in leveraging the Region’s “brand power” for food product marketing, particularly in markets adjacent to the Region and large metropolitan areas.

The Appalachian Region is characterized by its mountainous, forested landscape. Twenty-nine percent of Appalachian farmland is categorized as woodlands, compared to just 8% for the U.S. overall. Forestland offers a distinct opportunity for agricultural and economic diversification

Foodways

Foodways are the cultural, social, and economic practices related to food in a community or region. These practices include both long-held traditions and daily activities associated with producing, preserving, preparing, serving, and buying and selling foods.

in the Region. As one of the most biodiverse regions of the U.S., Appalachia is home to a wide range of flora and fauna, including specialty agricultural products that are native or grow wild in the Region.

Celebrating unique Appalachian foods and foodways is one strategy for supporting and diversifying the regional food economy. Heritage and heirloom crops represent one dimension of the cultural heritage of Appalachia. These crops include varieties of corn, grains, beans, greens, tomatoes, and other traditional row crops, as well as specialty crops and foraged forest crops.

Edible forest products, such as purslane, acorn flour, miners' lettuce, hickory nuts, black walnuts, ramps, mushrooms, elderberry, and pawpaw, are sold primarily at farmers' markets or to local restaurants. Medicinal forest crops, including ginseng, black cohosh, and goldenseal, are typically sold through wholesale channels. While this production occurs at varying scales, most forest farming is relatively small-scale. Sustainable cultivation and harvest of the foods and medicinal plants that grow in Appalachian forests present an opportunity for diversifying farm revenue.

According to regional stakeholders, the farmers who see the greatest success with forest production operate diverse enterprises, growing a range of products and participating in agritourism, consumer education, and retail and online sales.

Native and forest crops must be cultivated and harvested responsibly to ensure the long-term health of plant populations and sustainability of production. Most forest crops take time to become established and require specific conditions to thrive. Information about forest crop cultivation is limited. For that reason, organizations that support forest farming

Percent of Farmland Categorized as Woodlands

8% : United States

29% : Appalachian Region

need strong leadership as well as access to networking and training to disseminate knowledge and support learning.

Forest producers must understand food safety guidelines and regulatory compliance at the state and federal levels. The Food and Drug Administration's (FDA) traceability and post-harvest handling guidelines for food products on farms and agricultural operations also apply to forest products. There are additional state and federal regulations specific to forest farming, related to permitting, protecting endangered species, and transporting seeds across state lines.

CULTIVATING THE UNDERSTORY: BUILDING MARKETS AND SUPPORT FOR APPALACHIAN FOREST CROP PRODUCTION



GOLDENSEAL PLANTS. CREDIT: KATIE COMMENDER

IN THIS SECTION

- **Appalachian Sustainable Development's Appalachian Harvest Herb Hub**
- **Appalachian Beginning Forest Farming Coalition**
- **ForestHER – North Carolina Cooperative Extension & Alabama Cooperative Extension System**

Farmers and forestland owners in the Appalachian Region have an opportunity to meet the growing demand for native, locally grown edible and medicinal forest products by cultivating understory crops, or crops that grow below the forest tree canopy. Forest farming can grow and diversify farm income by making forestland productive and profitable.

Understory species thrive in dappled or limited sunlight and tolerate cooler temperatures and a more humid growing environment. Common understory medicinal crops native to Appalachia include ginseng, goldenseal, and cohosh. These grow across the Appalachian Region and can be wild harvested and sustainably cultivated.

Forest production comes with a unique set of challenges, including identifying appropriate locations for cultivation, understanding market demand, and specific cultivation, storage, and processing requirements. Education, technical assistance, aggregation, and market coordination are key to truly capitalizing on the market value of forest-grown crops. The following case studies highlight several organizations that provide education, networking, and logistics support.

Forest Medicinal Herbs

American ginseng is the highest value forest medicinal crop, with premium product selling at over \$1,000 per pound of root and \$700 per pound of leaf. Buyers pay price premiums for farmed or cultivated forest medicinals—as opposed to wild foraged plants—because responsibly grown and harvested products are more sustainable, a quality valued by many buyers. American ginseng is native throughout the Appalachian Region as well as parts of the Midwest, Northeast, and the Ozarks. Based on the Appalachian Harvest Herb Hub’s aggregation data, black cohosh is the highest volume forest medicinal in the Region. Black cohosh is grown from Maine to Georgia and as far west as Missouri. Goldenseal, native from Vermont to Alabama, is in the greatest demand in the Region.

Because most forest medicinal herbs must be exposed to

freezing temperatures to initiate germination, these forest products are found in the Region’s cooler, higher-elevation microclimates in West Virginia, Tennessee, Virginia, and North Carolina. Humidity also plays a role, as most forest medicinal herbs need a balance of cold and humid weather to thrive. Areas with higher elevations provide cold temperatures for a longer period, leading to higher yields and more productive “stands” or clusters of forest crops.

Beyond the top three understory medicinal species, many growers are turning to alley cropping with non-forest specific herbs such as elderberry, lavender, peppermint, stinging nettles, and others. Alley cropping is the practice of growing herbaceous crops in the alleyways between rows of trees or shrubs. This practice maximizes yields, manages weed growth, and builds soil nutrients in addition to generating income from sections of the field that would otherwise be used only for walking and working.

Appalachian Sustainable Development’s Appalachian Harvest Herb Hub

Forest production is a niche market, with many skills passed down through families and communities. The word-of-mouth production and distribution of these products make formal resource sharing and technical support a challenge. The Appalachian Sustainable Development (ASD) Herb Hub addresses these challenges by offering a variety of resources, technical services, aggregation, and marketing services to forest farmers.

ASD is a nonprofit organization located in Washington County, Virginia, with a mission “to build a thriving regional food and agriculture system that creates healthy communities, respects the planet, and cultivates profitable opportunities for Appalachians.” ASD created an Agroforestry Program in 2010 to support the production of woodland crops outside of timber products. In 2016, ASD received grant funding through ARC’s POWER Initiative to create the Appalachian Harvest Herb Hub, which houses commercial herb processing equipment and provides aggregation and marketing services to growers that cultivate and harvest native herbs. The Herb Hub is based in Duffield, Virginia.

Most buyers of woodland medicinal crops are large companies that purchase raw materials

for further processing. Wholesale buyers require large volumes, which can constrain market access for smaller-scale producers. The Appalachian Harvest Herb Hub addresses this scale challenge by aggregating product from multiple producers in order to satisfy order minimums. The Herb Hub currently works with 15 Appalachian producers and seven domestic and international buyers, with the number of participants increasing every year.

Production and Marketing Challenges Addressed by the Appalachian Harvest Herb Hub

Site selection is one of the greatest challenges for understory medicinal herb production. While each site comes with a unique set of challenges, air flow and drainage are important considerations. The Herb Hub offers one-on-one training programs and technical assistance with site selection, cultivation, and processing of understory medicinal herbs.

Demand for forest crop root stock and seedlings is surpassing supply, presenting another challenge to production. It can take months for a nursery to cultivate viable root stock and seedlings for growers. The Herb Hub offers state- and federally funded mini grants to support local nurseries and greenhouses to increase production of root stocks and seedlings.

Marketing products and meeting demand

are additional challenges for herb producers. Wholesale customers require large order minimums that can exceed a single producer's capacity. Because most understory crops take five to seven years to fully mature, producers cannot scale up production as quickly as buyers might like, making aggregation particularly important. On the other hand, growers must be confident in a future market in order to take the risk to expand cultivation. In order to address this challenge, the Herb Hub is implementing an advanced purchase ordering system with a commitment from buyers to purchase products several years in advance.

Point of Harvest Program

There is currently no traceability system in place to ensure sustainable harvest of wild forest botanicals. However, there are programs to trace cultivated products, including Forest Grown Verified, a third-party verification program for non-timber forest products led by United Plant Savers, a non-profit based in Rutland, Ohio. There is strong interest from large wholesale buyers in this form of production and supply chain transparency. A certification or validation process could increase the price that wholesale buyers are willing to pay for forest products.

In 2020, Virginia Tech began working on the Point of Harvest training program in collaboration with the Herb Hub. The program is a partnership with several other organizations focused on forest products, including members of the Appalachian Beginning Forest Farming Coalition (see case study below). The aim of the program is to train producers in standardized processes, including safety protocols, propagation and harvest techniques, raw material storage, as well as plant identification and botany. Point of Harvest training will improve both product traceability and production transparency, two standards valued by wholesale buyers.

Appalachian Beginning Forest Farming Coalition

As the market for forest-grown edible and medicinal crops expands, the importance of

networks, support systems, and technical assistance continues to grow. Coalitions that host opportunities for growers to gather, share information and best practices, track production, and receive technical assistance are critical to fostering a thriving forest farming sector.

The Appalachian Beginning Forest Farming Coalition (ABFFC) is a membership-based organization that aims to “increase the awareness of forest-grown medicinal, edible plants and products (non-timber forest products) through education and relationship building, and support conservation efforts through stewardship of existing plant populations and forest farming of these native botanicals.” Partner organizations for the ABFFC are located throughout the Appalachian Region, from Pennsylvania to Georgia. The coalition has received funding through USDA's National Institute of Food and Agriculture (NIFA) Beginning Farmer and Rancher Development Program.

Appalachian Beginning Forest Farming Coalition (ABFFC) non-government organizations and university anchors

- Appalachian Sustainable Development
- Catawba Sustainability Center
- North Carolina State University – Alternative Crops & Organics
- Organic Growers School
- Pennsylvania State Shaver's Creek Environmental Center
- Rural Action
- The Yew Mountain Center
- United Plant Savers
- Virginia Tech College of Natural Resources & Environment
- Warren Wilson College – Ecological Forestry



BLACK COHOSH FARMER, MICHELLE PRIDGEN OF WINDY HILL FARM . CREDIT: PRIYA JANISHKAR

The ABFFC is composed of six non-government organizations, four universities, Southern Regional Extension Forestry, the Pennsylvania Bureau of Forestry, and the U.S. Forest Service's Southern Research Station.

Membership to the ABFFC is free and includes training and support, an online information database, free and reduced-priced seeds, and an online forum for connecting beginning forest farmers with processing equipment and infrastructure. Members are invited to join stakeholder meetings to connect with other producers, buyers, and certifiers. The ABFFC also offers a mentorship program with Extension staff and other agency members to help site and plan new growing spaces. The ABFFC has a strong social media presence with an active Facebook group and YouTube channel.

The ABFFC maintains a calendar of events hosted by partner organizations throughout the year. In the late summer and fall of 2021, the ABFFC and organization partners offered the following conferences:

- Southern Ohio Forest Farming Conference hosted by United Plant Savers with a keynote address titled, "Income Opportunities from Forested Land"
- Forest Farming Intensive, Propagation-to-Processing hosted by Appalachian Sustainable Development
- Growing Under the Canopy, hosted by the Organic Growers School

Conferences usually include farm tours, workshops, and guest speakers from ABFFC partner organizations and Extension staff.

The ABFFC was established as an interim organization, with initial funding through 2023. The Coalition's goal is to secure longer-term funding and support that allow it to evolve into a permanent professional networking group for forest farmers across Appalachia that provides resources through committees and programs directed by members.

ForestHER – North Carolina Cooperative Extension and Alabama Cooperative Extension System

ForestHER is a program hosted by both North Carolina Cooperative Extension (NCSU Extension) and the Alabama Cooperative Extension System. The programs are operated independently in the respective states, but with a common goal to provide educational resources, communication, training, and best practices for women forest owners.

According to the National Woodland Owners Survey, the share of forest lands owned by women increased from 13% in 2006 to 20% in 2013. Women manage over 44 million acres of forest land in the United States. In North Carolina, between 60% and 65% of forestland is owned or jointly owned by women, but according to NCSU Extension, women are less likely to participate in traditional programs and land management activities. ForestHER programs provide an alternative to these programs, with workshops offered virtually. Topics range from forest certification and cost-share programs to managing invasive species and alternative income opportunities. All webinars are recorded and available online. The North Carolina program maintains a consistent social media presence and Alabama ForestHER hosts a podcast.

KEY TAKEAWAYS

Forest farming can diversity and increase farm income across the Appalachian Region by expanding profitable production of understory crops.

There is potential economic benefit in expanding production to meet the demand for edible and medicinal forest products. However, these unique crops take several years to become established and thrive in new areas. Securing buyers and advanced purchasing is one key to success.

Increasing access to technical and market information about forest-grown crops is crucial.

Successful cultivation of forest crops requires specific conditions tailored to the needs of wild plants grown in a semi-controlled environment. Information about production and marketing nuances has typically been shared through word of mouth or passed down through families or communities. For new and beginning forest farmers, supportive networks are key to establishing successful production.

Establishing necessary infrastructure for forest crop production and marketing can provide additional opportunities for economic development.

Opportunities for expanded forest crop production infrastructure and marketing include investments in nursery and greenhouse production to meet forest farmers' demand for seedlings; securing advanced wholesale purchases with large buyers; and establishing post-harvest handling, storage, and processing sites.

LEVERAGING REGIONAL IDENTITY AND HERITAGE



CREDIT: HICKORY NUT GAP

IN THIS SECTION

- **Hickory Nut Gap Meats**
- **Dairy Marketing In Vermont**

Highlighting the characteristics of the places where products are cultivated or produced is central to local and regional food marketing. Elevating Appalachian identity and heritage in food branding is one route to expanding market opportunities for products produced in the Region, and supporting economic development. Rather than creating a single “regional brand,” place-based branding strategies can emphasize characteristics of regions that align with food trends and consumer preferences. These case studies feature an Appalachian farm and food business that centers a sense of place in its brand values, as well as the state of Vermont’s established marketing identity. The Vermont case illustrates the ways in which a place-based brand identity can evoke the landscape, values, and culture of a region.

Hickory Nut Gap Meats

Hickory Nut Gap Meats’ success is grounded in relationships in the Region and recognition of the brand’s Appalachian roots among customers in the Region and across the East Coast.

Hickory Nut Gap Meats keeps their Appalachian origin at the center of their brand as they market product through large, national wholesale distributors such as Whole Foods, US Foods, Sysco, Inland Seafood, and Ingles Market. Being based in Appalachia and part of the Appalachian local food economy is a key value for the company, and producing, processing, packaging, and distributing products in the

Hickory Nut Gap Farm and Hickory Nut Gap Meats

Hickory Nut Gap’s farm and meat business is described in detail on p. 102 of the Animal Agriculture Opportunity and Case Studies set.

Region is central to the company's image. Western North Carolina is a southern culinary destination due to the fresh, seasonal produce available from local farms; celebration of local agriculture; presence of regionally and nationally known chefs and food artisans; and the density of breweries—the highest number of breweries per capita in the United States. Hickory Nut Gap Meats plays a prominent role in the Asheville food scene with many Asheville restaurants featuring their product with the simple moniker of “HNG.”

Beyond the marketing elements of claiming an Appalachian product and brand, education about local foods can encourage consumers to know where their meat comes from. The Hickory Nut Gap Meats brand leads with flavor and follows with the story of their local farm and history in Appalachia, as well as their grazing and production practices, which are environmentally resilient and sustainable. The company pursues a holistic approach to changing how people see the food system

and encouraging an educated consumer base to choose a high-quality product from a local, sustainable food business. Being tied to the Appalachian Region and celebrating that heritage helps Hickory Nut Gap Meats accomplish this goal.

Dairy Marketing in Vermont

In 2019, the state of Vermont undertook a dairy marketing study to understand opportunities and strategies to support the viability of its dairy industry, which accounts for nearly two-thirds of the state's total agricultural revenue.⁹⁶ There are many well-known value-added dairy brands that are associated with the state, including cheese producers Cabot Creamery and Jasper Hill, as well as iconic Ben & Jerry's ice cream.

While each brand and product are unique, the report identified eight qualities that brands incorporate into their marketing identities that align with the characteristics people tend to

96. Vermont Dairy Marketing Assessment: Final Report. Prepared by Karen Karp & Partners for the Vermont Agency of Commerce & Community Development and Agency of Agriculture, Food, & Markets. February 2020.



HICKORY NUT GAP LAND. CREDIT: HICKORY NUT GAP

associate with Vermont. These include quality and flavor of product, authentic handmade or artisanal goods, heritage and history, a focus on family farms, concern for the environment and sustainable practices, having a social mission, and finally, being whimsical or playful in messaging and brand choices.

The report also assessed the idea of creating a Vermont dairy brand mark or campaign. It was concluded that while the creation of a “state brand” would not yield the highest benefit for supporting the state’s dairy sector, the state could support more alignment with the unique strengths of the dairy industry in Vermont to further industry growth. Of the characteristics listed above, quality, artisanal and small-batch products, and attention to environmental and social impacts are suggested as opportunities for additional development and support from the state. This notion could also be applied to the Appalachian Region. Even without creating a singular, regional Appalachian “brand,” there are unifying and underlying themes which Appalachian brands can use to signal their place-based identity as an Appalachian product.

As in Vermont, several of the regional characteristics that could be perceived as quintessentially “Appalachian” align with broader trends and consumer preferences in the marketplace, including independence and resilience, artisanal and handcrafted products, farming and land stewardship as a way of life, support for local economies, and an appreciation for “natural” products.

KEY TAKEAWAY

The Appalachian regional identity has brand power, and celebrating place-based production can be an effective marketing strategy.

The qualities associated with Appalachian identity and culture appeal to customers within and beyond the Region, and align with food trends and consumer preferences. However, regionally driven and place-based brand strategies do not require a formal, shared “regional brand.” Hickory Nut Gap Meat’s popularity in North Carolina and across the East Coast attests to the potential of rooting brand narratives in the Region’s characteristics. Brands that evoke appreciation for Appalachia can appeal to customers who desire food produced with values and practices that reflect respect for land and community.

Capture more public and private food assistance dollars to support local food producers while enhancing community food security.

Effective and Innovative Strategies

Initiatives that endeavor to improve public health and equity by expanding access to fresh and healthy foods can also provide economic benefits to local food producers. Strategies to maximize the community benefits of federal, state, and private food assistance dollars link healthy food access to the local food economy. Within the Region, there are opportunities to draw on the lessons of promising programs that operate at the intersection of food security and economic development. These interventions address food insecurity and chronic disease by making it easier for individuals to use food assistance benefits to purchase locally grown foods.

The Supplemental Nutrition Assistance Program

Thirteen percent of households in Appalachia use the Supplemental Nutrition Assistance Program (or SNAP, formerly known as food stamps) benefits to support their food budget. In Central Appalachia, one-fifth of all households purchase food with SNAP benefits. While SNAP benefits amount to substantial food spending, a tiny fraction of those benefits are utilized in local food channels. For example, over \$500 million is allocated in SNAP benefits to West Virginian residents annually, with 85% of those benefits redeemed at large retailers such as Walmart, Kroger, Dollar General, etc., and only 0.12% of SNAP redemptions at farmers' markets in West Virginia. According to the USDA, there are 233 SNAP-authorized farmers' markets in

the Appalachian Region. Customers at these markets can use SNAP benefits to purchase fresh produce from local producers (Table 4.3).

In 2019, the U.S. average for SNAP redemptions at farmers' markets and direct marketing farmers was \$1.82 per SNAP-receiving household. The average for states in the Region (both Appalachian and non-Appalachian portions) was \$1.34, with per-household SNAP redemptions ranging from \$0.38 in Alabama to \$3.27 in New York (Table 4.4). In 10 of the 13 Appalachian states, per-household SNAP redemptions for purchases from farmers are less than one dollar. While this state-level data does not focus exclusively on the Appalachian portion of states, it clearly points to an opportunity for increased SNAP usage to purchase fresh foods from local farmers.



MOUNTAINEER FOOD BANK. CREDIT: TABITHA MAYS

Directing federal and private dollars to support food access, equity, and local economies is an opportunity in Appalachia, especially in communities that leverage SNAP Double Bucks programs. The SNAP Double Bucks program, and others modeled after it, utilize private funding to double the dollar value of SNAP purchases at farmers' markets. In this case, the use of private-, nonprofit-, and/or government-funded dollars can enhance community food access while increasing farmers' incomes.

Food Bank Innovation

As well-established and consistent institutions in their communities, food banks are often considered to be part of the “bedrock” of the regional food system. The core function of most food banks is high volume food distribution to alleviate hunger and food insecurity. Innovative food banks in the Region (and across the U.S.) have expanded their goals and strategies to include distributing fresh, healthy produce to clients and partnering with local food system organizations and enterprises.

In Appalachia, many food banks are sourcing locally grown produce to increase the quality and diversity of products they provide to clients. In some cases, they can direct federal food assistance dollars to procuring local foods, essentially re-investing in the local economy.

From the farmer's perspective, food banks and other food assistance organizations are easy to serve because they are generally seeking a mix of fresh, quality products, rather than specific items with detailed specifications. One farmer stakeholder identified food access organizations as an integral part of a diverse customer base.

Unlike many high volume, public-serving food outlets, food banks are not required by law to purchase from farms with Good Agricultural Practices (GAP) Certification (a food safety certification overseen by the Food and Drug Administration under the Food Safety Modernization Act). Substantial annual fees to maintain GAP certification status and time and labor requirements can be prohibitive for many small-scale farmers. Because of their



MOUNTAINEER FOOD BANK WAREHOUSE. CREDIT: GABRI BONAZZO

purchasing flexibility, food banks can offer a wholesale market channel for these smaller-scale producers.

Finally, food banks often have significant physical infrastructure assets such as cold storage and refrigerated trucks, as well as systems to manage transportation and distribution logistics. Partnerships between food banks and farmers, regional aggregation and distribution hubs, and other local food businesses may have the potential to address infrastructure gaps in regional supply chains.

State Government Interventions: Pennsylvania Agricultural Surplus System

The Pennsylvania Agricultural Surplus System (PASS), managed by the Pennsylvania Department of Agriculture Bureau of Food Assistance, supports charitable food distributors—food banks in most cases—to procure and distribute Pennsylvania-grown agricultural products to organizations that serve Pennsylvanians in need. The program captures agricultural surplus by reimbursing farmers for product that might otherwise go to waste. In 2015, the governor committed \$1 million in annual funding for the program. In 2017, the state allocated \$1.5 million, and funding was increased to \$2.5 million in 2021.

In 2020, Pennsylvania contracted Feeding Pennsylvania (the state association of Feeding America member food banks) to manage the program. Feeding Pennsylvania administered the \$1.5 million state allocation as well as \$10 million in CARES Act (Coronavirus Aid, Relief and Economic Security) funding from the federal government.

The program operates in all 67 counties of Pennsylvania, providing fresh state-grown fruit, vegetables, and proteins to communities through a network of over 2,700 local partner organizations—primarily food pantries and soup kitchens—affiliated with one of the 13 regional food banks or hunger relief organizations that assist with food distribution.

The Pennsylvania Department of Agriculture coordinates logistics between farmers and distribution partners. Between 2015 and September 2021, the PASS program partnered with 170 food and agriculture vendors across 49 Pennsylvania counties. The program spent over \$17 million in PASS funds during this time to purchase and distribute more than 21 million pounds of Pennsylvania products.

LOCAL PRODUCE PRESCRIPTION PROGRAMS



PRODUCE SUPPLIED BY GROW OHIO VALLEY. CREDIT: FARMACYWV: PRESCRIPTIONS FOR PRODUCE

IN THIS SECTION

- **FARMacyWV: Prescriptions for Produce**
- **Georgia Food for Health Program, Wholesome Wave Georgia**

Local produce prescription programs support public health goals while providing a consistent revenue stream for farmers. The majority of produce prescription programs are partnerships between a clinic or medical provider and a local food outlet (e.g., a farmer, farmers' market, or distributor). Medical providers issue "prescriptions" for fresh produce to treat diet-related chronic disease. Participants then redeem these prescriptions for locally-grown fruits and vegetables. Produce prescription programs provide one model for Appalachian communities to use public and private dollars to simultaneously support healthy food access and local farmers.

FARMacyWV: Prescriptions for Produce

FARMacyWV: Prescriptions for Produce began as a pilot program in 2016 in response to high rates of chronic diseases among West Virginians. The program launched as a partnership between Wheeling Health Right Clinic, a free medical clinic in downtown Wheeling, and Grow Ohio Valley, an urban farm with sites throughout Wheeling. For 15 weeks, 30 Health Right patients were each given a voucher, or "prescription," for \$20 worth of fresh produce from a farmers' market set up at the clinic. The voucher could only be redeemed at this market, which exclusively served program participants. Grow Ohio Valley provided the produce for the weekly market and was paid in advance by the clinic. The program generated \$9,000 in revenue for Grow Ohio Valley. The Wheeling Health Right Clinic funded the Prescriptions for Produce pilot program from its budget allocation for community health programs.

In 2019, the Wal-Mart Foundation awarded a \$1 million grant to FARMacyWV to expand to 10 additional counties within two years. FARMacyWV's success encouraged other organizations to establish similar models throughout the state. As of 2021, the FARMacyWV model exists in 21 West Virginia counties. Each county program is set up and managed independently, with collaboration and support from FARMacyWV and WVU Extension. Dozens of additional farmers have joined Grow Ohio Valley as agricultural suppliers for county programs.

In order to serve a FARMacyWV program, a farmer must have the capacity to fulfill weekly orders for the 15-week program period. FARMacyWV has established a partnership with the WV Department of Agriculture to provide technical assistance, crop management plans, and other resources for farms to increase production for the program. The WV Department of Agriculture and WVU Extension also help each county's medical provider establish relationships with farmers who can support the program.

Farmers who supply produce for the FARMacyWV program are paid upfront and appropriately for the crops provided. This revenue stream is secure and consistent throughout a growing season (typically June to October in West Virginia). The medical provider works with the farmer to develop a crop list each year. Some farms and food aggregators work together across multiple counties to supply produce, such as Turnrow Appalachian Farm Collective, which coordinates with four to five farmers to supply produce for the program in a handful of counties.

In 2020, between 30 and 50 clients in each county-based program received \$300 in fresh produce—with the total revenue supporting partner farms ranging from \$9,000 to \$15,000.

Challenges

The greatest challenge for the farms that serve FARMacyWV programs is increasing production to meet demand for the program. Sourcing necessary infrastructure for increasing production, like a tractor, cold-storage facility, or other post-harvest handling equipment, can also be a challenge. Through partnerships

with WVU Extension and the WV Department of Agriculture, farmers can find resources (e.g., grants and training) to support scaling up to meet program demands.

FARMacyWV is entirely volunteer-managed and -led. The absence of paid staff and consistent funding challenge the program's sustainability. With the exception of the two-year Wal-Mart grant (2019–2021), each county program must meet its own funding needs. FARMacyWV is pursuing potential funding opportunities through the state Medicare/Medicaid and WIC offices, as well as private insurance and medical companies. In addition to the challenges of securing sustainable funding for the program, promoting the program is made more difficult by limited broadband in rural parts of West Virginia. FARMacyWV relies on West Virginia University for communication and outreach support.

Georgia Food for Health Program, Wholesome Wave Georgia

Wholesome Wave Georgia (WWG) is a non-profit organization established in 2009 and headquartered in Atlanta, Georgia. It is modeled after a national organization with the same name, Wholesome Wave. WWG was created to expand the work of the national program to offer more direct and specific resources and services to Georgia.

With funding from federal grants, private foundations, food businesses, corporate sponsorships, and individual donations, WWG works in partnership with local farms, markets, and healthcare organizations to expand fresh food access for the 1.32 million food-insecure families in Georgia. WWG manages several food access and food security programs, including the Georgia Food for Health (GF4H) produce prescription program.

GF4H participants receive prescriptions for fresh produce based on their household size: \$1 per household member per day. During the six month program, participants take plant-based cooking classes, wellness classes, and regularly



PRODUCE SUPPLIED BY GROW OHIO VALLEY. SOURCE: CREDIT: PRESCRIPTIONS FOR PRODUCE

meet with a medical provider and/or nutritionist. Between 2015 and 2019, GF4H participants in Georgia redeemed a total of \$241,716 in produce prescriptions.

In 2015, WWG partnered with Augusta Locally Grown to pilot the first GF4H program, with 13 participants. In 2021, the GF4H program entered its seventh program year in Augusta, averaging about 40 participants per cohort, per year.

In Athens, GF4H partners with the Mercy Health Center and Athens Farmers' Market. According to 2020 program results, participants redeemed over 97% of their prescription dollars. High redemption rates were due, in part, to new produce delivery and pick-up options introduced during the COVID-19 pandemic.

The Good Samaritan Health Center in Atlanta manages a unique iteration of the GF4H program, operating a small farm on-site. A full-time farm manager and support staff produce 10 to 15 thousand pounds of food annually on the one-acre farm. The produce is sold through a market at the health center that serves prescription program participants and other community members.

KEY TAKEAWAYS

Directing community health funding through local food channels can support public health and the local food economy.

Produce “prescriptions” expand the reach of community health funding to provide value to program participants as well as local food producers. The markets that serve these programs provide farmers with reliable, guaranteed sales.

Providing technical assistance alongside a consistent market opportunity can support farm growth.

Support from technical assistance providers (e.g., Cooperative Extension, universities, farmer-to-farmer training, etc.) is an important resource for farmers who are growing to meet the supply requirements of produce prescription programs. Program leadership can coordinate this technical assistance to support the success of prescription programs and growth of farm businesses.

FOOD BANK INNOVATION AND LOCAL FOODS



MOUNTAINEER FOOD BANK KIDS MARKET. CREDIT: GABRI BONAZZO

IN THIS SECTION

- **Mountaineer Food Bank**
- **Food Bank of Northeast Georgia**

Food banks are aggregators and storage facilities, distributing goods to networks of food pantries and soup kitchens located across a given geography.

A handful of food banks across the Appalachian Region are developing and offering innovative programs and services that build on local food supply chains and leverage food banks' infrastructure to meet post-harvest processing, distribution, and storage needs. This is an innovative strategy for improving food access in communities, while also supporting a local food economy. Through these innovations, food banks are reimagining the ways in which they can provide core services. As food banks begin to work with local farmers and producers to source product for the communities they

serve, they are connecting with the local food economy and enabling food to move through new sales channels, supporting local farmers and increasing community well-being through more local food consumption.

Mountaineer Food Bank

Mountaineer Food Bank (MFB) was established in 1981 in Braxton County, West Virginia, the geographic center of the state. MFB distributed over 29.6 million pounds of food in 2020 to over 460 partner agencies in 48 of the 55 counties in West Virginia. In addition to coordinating with partner agencies, which typically operate food pantries, MFB manages a mobile food pantry that distributes emergency food to residents of West Virginia communities with the highest concentrations of food insecurity.

Over the past 10 years, MFB has worked to increase their distribution of fresh foods in addition to shelf stable items. Increased fresh food spending created an opportunity to purchase products from West Virginia growers,

and to inject grant dollars as well as federal and state funds into the local economy. MFB consistently sources fresh produce from 10 to 15 local farmers and spent \$85,000 on locally-grown produce from 2019 to 2020.

In 2021, the food bank received \$900,000 through two Community Development Block Grants and state funding. These funds will be leveraged to source produce from West Virginia farms. Food bank leaders note that consistent funding at this level for local food purchasing would be a “game changer,” and a model for other states and communities. The food bank has recently hired a Local Food Coordinator to help with sourcing local produce for distribution.

Food Bank of Northeast Georgia

The Food Bank of Northeast Georgia (FBNEGA) was founded in 1992 with the mission of ending hunger in 14 Georgia counties. The food bank distributes over 13 million pounds of food to Georgia residents each year through a network of 200 partner organizations, a mobile food pantry, and programs to address hunger among children and seniors. FBNEGA operates a one-acre teaching garden, a farm-to-school program in partnership with FoodCorps (a program affiliated with AmeriCorps), and a teaching kitchen. From April to October, the food bank’s Clayton, Georgia, location operates a farmers’ market with fresh produce, eggs, honey, and other items from local vendors.

Food Bank Infrastructure Supporting Local Foods Development

Since 2016, local food business operators have used a commercial kitchen at FBNEGA to produce value-added goods like syrups, jams, jerky, and other products. The kitchen, which meets food safety regulations, allows small business owners an alternative to investing in commercial kitchen space and equipment.

The food bank uses their individual quick freeze (IQF) equipment to flash freeze fresh, locally grown potatoes, squash, zucchini, blueberries, strawberries, carrots, bell peppers, and blackberries. Flash frozen produce can be

stored efficiently and readily distributed across the north Georgia mountains any time of year, allowing the food bank to purchase greater quantities of local produce during the growing season. In 2017, FBNEGA processed and stored 195,000 pounds of produce.

KEY TAKEAWAYS

By reimagining the ways they provide core services, food banks are identifying opportunities to support local food economies.

While remaining focused on hunger relief and emergency food distribution goals, Mountaineer Food Bank and the Food Bank of Northeast Georgia have expanded and shifted sourcing strategies to support local farmers. With commitment and coordination, food banks can be an anchor wholesale customer for Appalachian farmers.

Food bank infrastructure can be a resource for local supply chains.

Warehouse space, cold storage, trucks, processing equipment and other food bank infrastructure and equipment can fill gaps in regional supply chains. Partnerships between farmers and local food businesses and food banks can leverage this infrastructure in order to produce more value for the local food economy and deliver more fresh produce to food bank clients.

SNAP Redemption at Farmers' Markets

Farmers' markets provide direct-to-consumer sales opportunities for farmers and local food producers. Implementing SNAP redemption promotion programs and SNAP Double Bucks at farmers' markets can expand fresh food access for lower-income consumers and leverage federal food assistance dollars to support local and regional food economies.

Just Harvest's Fresh Access Program

Just Harvest is a non-profit organization committed to reducing hunger in Allegheny County, home to Pittsburgh, the largest city in the Appalachian Region.

Just Harvest launched the Fresh Access program in 2013, and it currently serves 14 farmers' markets in Pittsburgh. The program provides a cashier system that allows SNAP recipients to redeem benefits for tokens that can be used to purchase fresh food from farmers' market vendors. With support from The Food Trust, Just Harvest provides SNAP customers with an additional \$2 for every \$5 spent at the markets through the Fresh Access Food Bucks program.

According to Just Harvest, the Fresh Access Program is a good fit for farmers' markets that are located in lower-income neighborhoods, committed to serving customers that use SNAP benefits, and offer SNAP-eligible products. Just Harvest supports farmers' markets to obtain a USDA Food and Nutrition Service (FNS) License number, a requirement for redeeming SNAP benefits; train staff and volunteers; market the Fresh Access program to customers; and identify opportunities to offset set-up costs. For example, the National Association of Farmers Market Nutrition Program's MarketLink project offers free electronic payment equipment to eligible markets.

Participating markets handle cashier services, customer tokens, and compensation of vendors for tokens collected each market day. Markets encourage all vendors to participate, and most process SNAP transactions on their behalf at no cost.

Since 2013, Just Harvest has facilitated nearly a quarter of a million dollars in SNAP benefits and incentive spending at farmers' markets on behalf of over 100 unique market vendors. Investment in training, leadership, and business development for management would also be beneficial and point to a more successful management model.

Support the viability of farms into the future through cultivating place-based entrepreneurship and climate-resilient enterprise models.



ROBOT. CREDIT: AGLAUNCH

The economics of a running a farm business in Appalachia, or anywhere in the U.S., can be challenging. In preparation for—and in response to—shifting environmental and economic conditions, farmers need to balance near-term farm viability with longer-term resilience. Climate change is already affecting Appalachian farmers and will continue to impact the agricultural sector and shape farm-level

economics in the Region. Cultivating resilient agricultural production systems and a culture of entrepreneurship are key to the success of Appalachian farmers in the coming decades.

Near- and Longer-Term Challenges

Farm Viability

Stakeholders across the region emphasized that making a living through farming can be a challenge. Low food prices and high costs of land and farm inputs contribute to the difficulty of running an economically sustainable farm. Economic challenges are a likely contributor to farm loss in the Region. Appalachia lost 10.7% of farm operations between 2007 and 2017, compared to 7.4% of farms lost nationally. Sixty-one percent of farms in the Region reported net financial losses in 2017, compared with 56% nationally.^{96,97} Among Appalachian farms with net financial gains in 2017, the average was about \$72,000, significantly lower than the national average of nearly \$126,000.⁹⁸

Climate Change

Climate change presents both risks and opportunities for Appalachian producers. Global climate change is expected to affect the agriculture sector both directly and indirectly. Anticipated impacts include food supply chain disruption leading to decreasing food stocks and increasing food prices. Within the Appalachian Region, a changing climate will impact agriculture at a variety of scales, from shifts in regional temperature and precipitation patterns to pest pressures to field-level evapotranspiration rates. The Region as a whole is predicted to experience higher temperatures throughout the year. Annual precipitation is expected to decrease in the southern half of Appalachia and increase in the north.⁹⁹ With increasing temperatures, the evapotranspiration rate—or rate at which water is transferred to the atmosphere via evaporation from soil and transpiration from plants—is expected to increase. Higher evapotranspiration rates decrease water availability for plants during dry stretches and increase plant stress, which can reduce yields for farmers. Changes to seasonal temperatures, precipitation, storm

96. The USDA calculates net cash farm income by subtracting total farm expenses from total farm sales (including the value of commodities produced under production contracts), government payments, and other farm-related income.

97. Cite data table XX.

98. Cite data table XX.

99. Fernandez, R., & Zegre, N. (2019). Seasonal changes in water and energy balances over the Appalachian Region and beyond throughout the twenty-first century. *Journal of Applied Meteorology and Climatology*, 58(5), 1079-1102.

Farm Viability and Farm Losses in the Appalachian Region

	Appalachian Region	United States
% of Farms Lost, 2007-2017	10.7%	7.4%
% of Farms with Net Financial Losses, 2017	61%	56%
Average Net Profit for Profitable Farms, 2017	\$72,000	\$126,000

frequency and severity, and invasive plant and pest pressures will alter the range of suitable products and effective growing methods in the Region.

Effective and Innovative Strategies

Strengthening farm viability involves cultivating an environment where farmers are supported to become “price-makers” rather than “price-takers” in the marketplace. In other words, farmers who are able distinguish their products in the marketplace are better positioned to ask for and receive favorable prices for their products. Farm economics will be increasingly intertwined with the ongoing and intensifying impacts of climate change. While climate change will continue to impact the agricultural industry in Appalachia, changes within the Region are predicted to be less severe than those in many other food-producing regions in the United States. Experts and stakeholders identify climate change as an opportunity, in addition to a clear threat, because the Appalachian Region is likely to be relatively insulated from the most extreme changes to temperature and precipitation patterns.¹⁰⁰ In anticipation of a climate-change induced reconfiguration of U.S. agricultural production, farmers in Appalachia can prepare to meet market opportunities—and crucial food needs—that emerge as national supply chains experience disruptions. The adoption of scale-appropriate technologies, enterprise diversification, regenerative agricultural practices, and production for local markets can

100. Melillo, J. M., Richmond, T. T., & Yohe, G. (2014). Climate change impacts in the United States. *Third national climate assessment*, 52.

strengthen farmers' capacity and readiness to meet the emerging opportunities and the challenges brought about by climate change.

Support Farm Viability Now and into the Future: Entrepreneurship, Diversification, and Meeting Local Demand

For many small and midsize producers, product marketing is a significant part of running a farm business. These producers can increase economic returns by understanding consumer demand and working from that standpoint to design and build successful enterprises. Providing resources for farm innovations, connecting farmers through networks, and providing technical and business services can enhance entrepreneurial success among farmers. Extension offices, nonprofits, and philanthropic organizations can direct resources to catalyze the development of an agricultural sector in which farmers build profitable enterprises that reflect their unique combination of markets, natural and financial resources, and interests. These organizations play a critical role in the ecosystem of support for farm and food enterprises, yet often face challenges identifying and securing funding to support their own operations. Although traditional economic development agencies tend to focus on industrial development, they too can play a role in directing resources to farms to support viability and preserve agricultural land use.

Enterprise diversification is an opportunity available to all farm operations and can hedge against both economic and environmental disruptions. Incorporating diversity is one of the key tenets of building resilience. This principle applies both to farm enterprises and agroecosystems. Businesses that produce a diverse range of products are, by virtue of their diversification, more resilient than their counterparts who rely on one or two products for their income. For example, an abrupt market shift or an early frost is less likely to have a devastating financial impact on a diversified enterprise.

Agricultural land that is sold for non-agricultural

development can no longer be used for food production. Improving farm viability in Appalachia today is key to maintaining farmland into the future—a future in which the impacts of climate change may make regional agriculture more important to meeting the food needs of Appalachian residents. Current rates of farm loss raise concerns for the future of farming in Appalachia. Regional stakeholders and food sector experts underscored the importance of profitable farm operations for longer-term farmland preservation. Connecting and providing resources to today's farmers for building economic and ecological enterprise resilience is an important strategy for strengthening the future outlook of Appalachian agriculture. (The Farmer Training, Land Access, and Farmland Preservation Opportunity and Case Study describes relevant tools and resources in detail.)

Build Climate-Resilient Production Systems: Regenerative Agriculture and Controlled Environment Agriculture

Farm businesses are particularly vulnerable to climate change because it is difficult to protect agricultural production from extreme weather events or regional droughts. However, regenerative agricultural practices and controlled environment production systems can buffer farm operations from some impacts of climate change, including moderate droughts and heavy rains. Regenerative practices such as cover cropping, reduced or no-till farming, and managed grazing improve soil health, providing protection against some of the effects of changing weather patterns. Healthy soils can store water for long periods of time and have high infiltration rates, increasing the soil's capacity to absorb water quickly and reduce runoff during heavy rains. Any practice that improves the capacity of a farm operation to withstand adverse weather events can strengthen a producer's economic position. Investment in organizations that provide technical assistance to spur and support farmers to implement regenerative practices can promote sector-wide climate change resilience. Practices that measurably sequester

Controlled Environment Agriculture

Controlled environment agriculture (CEA) is taking root at various scales across Appalachia. CEA describes the production of plants or fish within a climate-controlled building or greenhouse using technologies including hydroponics, aeroponics, aquaculture, and aquaponics. CEA production systems often use a combination of technologies to control lighting, temperature, humidity, CO₂, nutrient concentrations, and pest control. Many of these growing systems produce food year-round and are inherently resistant to some of the impacts of climate change, including increasingly variable seasonal temperatures and changing precipitation patterns. Furthermore, these projects can also be a source of employment and local food in their communities. The environmental impacts of CEA vary depending on the specific production system. Present tradeoffs are between high energy consumption for lighting and temperature control and low water consumption.

AppHarvest, founded in 2017, is an Appalachian-based agtech startup that has received significant public attention. The company recently broke ground on three hydroponic grow facilities in eastern Kentucky, totaling 135 acres, and plans to expand to have 12 facilities by 2025. AppHarvest expects to create thousands of jobs managing and operating production

facilities. By integrating artificial intelligence, robotic crop harvesting, and precision growing sensors, AppHarvest produces vegetables without the use of chemical pesticides. The company currently produces tomatoes and will grow leafy greens and other produce in new facilities. AppHarvest has attracted hundreds of millions of dollars in investment and secured a partnership with the Dutch government to support the greenhouse design and construction process.

A much smaller-scale initiative, **Blue Acre Appalachian Aquaponics** (BAAA), combines a production aquaponic facility with workforce development and beginning farmer education and training. BAAA is a joint venture between the nonprofit Sprouting Farms and the Mingo County Redevelopment Authority, built on former mine land in Kermit, West Virginia. Established in late 2020, the greenhouse has capacity to produce 150,000 heads of lettuce and 20,000 pounds of tilapia annually. Blue Acre prioritizes local sales to individual and wholesale customers. The venture's intention is to create a sustainable, replicable economic model that employs three to five full-time staff.



CREDIT: APPHARVEST

carbon may also provide farmers with additional revenue in future years, as carbon sequestration markets come online.

A range of controlled environment agriculture (CEA) techniques, including hoop houses, greenhouses, and indoor farms, can also mitigate climate change impacts, like unusually early or late frosts. Regional agricultural stakeholders advocate for expanded use of high tunnels and greenhouses to extend the growing season, which can improve resilience to unexpected frosts or heavy rains.

In addition to hoop houses and greenhouses, there is an emerging interest in indoor farming initiatives that can strengthen food security in the face of climate change and provide employment. Hydroponically-grown produce and farmed fish are produced at multiple indoor facilities in Appalachia. While large-scale initiatives have the potential to support food security and economic goals, some stakeholders in the Region advised caution when considering such initiatives. These operations require large capital investments and, at this stage, the economic, environmental, and community impacts are not fully understood. One stakeholder described neighborhood disruption due to the intensity of grow lights used in a CEA facility in the region. While controlled environment agriculture is a promising direction in food production, communities must consider the trade-offs as they determine whether CEA is a good fit.

AGRICULTURAL AND ECONOMIC DIVERSIFICATION



SALAMI FROM SUN RAISED FOODS. CREDIT: BROOKS MIXON OF SUN RAISED FARMS

IN THIS SECTION

- **Walnut Hill Farm**
- **Tree-Range Chicken**
- **Sun Raised Farms**

Farm enterprise diversification can improve resilience to environmental and economic dynamics that can disrupt farm viability, including climate change. The following case studies profile food and agriculture businesses that demonstrate a range of approaches to diverse agricultural production systems and income streams. These approaches, one within Appalachia and others outside the Region, are examples of business models that could be replicated, modified, or reimaged to increase farm viability within Appalachian communities.

Walnut Hill Farm

Walnut Hill Farm, established in 2008, is a diversified farm in Sharpsville, Pennsylvania, adjacent to the Ohio border. The farm produces a range of meat products sold through their farmstand and a few area retailers, including angus beef, lamb, silvopastured pigs, and pasture-raised chickens and turkeys. Walnut Hill Farm manages their animals' movements around the property to raise healthy animals and improve the productive capacity of their farm. For example, Walnut Hill uses their pigs to clear woodlot understory vegetation to allow for the growth of grasses. This allows pigs to engage in natural behaviors and improves forage regrowth for other grazing animals. Cultivating a diversified farm ecosystem and building soil health over time improves the farm's ability to tolerate extreme weather events and economic setbacks to any one of their meat product lines.



COWS AT WALNUT HILL FARM. CREDIT: MICHAEL KOVACH FROM WALNUT HILL FARM

Silvopasture

Silvopasturing, or forest grazing, refers to integrating animal husbandry within a maintained woodlot. When implemented and managed effectively, the practice can build agricultural and economic resilience over time. A wide range of trees, understory forage, and animals can be used in silvopasture operations, providing opportunities to raise several agricultural products and diversify farm income from forest products such as fruits, nuts, syrups, berries, and lumber. Integrating animals with trees and pasture naturally manages vegetation and fertilizes soil. With effective implementation, silvopasturing can help mitigate climate change by removing carbon from the atmosphere and storing it in the soil, trees, and other vegetation.

Tree-Range Chicken

Tree-Range Chicken, a registered trademark of Minnesota-based Regeneration Farms, indicates chickens that are produced in silvopasture

systems that integrate small flocks of chickens under a productive tree canopy. Producers for the brand are located in Minnesota, Wisconsin, and Iowa. The “poultry-centered regenerative farming system” is indigenous in origin and oriented toward eliminating many of the negative social and environmental outcomes associated with conventional poultry production. Tree-Range poultry farmers cultivate elderberry and hazelnut trees to provide forage for birds. Marketing elderberries and hazelnuts can also provide additional farm income. Farmers use a paddock system that allows for forage to regenerate: each parcel of land is fully utilized by the birds for short periods of time followed by periods of rest, when birds are moved to another parcel. This regenerative agriculture practice helps to build biodiversity and ecosystem health. The Tree-Range Chicken brand identity aligns with emerging customer preferences for environmentally and socially responsible meat products.

Sun-Raised Farms

Sun-Raised Farms, established in 2012, is a grounds maintenance company in North Carolina that provides landowners with vegetation maintenance services around solar panel installations. Sun-Raised Farms hires farmers to graze their sheep in the aisles between solar arrays to control vegetation. This partnership provides farmers with access to pasture and compensation for their services while supporting the dual use of land for both agricultural and energy production. Sun-Raised Farms also provides landowners with resources for best practices on raising sheep and maintaining pastures. Sun-Raised Foods is the sister company to Sun-Raised Farms and sells artisanal cuts of lamb and locally-made lamb salami from animals produced by partner farms.

KEY TAKEAWAYS

Enterprise diversification can improve economic resilience for farm operations.

Producing multiple products that are aligned with market opportunities and ecological context can improve the resilience of a farm operation in the case of any number of economic or environmental disruptions. Integrating enterprises that improve the social and ecological resilience of a farm operation can lead to stronger farm viability in the future.

Implementing regenerative agricultural practices can better position producers to both mitigate and adapt to climate change.

Practices such as managed grazing, silvopasture, and cover cropping can improve soil health and the resilience of farm productivity. Cultivating production resilience will become increasingly important as Appalachia experiences increasingly variable weather patterns stemming from climate change. Because regenerative agricultural practices increase the carbon storage capacity of farmland, they are one component of climate change mitigation efforts.

Practices and production systems that improve farm resilience are aligned with emerging consumer preferences.

Many of the practices that can lead to improved enterprise resiliency such as farm diversification, environmental sustainability, and social responsibility, parallel national trends in consumer preferences and willingness to pay.

CULTIVATING AGRICULTURAL INNOVATION: AGLAUNCH INITIATIVE



2021 FIELD DAY AT AGRICENTER. CREDIT: AGLAUNCH

KEY STATS AND IMPACT

AgTech Companies Incubated or Expanded:
30+

Farmer Network:

- 24+ farmers
- 150,000 acres

New Jobs Created at Startups: 100+

Impact for Farmers

AgLaunch only works with startups focused on an environmentally and economically sustainable farming future. Some of the products developed by partner startups are now being used by thousands of growers. For example, Rantizo, an AgLaunch partner startup, uses remote imagery and drones to target spraying on areas at the greatest risk, which reduces pesticide applications and associated environmental issues while lowering input costs for farmers.

Originally launched in 2015, the AgLaunch Initiative is a Tennessee-based 501c3 nonprofit organization that connects entrepreneurs with farmers to support the development of innovative, effective agricultural technologies and value-added processing ventures. AgLaunch leads the Small Business Administration Regional Innovation Cluster for the Mississippi Delta and provides resources and support for other regions, including Appalachia, the Willamette Valley in Oregon, and the Midwest.

Agritechnology, or agtech, is the use of technology to improve agricultural production, yield, efficiency, sustainability, or profitability. AgLaunch links agtech and value-added startups with a network of farmers who partner to design and test innovative technologies intended to increase farm efficiency, create wealth for farmers and their communities, and expand adoption of sustainability practices. The framework for AgLaunch's "Farmer-Centric Innovation Model" involves three phases: 1) startups bring early ideas to farmers;

2) farmers help startups iterate their concept; and 3) startups raise money and set up headquarters in rural America. Examples of technologies tested through AgLaunch's model include a marketplace for agricultural carbon sequestration credits, a smart monitoring collar for dairy cow health and behavior, low-cost climate control devices for hoop houses, advanced lighting systems for poultry houses, and electrification of existing farm machinery, such as tractors.

The AgLaunch model intentionally diverges from conventional commercialization of agricultural innovation, which rarely includes farmers in product design and development. The conventional process can result in low satisfaction among farmers with new technologies and reluctance to share farm data. Before beginning a project, AgLaunch, the startup venture, and farmers sign a three-way contract with a detailed scope of work that ensures farmers are partners in each step of technology development. These contracts may include stock options for farmers and shared

ownership in value-added enterprises.

AgLaunch's core programming budget has held steady at around \$1 million annually over the past several years. Funding for special projects increased AgLaunch's budget significantly in 2021 to about \$3 million total. AgLaunch's programming falls into the following categories: (1) create ventures; (2) grow companies; (3) connect farms and technology; (4) cultivate new talent; and (5) provide funds. In creating new ventures, AgLaunch supports both agtech startups and value-added processing ventures that address food system challenges identified by farmers and food value-chain participants.

To accelerate the growth of early-stage companies, AgLaunch provides entrepreneurship education and consulting services to these companies as they introduce new crops or build value-added ventures. AgLaunch brings together the assets and capabilities of university and farm organization partners to experiment with ideas and bring them into practice. Another objective of AgLaunch is to cultivate a pipeline of



2021 FIELD DAY AT FORSBACH FARM. CREDIT: AGLAUNCH



JADE IN MISSISSIPPI. CREDIT: AGLAUNCH

talent prepared to meet the needs of agricultural businesses. Lastly, AgLaunch aims to provide a pathway for startup companies to access the critical funds to grow their businesses through advising services and connections to funders. Their funder network includes Innova Ag Innovation Fund IV, a \$31 million USDA-licensed Rural Business Investment Company (RBIC).

AgLaunch in Appalachia

AgLaunch's partnerships and network extend throughout much of the Appalachian Region. The organization partners with Tennessee Tech University, the Oak Ridge National Laboratory, and the University of Tennessee Institute of Agriculture to support food and agriculture sector entrepreneurs, including technology transfer from research institutions to entrepreneurs. This work will expand greatly in the coming years as the Small Business Administration recently awarded AgLaunch Engine, a for-profit subsidiary of AgLaunch Initiative, a five-year \$1.5 million contract to launch the Southern Appalachian AgriFood Innovation Cluster, hosted at the Knoxville Entrepreneur Center (KEC). The Southern Appalachian AgriFood Innovation Cluster will target support to agrifood businesses in 240 Appalachian counties in Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, and Virginia. The Cluster will leverage existing programs to support entrepreneurs in the following areas:

1. Specialty crops, including new grains for beverage and food markets
2. Regenerative and organic agriculture and carbon markets
3. New uses for forestry products
4. Pasture raised cattle
5. Local value-added products
6. Farm-to-market with novel technologies
7. Bioenergy

Key Partnerships

Farmers

AgLaunch works with farmers who are interested in innovation, regardless of scale or production system. The strength of the farmer network is grounded in its diversity. The smallest farmer in the network grows on one acre and the largest cultivates 20,000 acres. A diverse farmer network is part of AgLaunch's unique value-add to early stage agtech startups who receive feedback directly from farmers.

Startups

Startups participate with AgLaunch through a variety of programs including bootcamps and AgLaunch's flagship AgLaunch365 accelerator. Each program for entrepreneurs involves active engagement with farmers and partnership directly with aligned investors.

Funding Sources

As a nonprofit, AgLaunch receives funding from the federal government (specifically the Economic Development Administration, U.S. Department of Agriculture, and Small Business Administration), Tennessee Department of Agriculture, and several philanthropic foundations. AgLaunch minimizes financial contributions from multinational agribusinesses to avoid corporate influence on the innovations scaled through the program.

“Tried and True” Interventions

Regional agricultural stakeholders highlighted the importance of “tried and true” interventions to advance local and regional food systems in Appalachia. While high-tech technologies and innovations offer potential benefits for Appalachian farmers, so do more traditional technologies and production systems, including high tunnels and greenhouses for growing season extension, as well as small-scale tractors and harvesting equipment. In recent years, time-tested production practices such as rotational grazing, alley cropping, and silvopasture have become increasingly recognized for their ecological benefits. Many traditional technologies can improve the resilience of Appalachian agriculture with relatively low costs and low risks. However, expanding the use of time-tested technologies may still require investments to increase the accessibility of these technologies among farmers in the Region.

KEY TAKEAWAYS

Connecting innovative farmers can catalyze a culture of entrepreneurship among growers.

Connecting innovative farmers can support the development of entrepreneurialism and skills for successfully marketing agricultural products. In addition to creating networking opportunities among innovative farmers, providing farmers with resources and training to meet market opportunities can improve the likelihood that innovative ideas come to fruition in the marketplace.

Including farmers as partners in the innovation process can ensure the relevancy, effectiveness, and eventual adoption of new technologies.

New technologies, both high and low tech, can increase farm efficiency, add wealth to farmers and their communities, and expand the adoption of sustainable growing practices. Partnering with a network of farmers of different sizes and enterprise models can produce the most useful and novel

innovations. Innovations that are informed by farmers’ on-the-ground experience are more likely to meet growers’ needs and be adopted in the marketplace.

Providing farmers with a financial stake increases buy-in and innovation adoption.

When farmers have a financial stake in the success of the company commercializing an innovation, they are more “bought in” to the innovation process. Farmer engagement can increase the success potential for innovations and the likelihood that producers in the network will promote new technologies and encourage broader adoption. Providing farmers with a financial stake in innovation development also demonstrates an important commitment to fairness and authentic partnership with farmer partners.



Appendix 1

Data Sources

United States Department of Agriculture (USDA)

- **Census of Agriculture, Census Years 2017, 2012, and 2007.**
 - Note: USDA Census of Agriculture data was accessed via Mass Economics' Urban Data Platform, which uses proprietary algorithms to estimate values for suppressed data points.
- **Agricultural Marketing Service: Local Food Directories**
 - Food Hub Directory (<https://www.ams.usda.gov/local-food-directories/foodhubs>), accessed Feb. 16, 2021.
 - On-Farm Market Directory (<https://www.ams.usda.gov/local-food-directories/onfarm>), accessed Feb. 16, 2021.
 - National Farmers Market Directory (<https://www.ams.usda.gov/local-food-directories/farmersmarkets>), accessed Nov. 13, 2020.
- **Food and Nutrition Service**
 - Farmers' Markets Accepting SNAP Benefits (<https://www.fns.usda.gov/snap/farmers-markets-accepting-snap-benefits>), November 2020 List, accessed Nov. 13, 2020.
 - SNAP Redemptions Report (<https://www.fns.usda.gov/snap/redemptions-report-fy-2013-2020>), FY2013 and FY2019 Report, FY2012 and FY2017 Report, accessed Nov. 13, 2020.
- **Food Safety and Inspection Service**
 - Meat, Poultry, and Egg Product Inspection Directory (<https://fsis-prod.fsis.usda.gov/inspection/establishments/meat-poultry-and-egg-product-inspection-directory>), accessed April 23, 2021.

United States Census Bureau (USCB)

- American Community Survey (<https://www.census.gov/programs-surveys/acs>), 2014-2018 Five-Year Estimates.

Appendix 2

Interviewees

The following individuals were interviewed over the course of this project, for general qualitative research and/or in the development of case studies.

Jamie Ager

Owner, Hickory Nut Gap Farm

Carol Antonelli-Greco

Co-Founder, FARMacy WV

Fritz Boettner

Co-Director & General Manager, Turnrow Appalachian Farm Collective

Katie Commender

Agroforestry Program Director, Appalachian Sustainable Development

David Cooke

Founder & Director, Grow Appalachia

Preston Correll

Owner, Marksbury Farm Market

Dan Dalton

Three Rivers Hub Manager, Pasa Sustainable Agriculture

Jeanine Davis

Associate Professor and Extension Specialist, NC State Cooperative Extension

Aaron de Long

Delaware Valley Hub Manager, Pasa Sustainable Agriculture

Jennifer Ferre

Executive Director, WNC Communities

Lauren Horning

Region Local Product Specialist, FreshPoint, Inc.

Adam Hudson

Director of Refresh Appalachia, Coalfield Development

Charlie Jackson

Executive Director, Appalachian Sustainable Agriculture Project

April Koenig

Executive Director, Sprouting Farms

Michael Kovach

Owner, Walnut Hill Farm
Vice President, Pennsylvania Farmers Union

Dwayne McIntyre

Owner, Goshen Homestead

Lee Menius

Technical Program Coordinator for NC Choices, NC State Cooperative Extension

Smithson Mills

Economic Development Consultant, Smithson Mills Inc.

Chad Morrison

CEO, Mountaineer Food Bank

Adrienne Nelson

Western Pennsylvania Organizer, National Young Farmers Coalition

Pete Nelson

President & Executive Director, AgLaunch Initiative

Kim Niewolny

Professor of Community Education and Development, Virginia Tech University

Tom Redfern

Director of Sustainable Agriculture, Rural Action

Michael Roth

Policy Director, Pennsylvania Department of Agriculture

Leslie Schaller

President & Executive Director, ACEnet

Keiko Tanaka

Professor of Rural Sociology, University of Kentucky

Kathlyn Terry Baker

Executive Director, Appalachian Sustainable Development

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| Agriculture and Local Food Systems Databook

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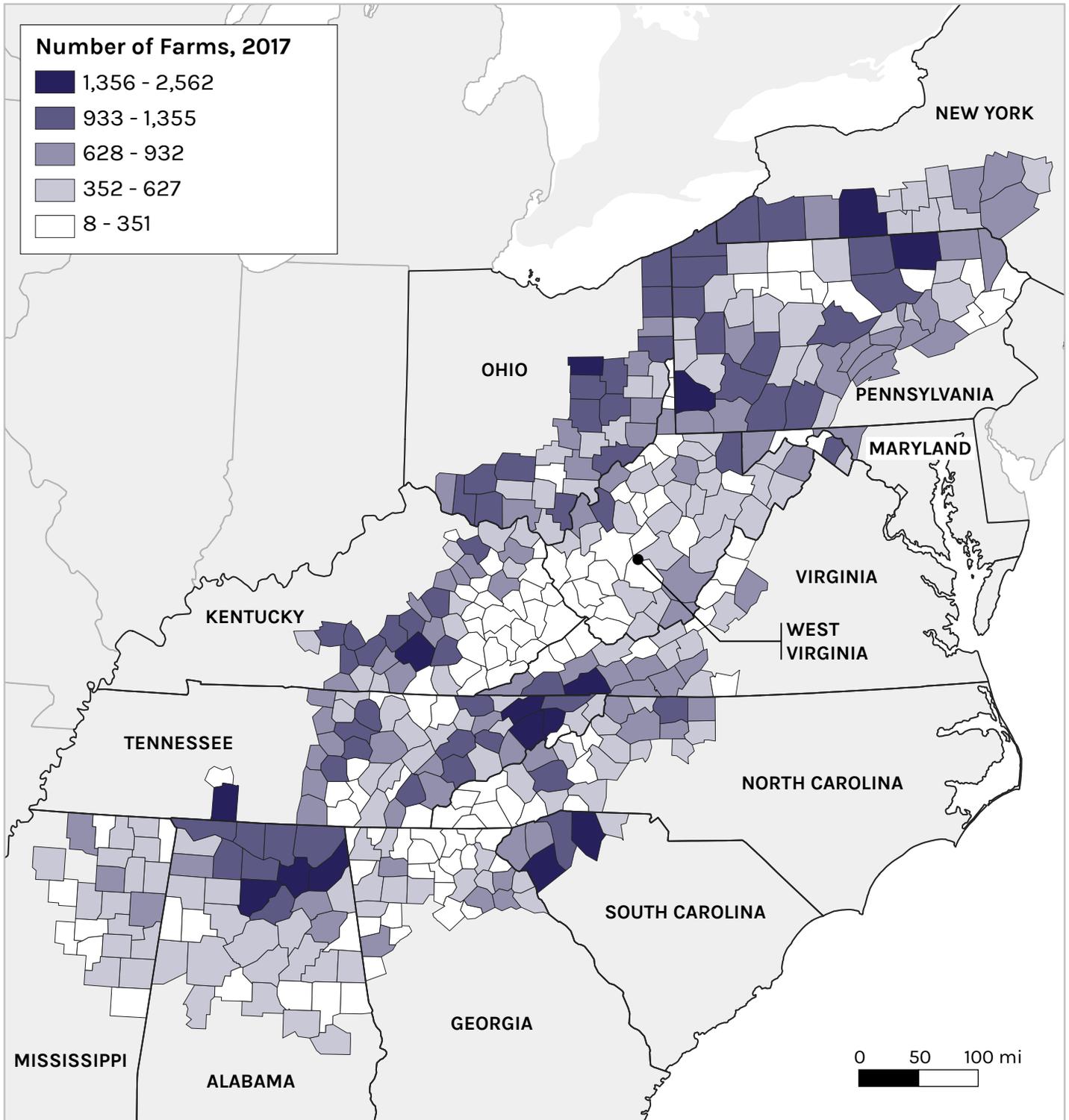


1. Farms & Farmland

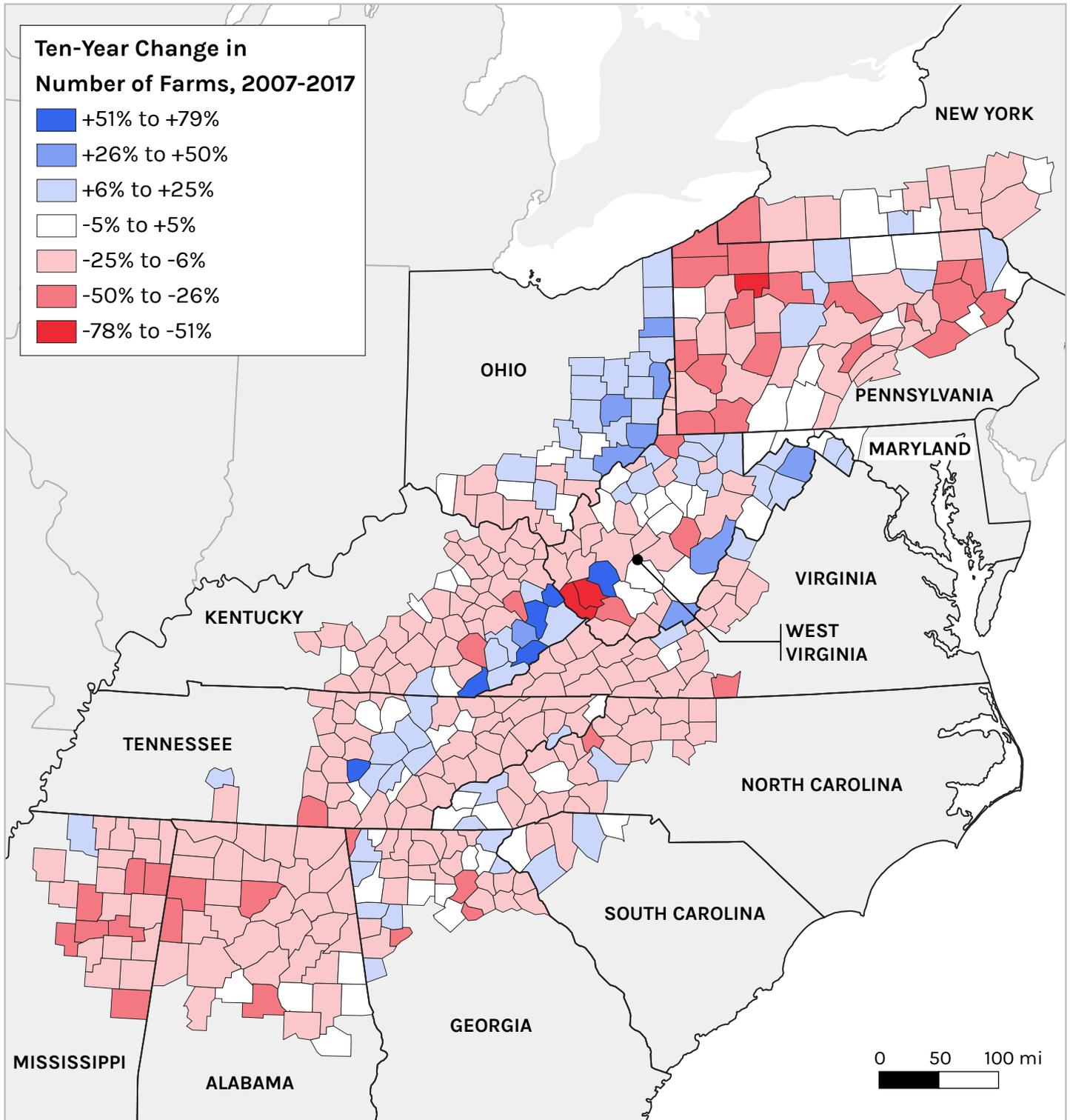
Table 1.1. Number of Farms and Land in Farms, 2017

	Farms			Farmland		
	Number of Farms	Change in Farms		Land in Farms (Acres)	Change in Farmland	
		2007-2017 (10 yr)	2012-2017 (5 yr)		2007-2017 (10 yr)	2012-2017 (5 yr)
United States	2,042,220	-7.4%	-3.2%	900,217,576	-2.4%	-1.6%
Appalachian Region	248,681	-10.7%	-3.1%	36,492,581	-4.7%	-2.6%
Subregions						
Northern Appalachia	60,886	-11.3%	-7.0%	9,355,450	-5.1%	-3.9%
North Central Appalachia	36,661	0.7%	5.2%	5,693,111	0.4%	1.5%
Central Appalachia	40,388	-11.2%	-1.9%	5,874,562	-8.1%	-2.1%
South Central Appalachia	53,837	-12.3%	-2.7%	6,402,966	-2.5%	-3.7%
Southern Appalachia	56,909	-14.6%	-4.7%	9,166,492	-6.6%	-3.2%
County Types						
Large Metros (pop. 1 million +)	21,190	-13.9%	-2.6%	2,843,883	-5.3%	-0.7%
Small Metros (pop. <1 million)	73,174	-10.1%	-1.1%	9,045,019	-5.9%	-2.8%
Nonmetro, Adjacent to Large Metros	34,150	-12.3%	-3.7%	5,485,496	-3.9%	-0.7%
Nonmetro, Adjacent to Small Metros	72,045	-9.6%	-3.8%	11,052,063	-2.1%	-2.3%
Rural (nonmetro, not adj. to a metro)	48,122	-10.8%	-4.5%	8,066,120	-7.3%	-4.7%
Appalachian States						
Alabama	40,592	-16.7%	-6.1%	8,580,940	-5.0%	-3.6%
Appalachian Alabama	26,023	-18.2%	-6.1%	4,291,185	-5.9%	-2.5%
Non-Appalachian Alabama	14,569	-14.1%	-6.1%	4,289,755	-4.2%	-4.7%
Georgia	42,439	-11.3%	0.4%	9,953,730	-1.9%	3.5%
Appalachian Georgia	13,894	-11.0%	0.1%	1,489,541	-0.3%	3.6%
Non-Appalachian Georgia	28,545	-11.5%	0.6%	8,464,189	-2.2%	3.4%
Kentucky	75,966	-10.9%	-1.4%	12,961,784	-7.4%	-0.7%
Appalachian Kentucky	27,947	-11.6%	-2.5%	4,189,096	-10.6%	-1.7%
Non-Appalachian Kentucky	48,019	-10.5%	-0.8%	8,772,688	-5.8%	-0.2%
Maryland	12,429	-3.2%	1.4%	1,990,122	-3.0%	-2.0%
Appalachian Maryland	1,874	2.8%	3.1%	244,887	-0.5%	-6.2%
Non-Appalachian Maryland	10,555	-4.1%	1.1%	1,745,235	-3.3%	-1.4%
Mississippi	34,988	-16.6%	-8.1%	10,415,136	-9.1%	-4.7%
Appalachian Mississippi	10,811	-17.8%	-10.6%	2,883,675	-10.4%	-7.4%
Non-Appalachian Mississippi	24,177	-16.1%	-7.0%	7,531,461	-8.6%	-3.6%
New York	33,438	-8.0%	-5.9%	6,866,171	-4.3%	-4.4%
Appalachian New York	10,289	-10.2%	-6.5%	2,018,558	-4.6%	-4.0%
Non-Appalachian New York	23,149	-7.0%	-5.6%	4,847,613	-4.2%	-4.6%
North Carolina	46,418	-12.3%	-7.6%	8,430,522	-0.5%	0.2%
Appalachian North Carolina	14,458	-13.3%	-9.4%	1,430,888	2.1%	1.0%
Non-Appalachian North Carolina	31,960	-11.8%	-6.7%	6,999,634	-1.0%	0.0%
Ohio	77,805	2.6%	3.1%	13,965,295	0.1%	0.0%
Appalachian Ohio	27,896	5.9%	1.7%	3,975,857	1.8%	1.5%
Non-Appalachian Ohio	49,909	0.8%	3.9%	9,989,438	-0.6%	-0.5%
Pennsylvania	53,157	-15.8%	-10.4%	7,278,668	-6.8%	-5.5%
Appalachian Pennsylvania	34,366	-19.1%	-11.8%	5,218,004	-7.6%	-5.5%
Non-Appalachian Pennsylvania	18,791	-9.2%	-7.6%	2,060,664	-4.6%	-5.6%
South Carolina	24,791	-4.2%	-1.9%	4,744,913	-3.0%	-4.6%
Appalachian South Carolina	6,181	2.3%	2.4%	502,091	-7.1%	-1.8%
Non-Appalachian South Carolina	18,610	-6.1%	-3.2%	4,242,822	-2.4%	-4.9%
Tennessee	69,983	-11.7%	2.8%	10,874,238	-0.9%	0.1%
Appalachian Tennessee	37,780	-10.8%	3.9%	4,319,474	-2.7%	-0.6%
Non-Appalachian Tennessee	32,203	-12.8%	1.7%	6,554,764	0.4%	0.5%
Virginia	43,225	-8.8%	-6.1%	7,797,979	-3.8%	-6.1%
Appalachian Virginia	13,540	-13.4%	-10.3%	2,267,147	-3.6%	-11.4%
Non-Appalachian Virginia	29,685	-6.5%	-4.0%	5,530,832	-3.9%	-3.7%
West Virginia	23,622	0.0%	9.9%	3,662,178	-1.0%	1.5%

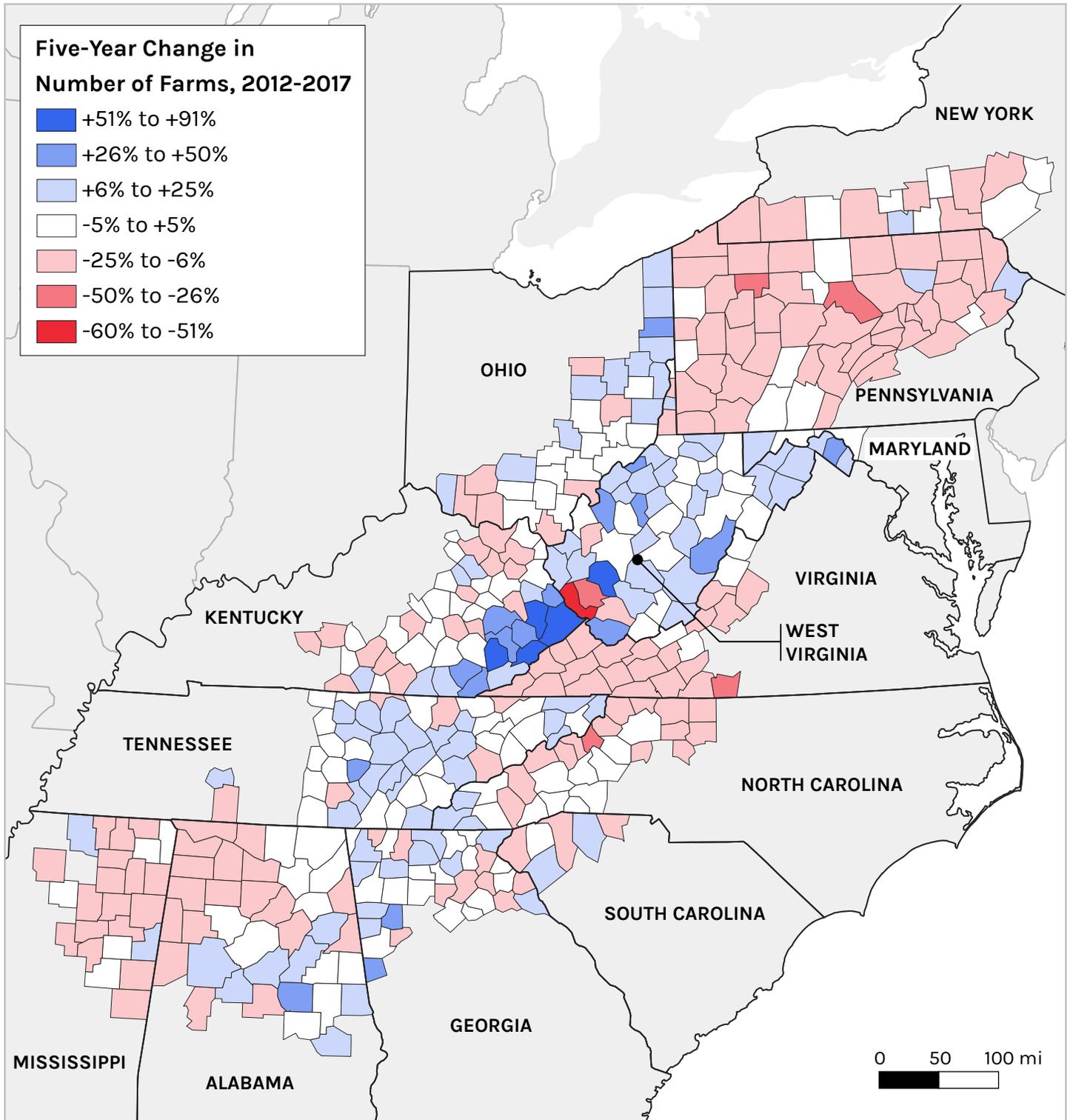
Map 1.1. Number of Farms, 2017



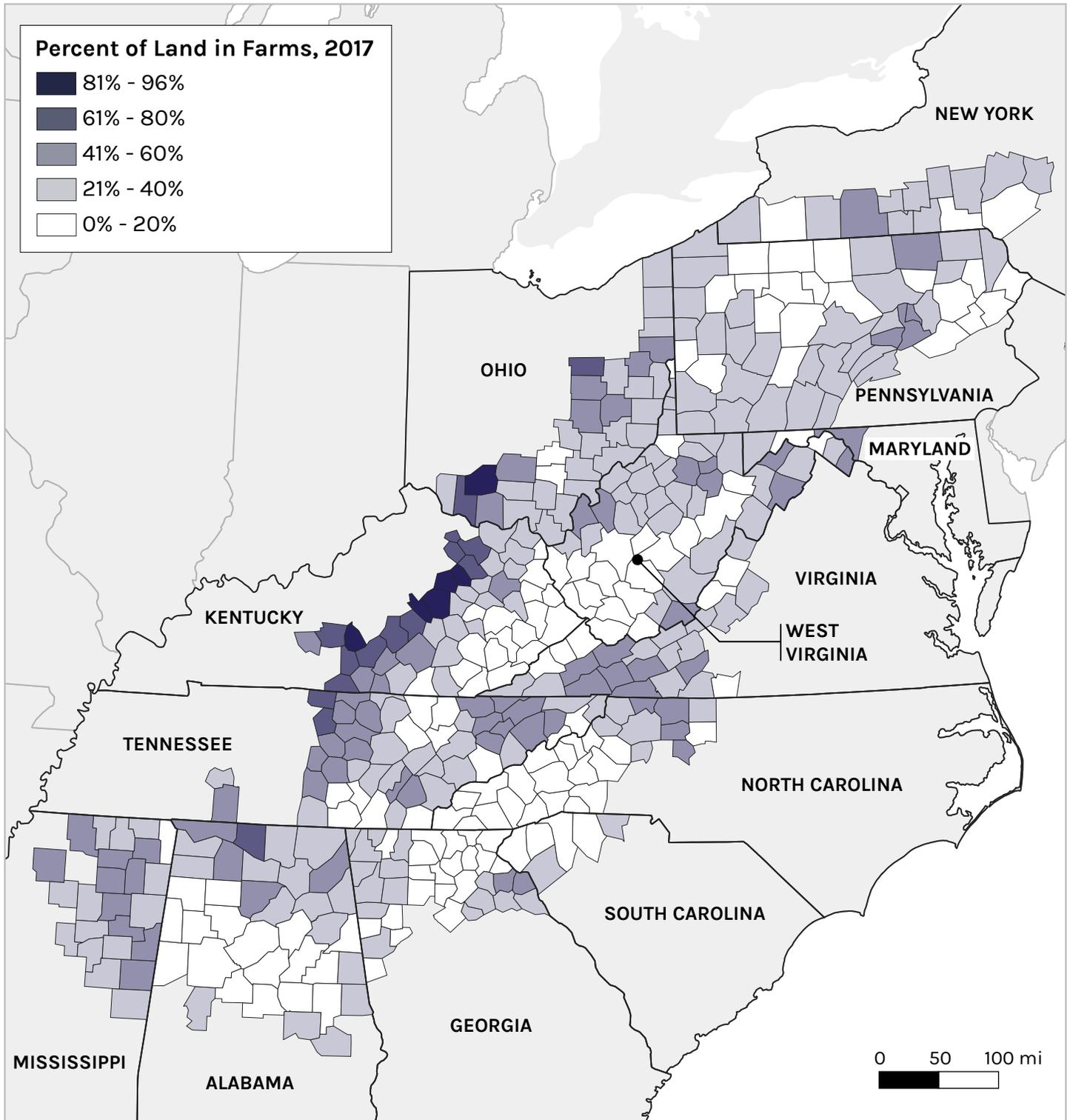
Map 1.2. Ten-Year Change in Number of Farms, 2007-2017



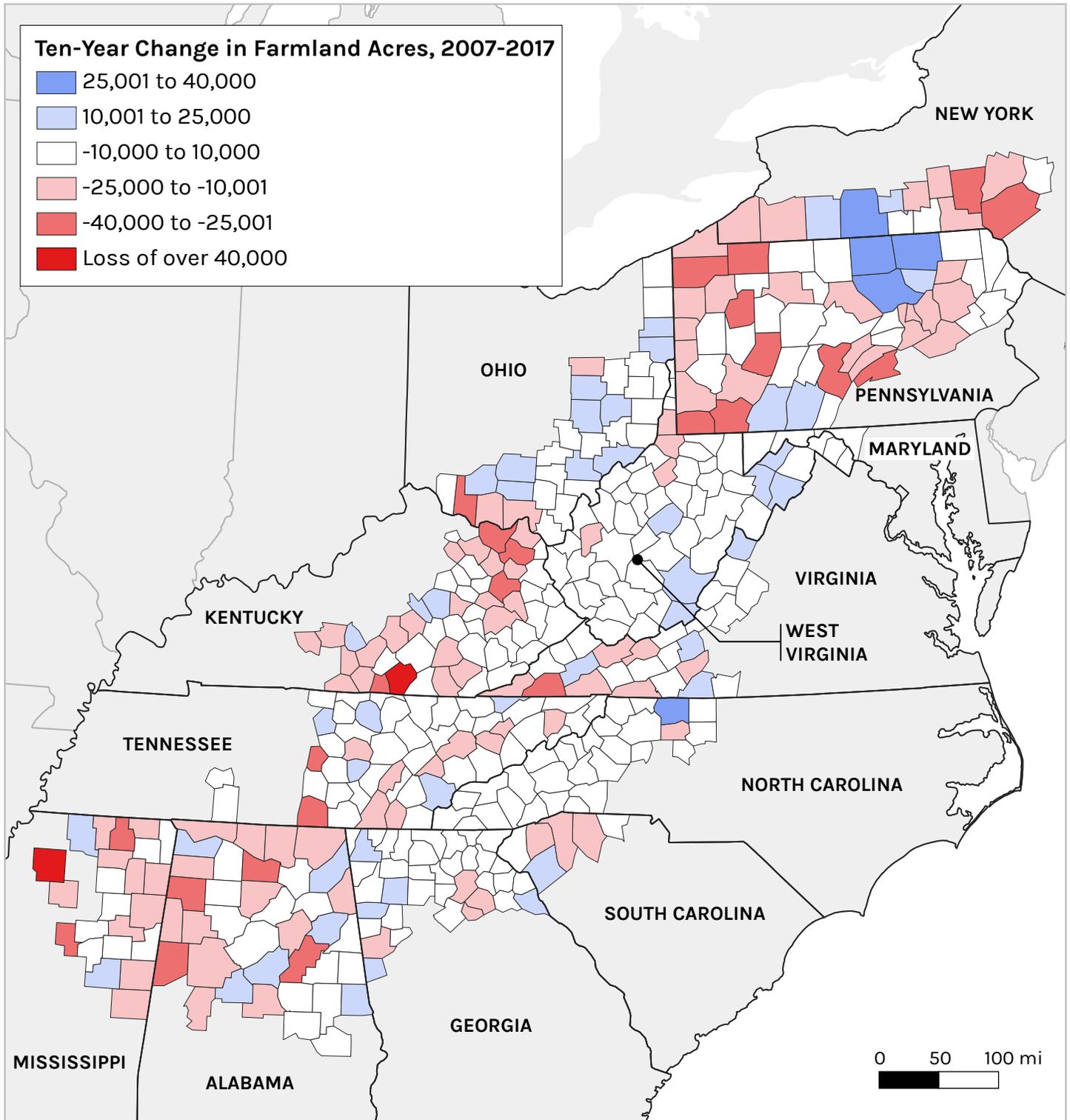
Map 1.3. Five-Year Change in Number of Farms, 2012-2017



Map 1.4. Percent of Land in Farms, 2017



Map 1.5. Ten-Year Change in Farmland Acreage, 2007-2017



Map 1.6. Five-Year Change in Farmland Acreage, 2012-2017

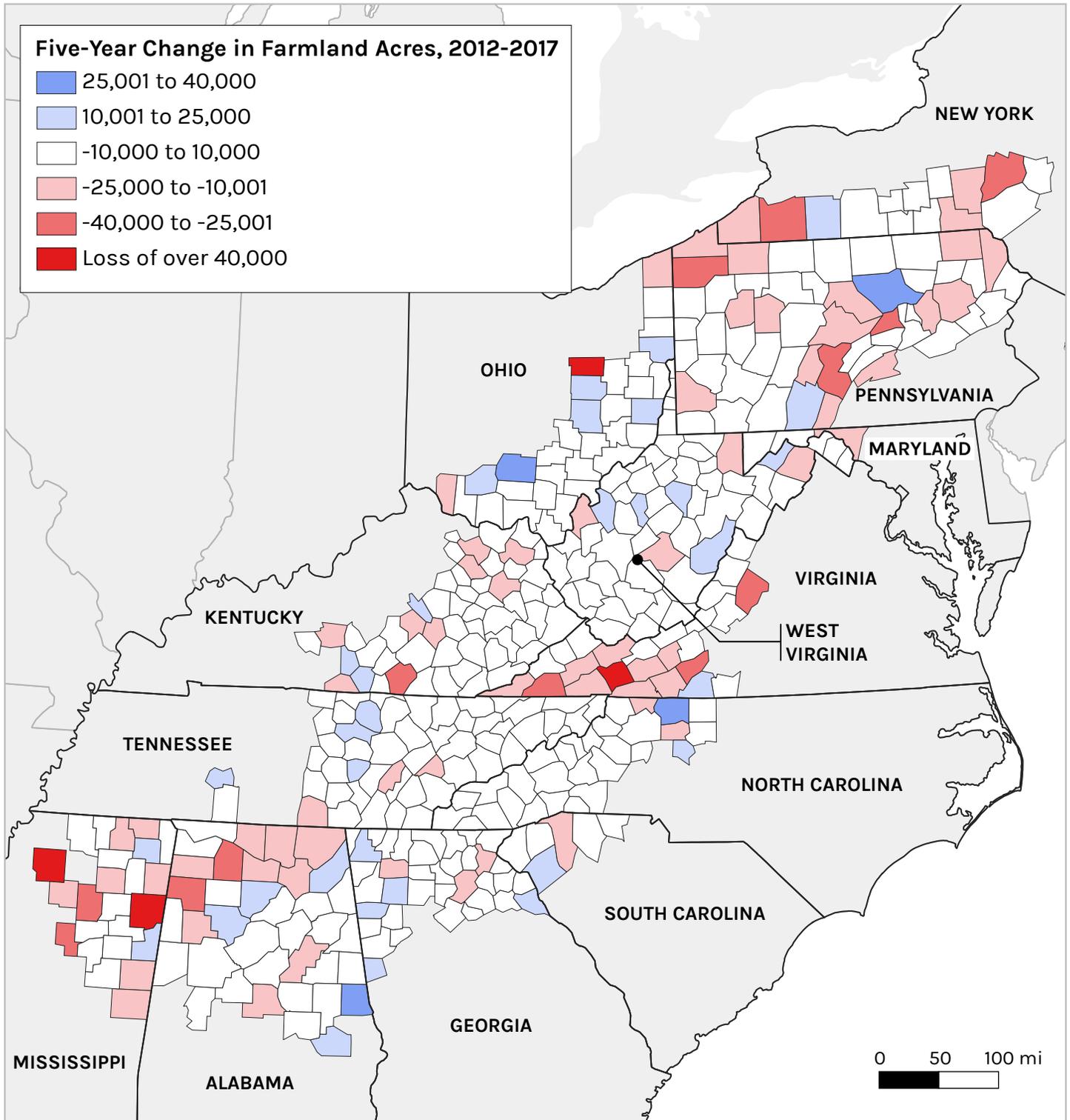


Table 1.2. Percent of Land in Farms, Farm Size, and Farmland Per Capita, 2017

	Percent of Land in Farms	Average Farm Size (acres)	Median Farm Size (acres) ¹	Acres of Farmland per Capita
United States	40%	441	75	2.8
Appalachian Region	28%	147	-	1.4
Subregions				
Northern Appalachia	26%	154	-	1.2
North Central Appalachia	30%	155	-	2.4
Central Appalachia	31%	145	-	3.2
South Central Appalachia	29%	119	-	1.3
Southern Appalachia	27%	161	-	1.1
County Types				
Large Metros (pop. 1 million +)	24%	134	-	0.5
Small Metros (pop. <1 million)	26%	124	-	0.8
Nonmetro, Adjacent to Large Metros	34%	161	-	2.5
Nonmetro, Adjacent to Small Metros	29%	153	-	2.8
Rural (nonmetro, not adj. to a metro)	27%	168	-	3.2
Appalachian States				
Alabama	26%	211	71	1.8
Appalachian Alabama	26%	165	-	1.4
Non-Appalachian Alabama	27%	294	-	2.5
Georgia	27%	235	67	1.0
Appalachian Georgia	20%	107	-	0.5
Non-Appalachian Georgia	29%	297	-	1.2
Kentucky	51%	171	70	2.9
Appalachian Kentucky	36%	150	-	3.6
Non-Appalachian Kentucky	64%	183	-	2.7
Maryland	32%	160	40	0.3
Appalachian Maryland	25%	131	-	1.0
Non-Appalachian Maryland	33%	165	-	0.3
Mississippi	35%	298	98	3.5
Appalachian Mississippi	36%	267	-	4.6
Non-Appalachian Mississippi	34%	312	-	3.2
New York	23%	205	82	0.4
Appalachian New York	27%	196	-	2.0
Non-Appalachian New York	21%	209	-	0.3
North Carolina	27%	182	52	0.8
Appalachian North Carolina	19%	99	-	0.8
Non-Appalachian North Carolina	30%	219	-	0.8
Ohio	53%	179	55	1.2
Appalachian Ohio	39%	143	-	2.0
Non-Appalachian Ohio	63%	200	-	1.0
Pennsylvania	25%	137	65	0.6
Appalachian Pennsylvania	22%	152	-	0.9
Non-Appalachian Pennsylvania	39%	110	-	0.3
South Carolina	25%	191	50	0.9
Appalachian South Carolina	21%	81	-	0.4
Non-Appalachian South Carolina	25%	228	-	1.1
Tennessee	41%	155	57	1.6
Appalachian Tennessee	34%	114	-	1.5
Non-Appalachian Tennessee	49%	204	-	1.7
Virginia	31%	180	66	0.9
Appalachian Virginia	32%	167	-	3.0
Non-Appalachian Virginia	31%	186	-	0.8
West Virginia	24%	155	81	2.0

¹ Median farm size only available at county, state, and national levels; not available for subregions or county groupings.

Table 1.3. Farms and Farmland by Farm Size, 2017

	Percent of Farms by Farm Size					Percent of Farmland by Farm Size				
	Farms Under 50 Acres	50-99 Acres	100-499 Acres	500-1,999 Acres	2,000 Acres or More	Farms Under 50 Acres	50-99 Acres	100-499 Acres	500-1,999 Acres	2,000 Acres or More
United States	42%	15%	28%	10.8%	4.2%	1.8%	2.4%	14%	24%	58%
Appalachian Region	41%	21%	33%	4.9%	0.5%	6.2%	10.0%	45%	28%	11%
Subregions										
Northern Appalachia	37%	21%	37%	5.1%	0.4%	5.1%	9.8%	49%	27%	9%
North Central Appalachia	37%	22%	36%	5.4%	0.5%	5.3%	10.0%	47%	29%	9%
Central Appalachia	38%	21%	36%	4.9%	0.3%	5.9%	10.3%	50%	27%	7%
South Central Appalachia	49%	20%	27%	3.8%	0.3%	9.1%	12.0%	44%	27%	8%
Southern Appalachia	45%	20%	29%	5.3%	0.8%	6.1%	8.7%	37%	29%	19%
County Types										
Large Metros (pop. 1 million +)	46%	21%	29%	4.0%	0.5%	7.2%	10.8%	44%	25%	13%
Small Metros (pop. <1 million)	48%	21%	28%	3.7%	0.4%	8.2%	11.7%	45%	25%	11%
Nonmetro, Adjacent to Large Metros	39%	21%	34%	5.6%	0.6%	5.5%	9.4%	42%	30%	12%
Nonmetro, Adjacent to Small Metros	38%	21%	36%	5.3%	0.4%	5.6%	9.6%	48%	28%	9%
Rural (nonmetro, not adj. to a metro)	37%	21%	36%	6.0%	0.6%	4.9%	8.8%	44%	30%	12%
Appalachian States										
Alabama	40%	19%	31%	7.8%	1.4%	4.2%	6.5%	31%	34%	24%
Appalachian Alabama	43%	21%	30%	5.5%	0.8%	5.9%	8.8%	37%	30%	19%
Non-Appalachian Alabama	34%	17%	35%	12.0%	2.3%	2.5%	4.1%	26%	39%	29%
Georgia	42%	18%	29%	8.8%	1.8%	3.8%	5.3%	27%	36%	28%
Appalachian Georgia	53%	19%	25%	2.6%	0.3%	10.5%	12.3%	48%	20%	9%
Non-Appalachian Georgia	37%	17%	31%	11.8%	2.5%	2.6%	4.1%	23%	39%	31%
Kentucky	40%	20%	34%	5.6%	0.9%	5.1%	8.2%	41%	28%	18%
Appalachian Kentucky	37%	21%	37%	5.2%	0.3%	5.4%	9.7%	51%	27%	7%
Non-Appalachian Kentucky	42%	19%	31%	5.8%	1.2%	5.0%	7.5%	36%	28%	23%
Maryland	55%	15%	23%	6.1%	1.1%	6.3%	6.5%	30%	35%	22%
Appalachian Maryland	44%	17%	35%	2.7%	0.4%	6.5%	9.6%	57%	15%	11%
Non-Appalachian Maryland	57%	14%	21%	6.7%	1.2%	6.2%	6.0%	27%	38%	23%
Mississippi	32%	19%	37%	10.0%	2.8%	2.5%	4.5%	27%	31%	35%
Appalachian Mississippi	28%	21%	40%	10.3%	1.8%	2.6%	5.5%	32%	35%	25%
Non-Appalachian Mississippi	33%	18%	36%	9.9%	3.2%	2.5%	4.1%	24%	30%	39%
New York	37%	18%	37%	7.3%	1.2%	3.5%	6.3%	39%	31%	20%
Appalachian New York	30%	19%	42%	7.4%	0.8%	3.4%	7.1%	46%	31%	13%
Non-Appalachian New York	39%	18%	34%	7.3%	1.3%	3.6%	6.0%	36%	31%	23%
North Carolina	48%	20%	25%	6.3%	1.3%	5.6%	7.5%	28%	32%	26%
Appalachian North Carolina	53%	21%	23%	2.6%	0.2%	11.4%	14.7%	44%	22%	8%
Non-Appalachian North Carolina	45%	19%	26%	7.9%	1.8%	4.4%	6.1%	25%	35%	30%
Ohio	47%	17%	27%	7.6%	1.0%	5.2%	6.9%	32%	38%	18%
Appalachian Ohio	41%	22%	32%	4.7%	0.5%	6.4%	11.1%	44%	28%	11%
Non-Appalachian Ohio	51%	14%	24%	9.2%	1.3%	4.7%	5.1%	27%	43%	20%
Pennsylvania	42%	20%	33%	4.5%	0.3%	5.9%	10.7%	49%	27%	8%
Appalachian Pennsylvania	36%	21%	38%	5.1%	0.3%	5.0%	9.9%	51%	27%	7%
Non-Appalachian Pennsylvania	54%	20%	23%	3.3%	0.3%	8.3%	12.7%	44%	25%	10%
South Carolina	50%	17%	26%	6.5%	1.5%	5.2%	6.0%	28%	31%	29%
Appalachian South Carolina	62%	17%	18%	1.9%	0.2%	15.2%	14.4%	45%	19%	6%
Non-Appalachian South Carolina	46%	16%	28%	8.0%	1.9%	4.0%	5.0%	26%	33%	32%
Tennessee	45%	20%	29%	4.9%	0.8%	6.6%	9.2%	38%	27%	19%
Appalachian Tennessee	49%	21%	27%	3.4%	0.2%	9.6%	12.7%	46%	25%	7%
Non-Appalachian Tennessee	41%	20%	31%	6.5%	1.5%	4.7%	6.9%	32%	29%	28%
Virginia	42%	18%	31%	7.2%	0.9%	4.8%	7.2%	37%	35%	16%
Appalachian Virginia	38%	20%	34%	6.5%	0.6%	5.2%	8.6%	42%	32%	12%
Non-Appalachian Virginia	44%	18%	30%	7.5%	1.0%	4.6%	6.7%	35%	37%	18%
West Virginia	35%	22%	38%	5.3%	0.4%	5.0%	10.1%	50%	28%	8%

Table 1.4. Farmland Composition and Vegetable & Orchard Acreage, 2017

	Farmland Composition				Vegetable and Orchard Acreage		
	Cropland	Woodland	Pasture-land	Other Ag Land	Vegetable and Orchard Acreage	Acreage Per 1,000 Population	Percent of Cropland in Vegetable/ Orchard Acreage
United States	44%	8%	45%	3%	11,336,860	34.7	2.9%
Appalachian Region	41%	29%	24%	6%	219,358	8.6	1.5%
Subregions							
Northern Appalachia	56%	25%	12%	7%	101,065	12.4	1.9%
North Central Appalachia	37%	34%	24%	6%	12,294	5.1	0.6%
Central Appalachia	34%	30%	31%	5%	6,047	3.3	0.3%
South Central Appalachia	37%	27%	31%	5%	36,897	7.5	1.6%
Southern Appalachia	36%	31%	26%	6%	63,055	7.6	1.9%
County Types							
Large Metros (pop. 1 million +)	44%	26%	23%	7%	12,368	2.0	1.0%
Small Metros (pop. <1 million)	43%	27%	24%	6%	66,599	6.1	1.7%
Nonmetro, Adjacent to Large Metros	49%	26%	19%	6%	43,936	20.0	1.6%
Nonmetro, Adjacent to Small Metros	39%	30%	25%	6%	37,652	9.5	0.9%
Rural (nonmetro, not adj. to a metro)	36%	33%	26%	6%	58,803	23.6	2.0%
Appalachian States							
Alabama	33%	36%	25%	6%	37,802	7.7	1.3%
Appalachian Alabama	36%	30%	28%	6%	12,758	4.1	0.8%
Non-Appalachian Alabama	30%	42%	22%	6%	24,636	14.0	1.9%
Georgia	44%	36%	13%	7%	294,603	28.0	6.7%
Appalachian Georgia	29%	29%	35%	7%	3,844	1.2	0.9%
Non-Appalachian Georgia	47%	37%	10%	7%	273,172	37.8	6.9%
Kentucky	51%	21%	23%	5%	12,675	2.8	0.2%
Appalachian Kentucky	37%	29%	29%	5%	3,632	3.1	0.2%
Non-Appalachian Kentucky	58%	17%	20%	5%	8,554	2.6	0.2%
Maryland	72%	16%	7%	6%	36,288	6.0	2.5%
Appalachian Maryland	56%	25%	15%	4%	2,013	8.0	1.5%
Non-Appalachian Maryland	74%	15%	6%	6%	31,694	6.1	2.5%
Mississippi	48%	32%	15%	6%	73,770	24.7	1.5%
Appalachian Mississippi	40%	35%	19%	6%	41,666	66.7	3.6%
Non-Appalachian Mississippi	51%	30%	14%	5%	10,732	4.5	0.3%
New York	63%	21%	8%	8%	229,994	11.8	5.4%
Appalachian New York	56%	26%	11%	8%	39,437	38.6	3.5%
Non-Appalachian New York	65%	19%	8%	8%	188,277	10.2	5.9%
North Carolina	59%	24%	11%	6%	273,873	26.4	5.5%
Appalachian North Carolina	38%	31%	24%	7%	16,343	9.3	3.0%
Non-Appalachian North Carolina	64%	22%	9%	5%	237,272	27.5	5.3%
Ohio	78%	10%	7%	4%	46,432	4.0	0.4%
Appalachian Ohio	54%	23%	18%	6%	9,706	4.9	0.5%
Non-Appalachian Ohio	88%	6%	3%	3%	34,236	3.5	0.4%
Pennsylvania	64%	20%	10%	6%	99,366	7.8	2.1%
Appalachian Pennsylvania	58%	25%	10%	6%	53,217	9.4	1.8%
Non-Appalachian Pennsylvania	79%	8%	8%	5%	45,187	6.3	2.8%
South Carolina	43%	38%	12%	7%	54,028	10.6	2.7%
Appalachian South Carolina	35%	29%	30%	6%	4,787	3.7	2.8%
Non-Appalachian South Carolina	44%	40%	10%	7%	42,669	11.2	2.3%
Tennessee	49%	23%	24%	4%	32,422	4.8	0.6%
Appalachian Tennessee	38%	26%	31%	5%	16,516	5.7	1.0%
Non-Appalachian Tennessee	55%	21%	20%	4%	6,406	1.7	0.2%
Virginia	40%	28%	26%	6%	45,559	5.4	1.5%
Appalachian Virginia	26%	30%	39%	5%	6,183	8.3	1.1%
Non-Appalachian Virginia	45%	28%	21%	6%	37,705	5.7	1.5%
West Virginia	26%	40%	28%	6%	9,256	5.1	1.0%

Table 1.5. Farm Ownership and Internet Access, 2017

	Farms Fully or Partly Owned by the Operator	Farms with Internet Access
United States	93%	75%
Appalachian Region	96%	71%
Subregions		
Northern Appalachia	96%	71%
North Central Appalachia	97%	70%
Central Appalachia	96%	70%
South Central Appalachia	96%	73%
Southern Appalachia	96%	73%
County Types		
Large Metros (pop. 1 million +)	96%	76%
Small Metros (pop. <1 million)	96%	73%
Nonmetro, Adjacent to Large Metros	97%	72%
Nonmetro, Adjacent to Small Metros	96%	71%
Rural (nonmetro, not adj. to a metro)	96%	68%
Appalachian States		
Alabama	95%	73%
Appalachian Alabama	95%	74%
Non-Appalachian Alabama	94%	70%
Georgia	95%	76%
Appalachian Georgia	96%	78%
Non-Appalachian Georgia	94%	75%
Kentucky	96%	72%
Appalachian Kentucky	96%	71%
Non-Appalachian Kentucky	96%	73%
Maryland	93%	77%
Appalachian Maryland	93%	66%
Non-Appalachian Maryland	94%	79%
Mississippi	94%	66%
Appalachian Mississippi	95%	63%
Non-Appalachian Mississippi	93%	68%
New York	96%	77%
Appalachian New York	97%	76%
Non-Appalachian New York	95%	78%
North Carolina	94%	75%
Appalachian North Carolina	95%	74%
Non-Appalachian North Carolina	94%	76%
Ohio	95%	75%
Appalachian Ohio	97%	68%
Non-Appalachian Ohio	94%	78%
Pennsylvania	94%	69%
Appalachian Pennsylvania	96%	71%
Non-Appalachian Pennsylvania	90%	66%
South Carolina	96%	73%
Appalachian South Carolina	97%	74%
Non-Appalachian South Carolina	96%	72%
Tennessee	97%	73%
Appalachian Tennessee	97%	72%
Non-Appalachian Tennessee	96%	74%
Virginia	95%	74%
Appalachian Virginia	96%	71%
Non-Appalachian Virginia	94%	76%
West Virginia	97%	70%



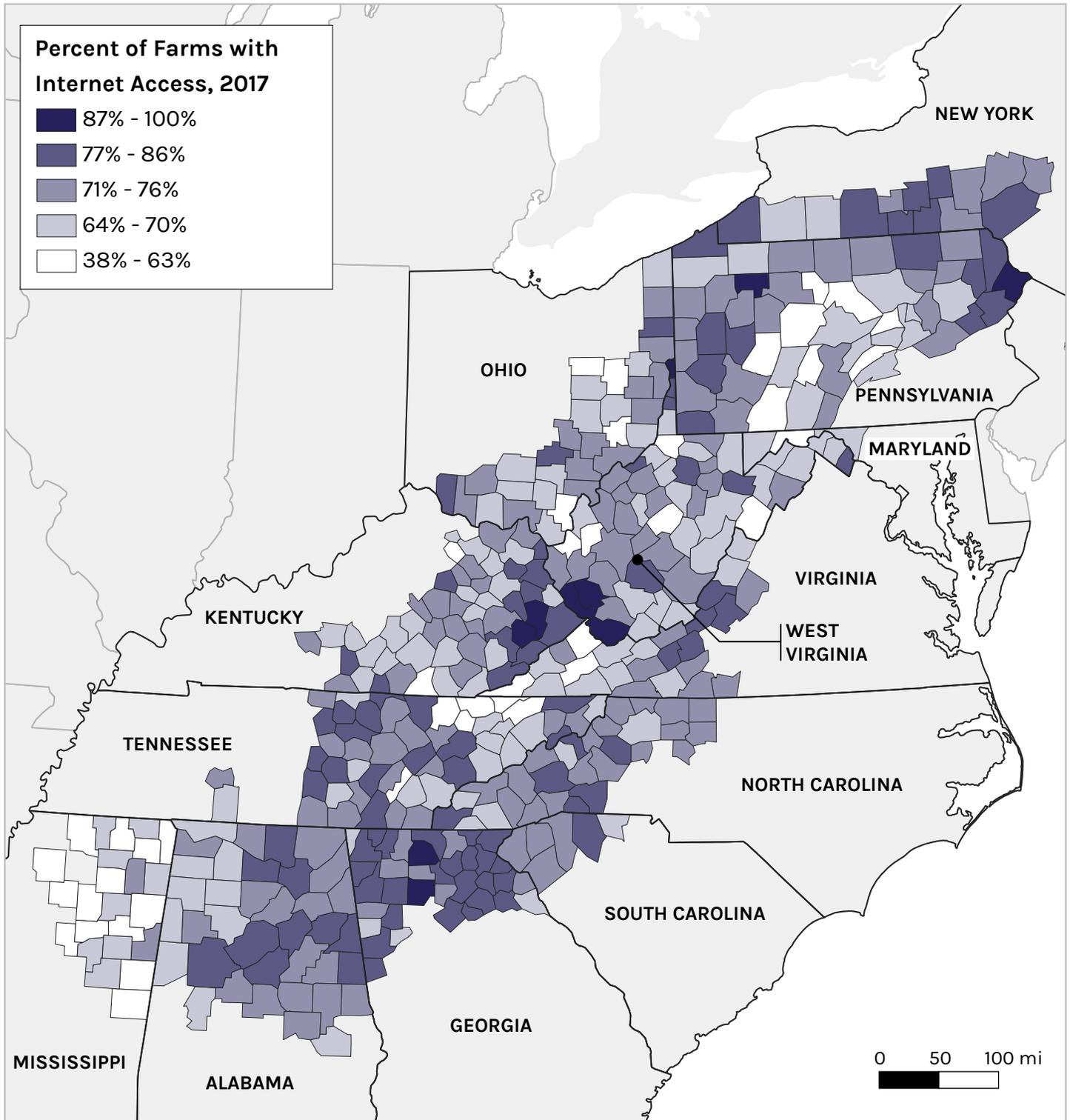
2. Farm Operator Characteristics

Table 2.1. Farmers, Female and Beginning Farmers, and Farmer Age, 2017

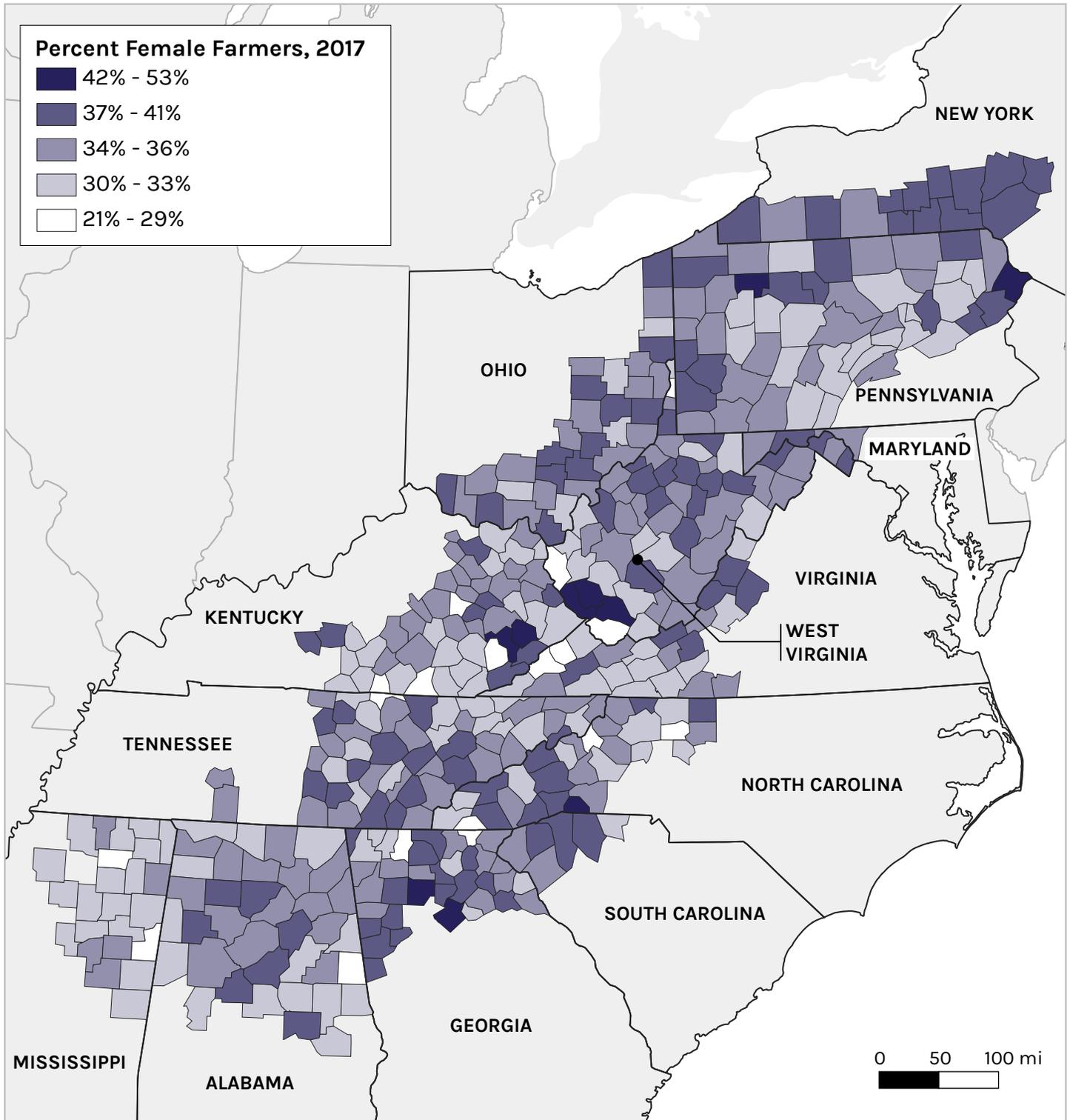
	Total Number of Producers/ Farmers	Female Farmers	Beginning Farmers ¹	Farmer Age			
				Average Age	Age 44 or younger	Age 45-64	Age 65 or older
United States	3,399,834	36%	27%	58	20%	46%	34%
Appalachian Region	405,272	35%	28%	57	20%	46%	34%
Subregions							
Northern Appalachia	102,938	35%	25%	56	23%	47%	30%
North Central Appalachia	59,766	35%	29%	57	21%	46%	34%
Central Appalachia	64,635	34%	28%	56	22%	46%	32%
South Central Appalachia	87,027	35%	26%	58	18%	45%	37%
Southern Appalachia	90,906	35%	31%	58	19%	46%	35%
County Types							
Large Metros (pop. 1 million +)	34,754	37%	28%	58	18%	47%	35%
Small Metros (pop. <1 million)	119,322	35%	29%	58	19%	46%	34%
Nonmetro, Adjacent to Large Metros	56,334	35%	26%	57	21%	47%	32%
Nonmetro, Adjacent to Small Metros	117,552	34%	27%	57	21%	46%	34%
Rural (nonmetro, not adj. to a metro)	77,310	34%	27%	57	22%	45%	33%
Appalachian States							
Alabama	64,742	34%	30%	58	18%	46%	36%
Appalachian Alabama	41,922	35%	31%	57	20%	46%	34%
Non-Appalachian Alabama	22,820	34%	29%	60	15%	45%	40%
Georgia	68,087	34%	33%	58	19%	46%	35%
Appalachian Georgia	22,557	36%	34%	57	19%	47%	34%
Non-Appalachian Georgia	45,530	33%	33%	58	18%	45%	36%
Kentucky	123,995	35%	29%	56	22%	46%	31%
Appalachian Kentucky	44,927	34%	28%	56	23%	46%	31%
Non-Appalachian Kentucky	79,068	35%	29%	56	22%	47%	31%
Maryland	21,279	38%	27%	57	20%	48%	32%
Appalachian Maryland	3,237	35%	30%	54	28%	45%	27%
Non-Appalachian Maryland	18,042	39%	27%	58	18%	49%	33%
Mississippi	54,997	33%	28%	59	17%	45%	38%
Appalachian Mississippi	16,453	32%	26%	60	16%	44%	40%
Non-Appalachian Mississippi	38,544	34%	29%	59	18%	46%	37%
New York	57,865	38%	27%	56	23%	48%	29%
Appalachian New York	17,591	38%	26%	56	22%	48%	30%
Non-Appalachian New York	40,274	38%	27%	56	23%	48%	29%
North Carolina	74,062	33%	27%	58	18%	46%	36%
Appalachian North Carolina	23,467	34%	27%	58	18%	45%	37%
Non-Appalachian North Carolina	50,595	32%	28%	58	18%	46%	36%
Ohio	128,686	34%	26%	56	24%	47%	29%
Appalachian Ohio	46,675	36%	26%	56	23%	48%	30%
Non-Appalachian Ohio	82,011	32%	26%	56	24%	47%	29%
Pennsylvania	90,461	35%	26%	55	26%	45%	29%
Appalachian Pennsylvania	57,835	35%	24%	56	22%	46%	32%
Non-Appalachian Pennsylvania	32,626	35%	29%	52	34%	43%	23%
South Carolina	38,970	35%	29%	58	18%	46%	36%
Appalachian South Carolina	9,974	37%	31%	57	19%	47%	34%
Non-Appalachian South Carolina	28,996	34%	29%	59	18%	46%	37%
Tennessee	113,599	35%	27%	58	18%	46%	36%
Appalachian Tennessee	60,946	35%	27%	58	18%	46%	36%
Non-Appalachian Tennessee	52,653	36%	28%	58	18%	47%	35%
Virginia	70,594	36%	27%	59	18%	45%	37%
Appalachian Virginia	21,565	34%	24%	59	17%	45%	37%
Non-Appalachian Virginia	49,029	37%	28%	58	18%	45%	37%
West Virginia	38,123	35%	31%	57	20%	45%	35%

¹ Defined as farmers with 0-10 years experience

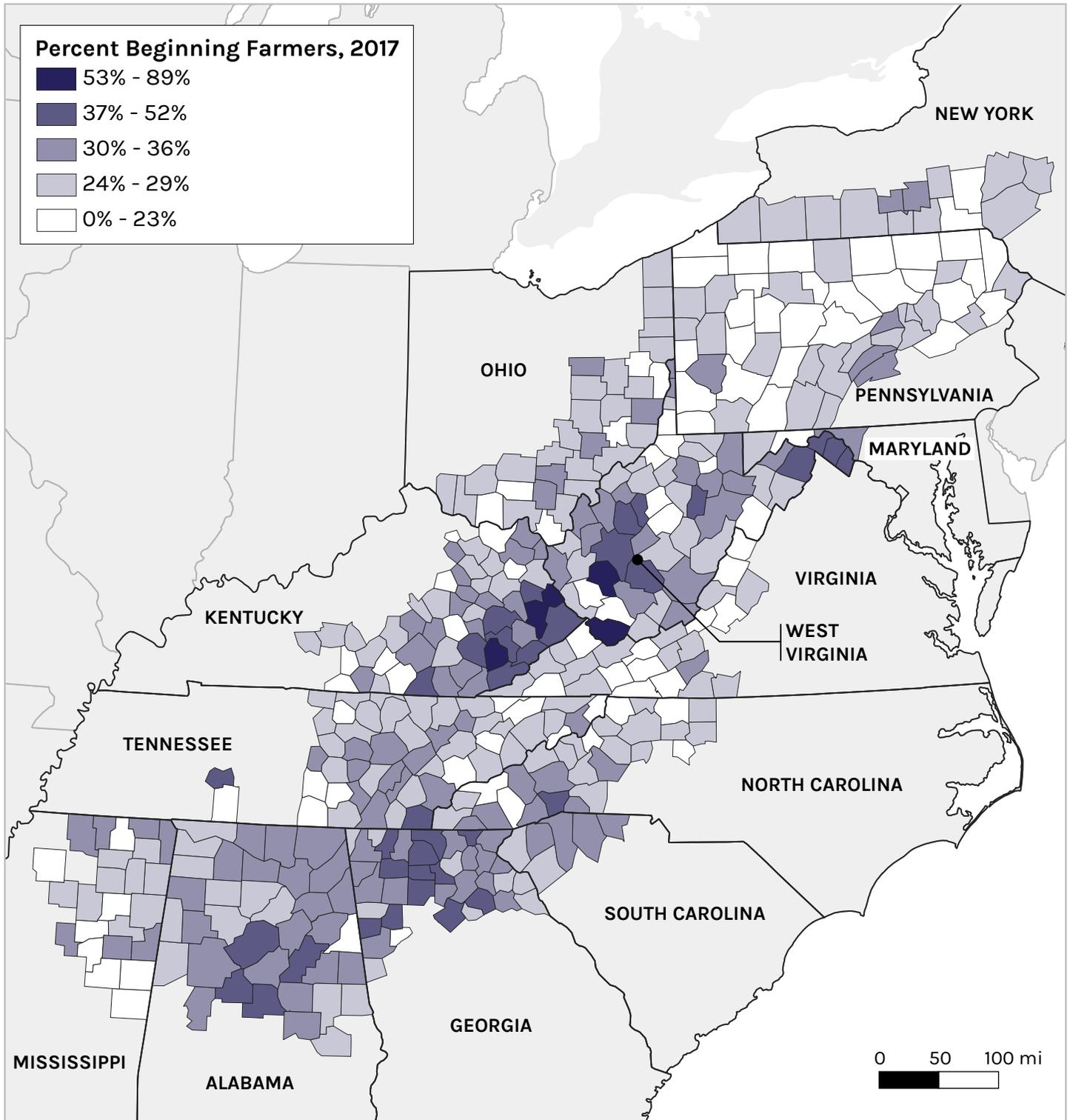
Map 2.1. Percent of Farms with Internet Access, 2017



Map 2.2. Percent Female Farmers, 2017



Map 2.3. Percent Beginning Farmers¹, 2017



¹ Defined as farmers with 0-10 years experience

Table 2.2. Participation in Farming by Race and Hispanic Origin, 2017

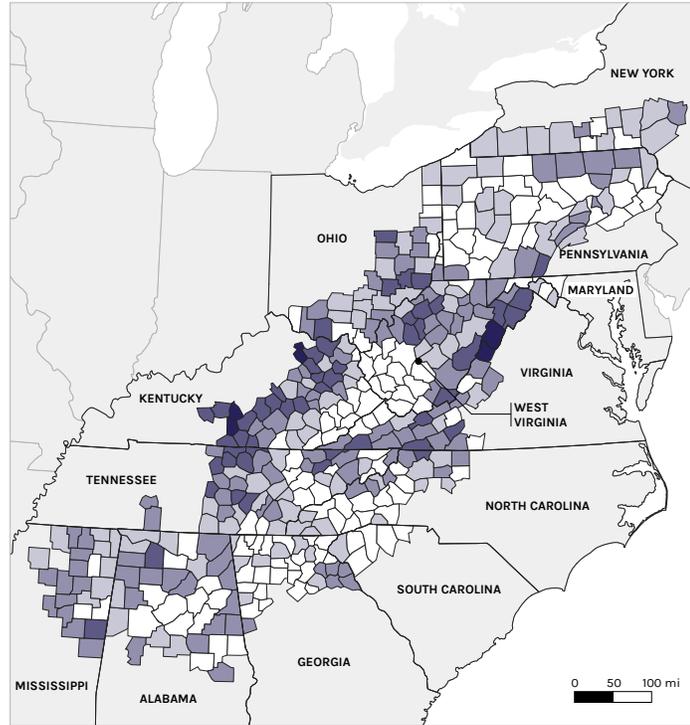
	Number of Farmers per 1,000 Residents by Race and Hispanic Origin ¹							
	All	Hispanic	American Indian	Asian	Black/African American	Hawaiian / Pacific Islander	White	Multi-Race
United States	10.4	2.0	21.6	1.3	1.1	5.2	13.8	2.6
Appalachian Region	15.8	2.8	17.8	1.6	1.7	9.2	18.4	4.3
Subregions								
Northern Appalachia	12.6	3.2	9.6	0.9	0.1	6.4	13.8	2.1
North Central Appalachia	24.9	13.9	27.2	3.3	1.3	23.1	26.2	7.3
Central Appalachia	34.7	15.2	26.6	7.2	5.0	6.6	35.7	11.0
South Central Appalachia	17.7	3.6	12.7	2.8	1.0	5.0	20.4	5.0
Southern Appalachia	10.9	1.3	22.7	1.4	2.2	12.9	14.4	4.2
County Types								
Large Metros (pop. 1 million +)	5.7	0.7	7.7	0.3	0.5	4.4	7.4	1.3
Small Metros (pop. <1 million)	11.0	2.0	16.7	1.3	1.1	6.0	12.7	3.2
Nonmetro, Adjacent to Large Metros	25.6	5.6	21.0	6.7	4.1	13.3	27.8	5.4
Nonmetro, Adjacent to Small Metros	29.7	7.3	20.2	12.4	3.0	17.5	32.1	10.7
Rural (nonmetro, not adj. to a metro)	31.0	12.8	29.5	6.5	7.8	17.6	33.6	9.7
Appalachian States								
Alabama	13.2	2.8	30.0	2.2	3.2	7.8	17.8	6.7
Appalachian Alabama	13.4	2.5	38.4	2.0	1.7	6.1	17.6	7.5
Non-Appalachian Alabama	13.0	3.6	18.5	2.4	5.0	15.5	18.3	5.2
Georgia	6.5	1.0	6.3	1.1	0.9	4.9	10.6	1.6
Appalachian Georgia	6.9	0.7	6.3	1.1	0.4	14.7	9.4	1.8
Non-Appalachian Georgia	6.3	1.2	6.3	1.2	0.9	2.6	11.3	1.6
Kentucky	27.7	5.0	23.0	2.2	1.7	14.6	31.7	5.0
Appalachian Kentucky	38.6	13.2	28.6	7.8	7.7	11.4	39.7	11.4
Non-Appalachian Kentucky	23.9	3.9	20.3	1.8	1.3	14.9	28.4	3.8
Maryland	3.5	0.5	4.2	0.8	0.2	6.2	6.1	0.6
Appalachian Maryland	12.9	4.9	55.8	0.6	0.1	0.0	14.8	1.5
Non-Appalachian Maryland	3.5	0.4	2.8	0.8	0.2	7.1	5.8	0.6
Mississippi	18.4	6.1	10.5	5.3	6.2	33.9	27.1	6.5
Appalachian Mississippi	26.3	7.7	30.5	4.1	9.7	58.4	35.3	10.8
Non-Appalachian Mississippi	16.3	5.7	8.5	5.5	5.4	27.1	24.6	5.3
New York	3.0	0.2	1.6	0.1	0.0	5.0	4.6	0.4
Appalachian New York	17.2	5.0	5.7	1.7	0.7	6.9	18.5	2.9
Non-Appalachian New York	2.2	0.1	1.3	0.1	0.0	4.9	3.4	0.3
North Carolina	7.1	0.8	6.1	1.5	0.9	2.6	10.1	1.3
Appalachian North Carolina	13.3	1.8	7.3	3.8	0.7	0.0	15.6	3.8
Non-Appalachian North Carolina	5.9	0.7	6.0	1.3	1.0	3.3	8.6	0.9
Ohio	11.0	2.2	7.3	0.7	0.1	6.1	13.4	1.6
Appalachian Ohio	23.4	6.8	21.0	3.0	1.0	16.6	25.0	4.7
Non-Appalachian Ohio	8.5	1.7	4.4	0.6	0.1	4.7	10.6	1.2
Pennsylvania	7.1	0.8	4.3	0.2	0.1	5.6	8.7	1.0
Appalachian Pennsylvania	10.2	2.4	8.6	0.6	0.1	7.1	11.2	1.8
Non-Appalachian Pennsylvania	4.6	0.4	2.5	0.2	0.1	4.4	6.2	0.5
South Carolina	7.7	1.5	9.6	1.5	1.9	7.3	10.8	2.1
Appalachian South Carolina	7.7	1.3	6.4	2.0	0.9	17.7	10.0	1.9
Non-Appalachian South Carolina	7.6	1.6	10.5	1.3	2.1	4.6	11.1	2.1
Tennessee	16.8	3.4	18.4	1.9	1.2	6.3	21.5	4.3
Appalachian Tennessee	20.9	5.4	23.2	2.6	1.0	10.3	23.2	5.6
Non-Appalachian Tennessee	13.7	2.5	14.6	1.6	1.3	3.8	19.8	3.4
Virginia	8.3	1.1	7.3	0.5	1.0	5.6	11.9	1.3
Appalachian Virginia	28.9	16.4	24.5	2.6	2.0	0.0	34.4	10.9
Non-Appalachian Virginia	7.4	1.0	8.3	0.5	1.7	7.7	11.4	1.3
West Virginia	21.1	14.1	22.1	3.6	0.5	17.1	22.1	6.8

¹ For each demographic group, both the farmers and residents are defined by that group. For example, the Appalachian Region has 2.8 Hispanic farmers for every 1,000 Hispanic residents.

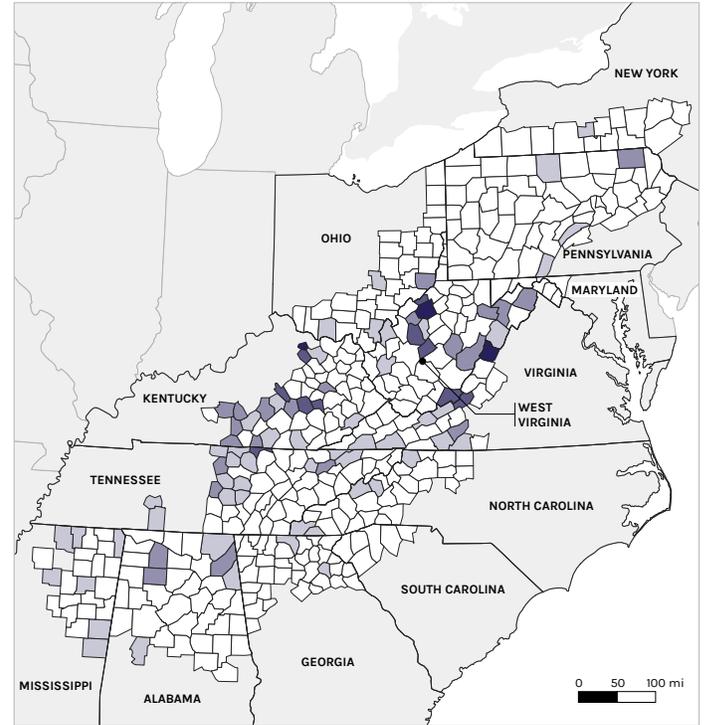
Maps 2.4a-d. Number of Farmers by Race and Hispanic Origin, 2017

Legend: More than 120 61 - 120 31 - 60 16 - 30 0 - 15

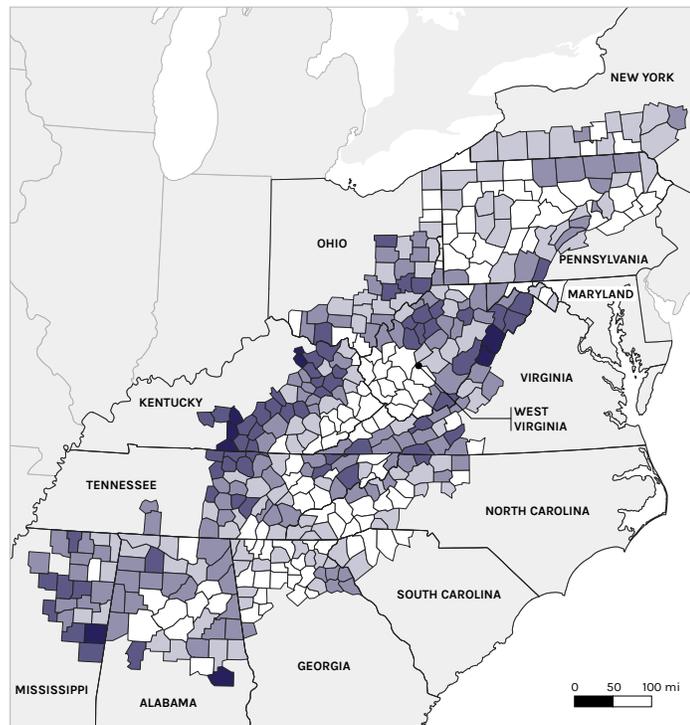
Map 2.4a. Number of Farmers per 1,000 Residents, 2017



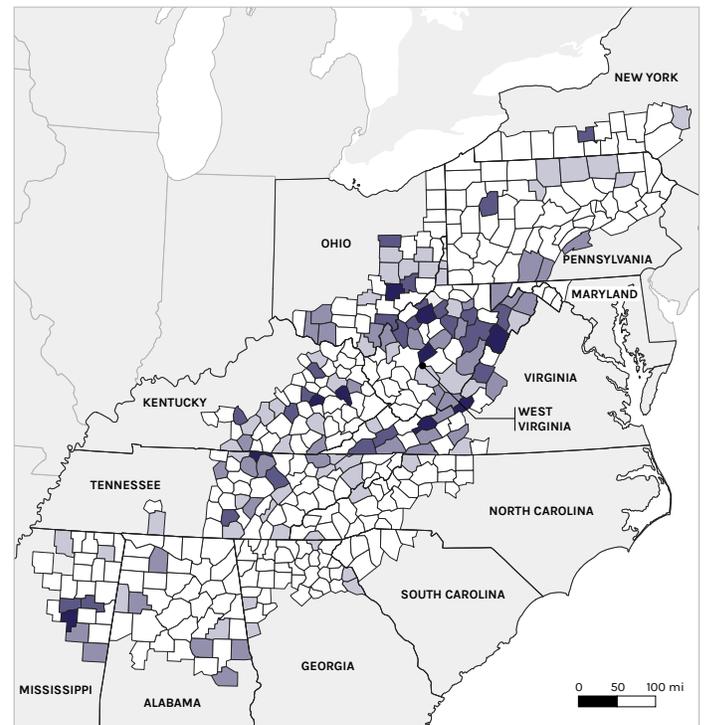
Map 2.4b. Number of Non-White Farmers per 1,000 Non-White Residents, 2017



Map 2.4c. Number of White Farmers per 1,000 White Residents, 2017



Map 2.4d. Number of Hispanic Farmers per 1,000 Hispanic Residents, 2017



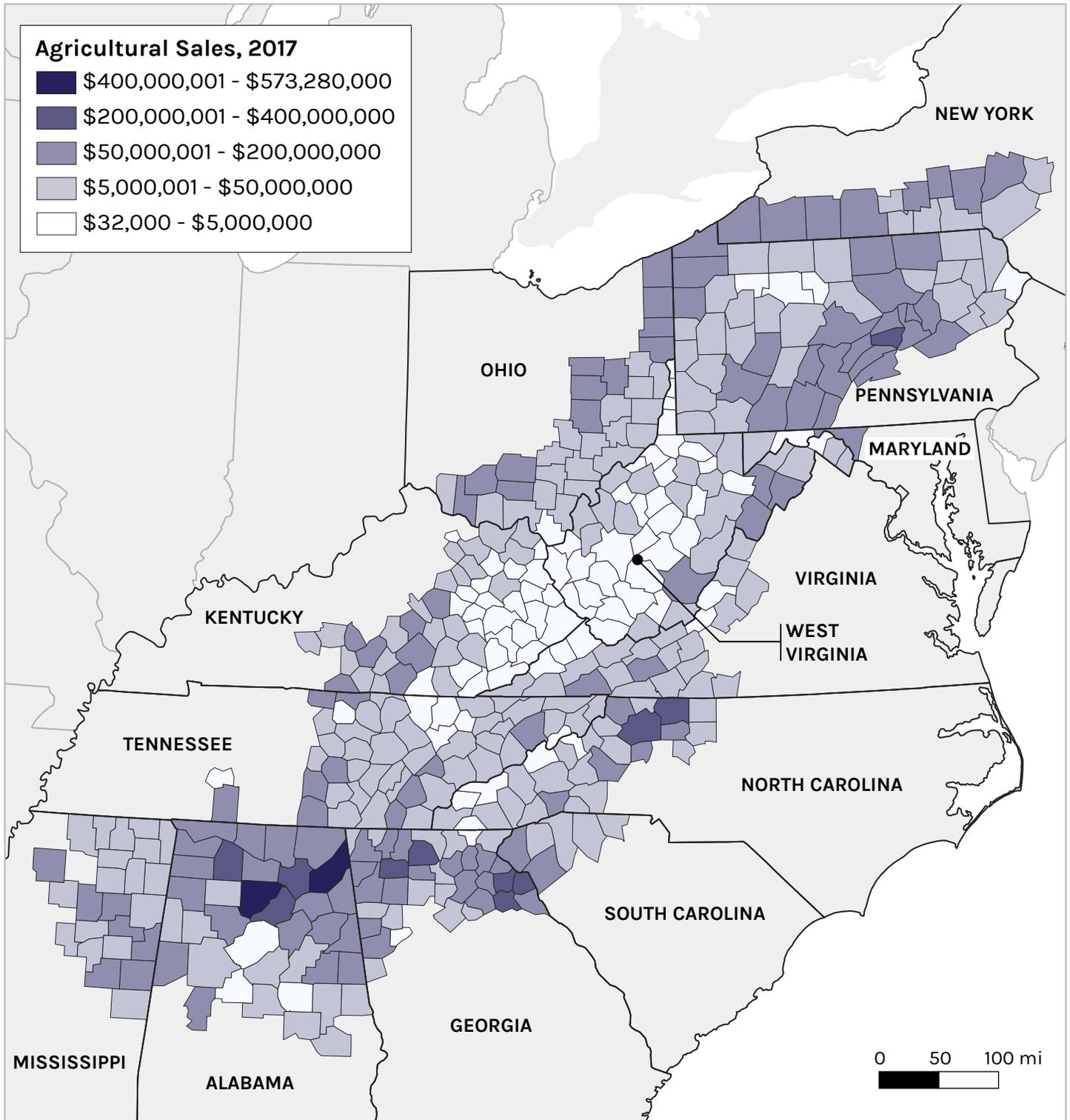


3. Sales and Products

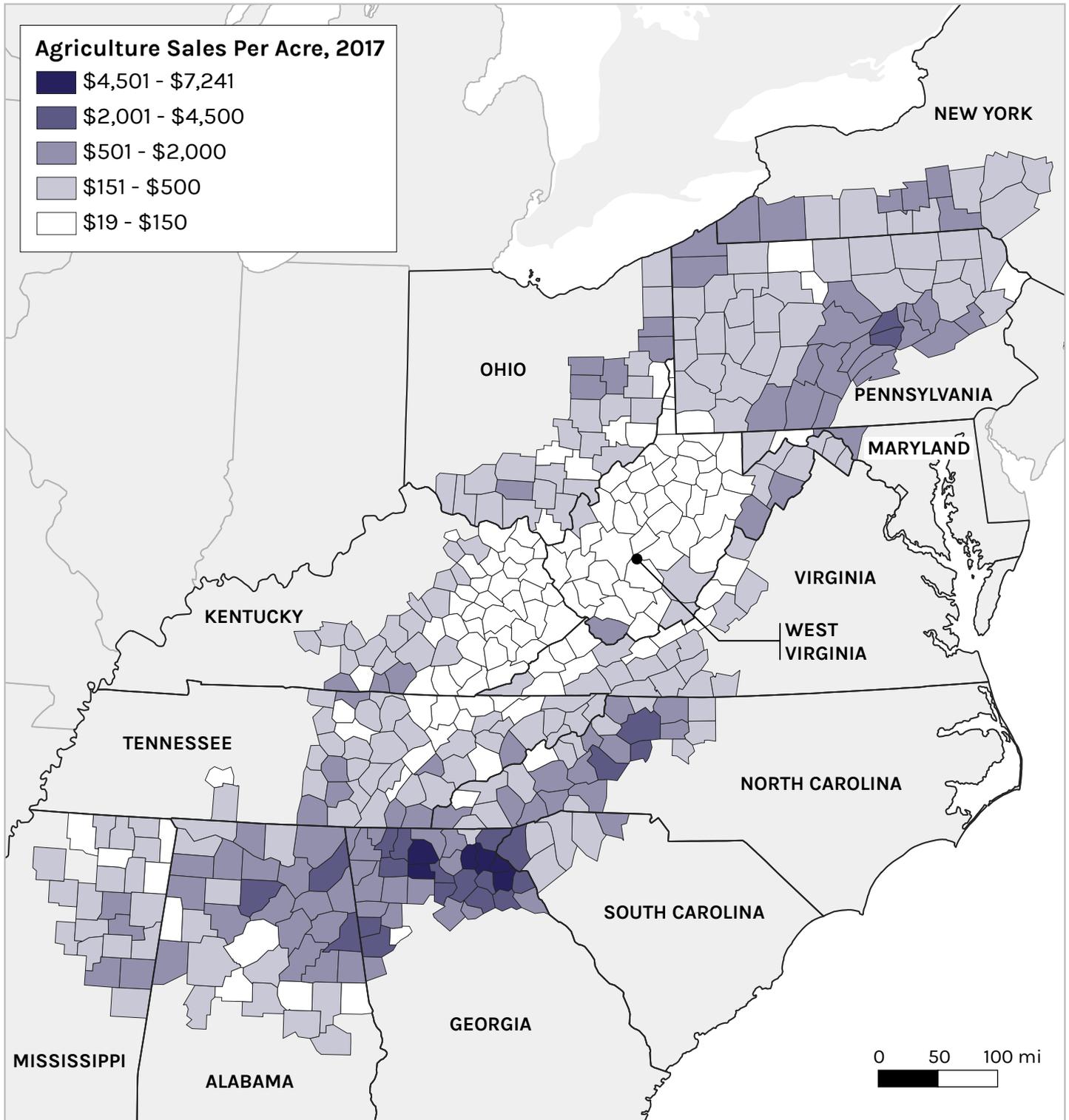
Table 3.1. Agriculture Sales, Sales and Net Income Per Acre, and Organic Share of Sales, 2017

	Agriculture Sales (Millions)	Change in Sales		Sales & Net Income Per Acre		Organic Share of All Sales
		2007-2017 (10 yr)	2012-2017 (5 yr)	Sales	Net Income	
United States	\$388,523 M	31%	-2%	\$432	\$98	1.9%
Appalachian Region	\$19,822 M	30%	6%	\$543	\$143	1.6%
Subregions						
Northern Appalachia	\$5,239 M	33%	5%	\$560	\$155	5.2%
North Central Appalachia	\$1,348 M	38%	-4%	\$237	\$44	1.0%
Central Appalachia	\$1,333 M	25%	6%	\$227	\$38	0.2%
South Central Appalachia	\$3,234 M	22%	6%	\$505	\$112	0.4%
Southern Appalachia	\$8,668 M	31%	7%	\$946	\$280	0.1%
County Types						
Large Metros (pop. 1 million +)	\$1,605 M	16%	4%	\$564	\$145	0.7%
Small Metros (pop. <1 million)	\$5,015 M	32%	3%	\$554	\$127	1.2%
Nonmetro, Adjacent to Large Metros	\$3,739 M	22%	6%	\$682	\$206	1.0%
Nonmetro, Adjacent to Small Metros	\$6,595 M	32%	10%	\$597	\$159	1.9%
Rural (nonmetro, not adj. to a metro)	\$2,868 M	40%	2%	\$356	\$93	2.5%
Appalachian States						
Alabama	\$5,981 M	35%	7%	\$697	\$191	0.0%
Appalachian Alabama	\$3,821 M	34%	12%	\$891	\$235	0.0%
Non-Appalachian Alabama	\$2,159 M	38%	0%	\$503	\$147	0.0%
Georgia	\$9,573 M	35%	3%	\$962	\$303	0.3%
Appalachian Georgia	\$3,657 M	25%	6%	\$2,455	\$811	0.1%
Non-Appalachian Georgia	\$5,917 M	41%	2%	\$699	\$214	0.4%
Kentucky	\$5,738 M	19%	13%	\$443	\$122	0.2%
Appalachian Kentucky	\$969 M	23%	4%	\$231	\$40	0.2%
Non-Appalachian Kentucky	\$4,769 M	18%	15%	\$544	\$161	0.2%
Maryland	\$2,473 M	35%	9%	\$1,243	\$331	1.2%
Appalachian Maryland	\$187 M	66%	31%	\$763	\$213	1.2%
Non-Appalachian Maryland	\$2,286 M	33%	7%	\$1,310	\$348	1.2%
Mississippi	\$6,196 M	27%	-4%	\$595	\$214	0.2%
Appalachian Mississippi	\$872 M	48%	-7%	\$302	\$101	0.2%
Non-Appalachian Mississippi	\$5,324 M	24%	-3%	\$707	\$258	0.2%
New York	\$5,369 M	22%	-1%	\$782	\$209	3.8%
Appalachian New York	\$1,009 M	21%	1%	\$500	\$156	5.3%
Non-Appalachian New York	\$4,360 M	22%	-1%	\$899	\$231	3.5%
North Carolina	\$12,901 M	25%	2%	\$1,530	\$477	1.0%
Appalachian North Carolina	\$1,497 M	25%	11%	\$1,046	\$322	0.5%
Non-Appalachian North Carolina	\$11,404 M	25%	1%	\$1,629	\$509	1.1%
Ohio	\$9,341 M	32%	-7%	\$669	\$165	1.1%
Appalachian Ohio	\$1,499 M	49%	3%	\$377	\$71	2.4%
Non-Appalachian Ohio	\$7,842 M	29%	-9%	\$785	\$203	0.8%
Pennsylvania	\$7,759 M	34%	5%	\$1,066	\$307	9.1%
Appalachian Pennsylvania	\$3,140 M	31%	5%	\$602	\$176	6.0%
Non-Appalachian Pennsylvania	\$4,619 M	35%	5%	\$2,241	\$640	11.2%
South Carolina	\$3,009 M	28%	-1%	\$634	\$171	0.6%
Appalachian South Carolina	\$318 M	17%	19%	\$634	\$126	0.5%
Non-Appalachian South Carolina	\$2,690 M	29%	-3%	\$634	\$177	0.6%
Tennessee	\$3,799 M	45%	5%	\$349	\$70	0.1%
Appalachian Tennessee	\$1,532 M	16%	7%	\$355	\$54	0.1%
Non-Appalachian Tennessee	\$2,267 M	75%	4%	\$346	\$81	0.1%
Virginia	\$3,961 M	36%	6%	\$508	\$107	0.9%
Appalachian Virginia	\$566 M	37%	-3%	\$249	\$35	0.6%
Non-Appalachian Virginia	\$3,395 M	36%	7%	\$614	\$137	1.0%
West Virginia	\$754 M	27%	-7%	\$206	\$37	0.5%

Map 3.1. Agricultural Sales, 2017



Map 3.2. Agriculture Sales Per Acre, 2017



Map 3.3. Net Cash Farm Income (Profits) Per Acre, 2017

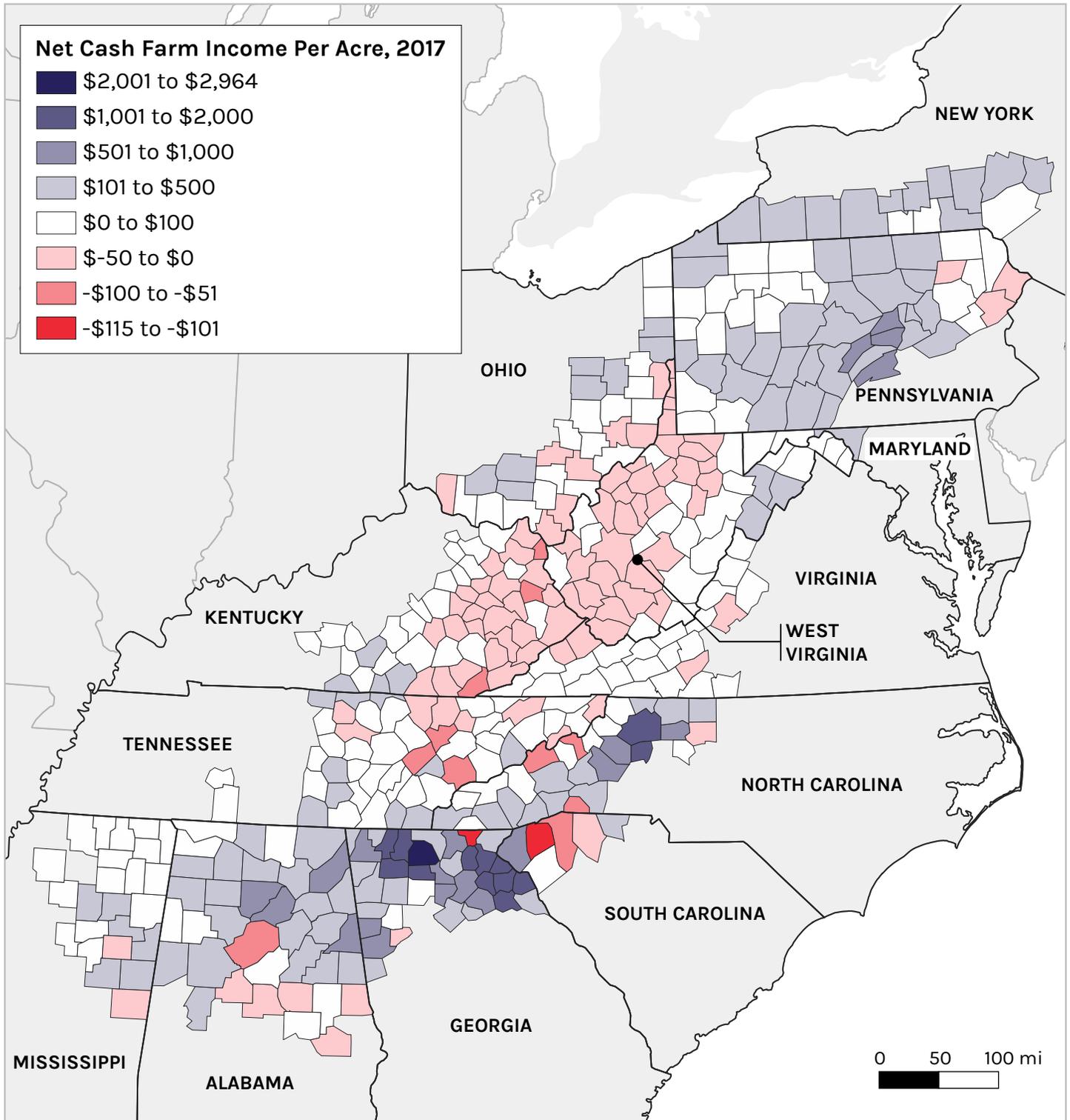
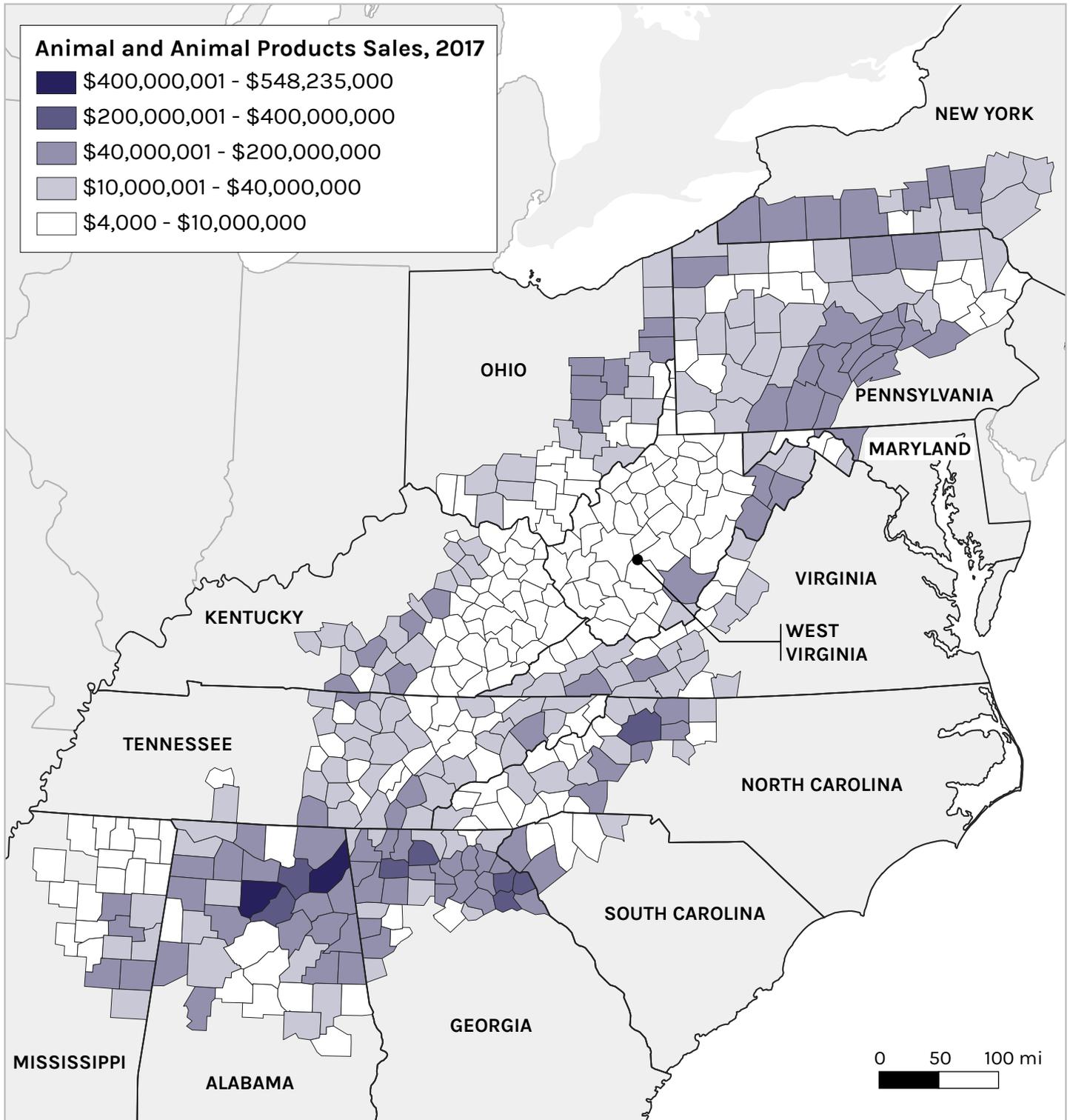


Table 3.2. Crop Sales and Animal/Animal Products Sales, 2017

	Sales (Millions)			Percent of Total Agriculture Sales	
	All Products ¹	Crops	Animal and Animal Products	Crops	Animal and Animal Products
United States	\$388,523 M	\$193,547 M	\$194,976 M	49.8%	50.2%
Appalachian Region	\$19,822 M	\$5,074 M	\$14,748 M	25.6%	74.4%
Subregions					
Northern Appalachia	\$5,239 M	\$1,786 M	\$3,453 M	34.1%	65.9%
North Central Appalachia	\$1,348 M	\$565 M	\$783 M	41.9%	58.1%
Central Appalachia	\$1,333 M	\$426 M	\$907 M	32.0%	68.0%
South Central Appalachia	\$3,234 M	\$1,060 M	\$2,174 M	32.8%	67.2%
Southern Appalachia	\$8,668 M	\$1,236 M	\$7,432 M	14.3%	85.7%
County Types					
Large Metros (pop. 1 million +)	\$1,605 M	\$476 M	\$1,129 M	29.7%	70.3%
Small Metros (pop. <1 million)	\$5,015 M	\$1,485 M	\$3,530 M	29.6%	70.4%
Nonmetro, Adjacent to Large Metros	\$3,739 M	\$1,010 M	\$2,729 M	27.0%	73.0%
Nonmetro, Adjacent to Small Metros	\$6,595 M	\$1,252 M	\$5,343 M	19.0%	81.0%
Rural (nonmetro, not adj. to a metro)	\$2,868 M	\$850 M	\$2,017 M	29.7%	70.3%
Appalachian States					
Alabama	\$5,981 M	\$1,212 M	\$4,768 M	20.3%	79.7%
Appalachian Alabama	\$3,821 M	\$579 M	\$3,243 M	15.1%	84.9%
Non-Appalachian Alabama	\$2,159 M	\$634 M	\$1,525 M	29.4%	70.6%
Georgia	\$9,573 M	\$3,272 M	\$6,301 M	34.2%	65.8%
Appalachian Georgia	\$3,657 M	\$166 M	\$3,491 M	4.5%	95.5%
Non-Appalachian Georgia	\$5,917 M	\$3,106 M	\$2,810 M	52.5%	47.5%
Kentucky	\$5,738 M	\$2,541 M	\$3,197 M	44.3%	55.7%
Appalachian Kentucky	\$969 M	\$330 M	\$639 M	34.1%	65.9%
Non-Appalachian Kentucky	\$4,769 M	\$2,211 M	\$2,558 M	46.4%	53.6%
Maryland	\$2,473 M	\$948 M	\$1,525 M	38.3%	61.7%
Appalachian Maryland	\$187 M	\$53 M	\$134 M	28.6%	71.4%
Non-Appalachian Maryland	\$2,286 M	\$895 M	\$1,391 M	39.1%	60.9%
Mississippi	\$6,196 M	\$2,292 M	\$3,904 M	37.0%	63.0%
Appalachian Mississippi	\$872 M	\$433 M	\$438 M	49.7%	50.3%
Non-Appalachian Mississippi	\$5,324 M	\$1,858 M	\$3,466 M	34.9%	65.1%
New York	\$5,369 M	\$2,108 M	\$3,261 M	39.3%	60.7%
Appalachian New York	\$1,009 M	\$336 M	\$673 M	33.3%	66.7%
Non-Appalachian New York	\$4,360 M	\$1,772 M	\$2,588 M	40.6%	59.4%
North Carolina	\$12,901 M	\$3,735 M	\$9,166 M	29.0%	71.0%
Appalachian North Carolina	\$1,497 M	\$423 M	\$1,073 M	28.3%	71.7%
Non-Appalachian North Carolina	\$11,404 M	\$3,312 M	\$8,092 M	29.0%	71.0%
Ohio	\$9,341 M	\$5,426 M	\$3,915 M	58.1%	41.9%
Appalachian Ohio	\$1,499 M	\$716 M	\$784 M	47.7%	52.3%
Non-Appalachian Ohio	\$7,842 M	\$4,710 M	\$3,131 M	60.1%	39.9%
Pennsylvania	\$7,759 M	\$2,781 M	\$4,978 M	35.8%	64.2%
Appalachian Pennsylvania	\$3,140 M	\$1,095 M	\$2,046 M	34.9%	65.1%
Non-Appalachian Pennsylvania	\$4,619 M	\$1,687 M	\$2,932 M	36.5%	63.5%
South Carolina	\$3,009 M	\$1,096 M	\$1,912 M	36.4%	63.6%
Appalachian South Carolina	\$318 M	\$59 M	\$260 M	18.5%	81.5%
Non-Appalachian South Carolina	\$2,690 M	\$1,037 M	\$1,653 M	38.6%	61.4%
Tennessee	\$3,799 M	\$2,182 M	\$1,617 M	57.4%	42.6%
Appalachian Tennessee	\$1,532 M	\$613 M	\$919 M	40.0%	60.0%
Non-Appalachian Tennessee	\$2,267 M	\$1,569 M	\$697 M	69.2%	30.8%
Virginia	\$3,961 M	\$1,361 M	\$2,599 M	34.4%	65.6%
Appalachian Virginia	\$566 M	\$118 M	\$448 M	20.9%	79.1%
Non-Appalachian Virginia	\$3,395 M	\$1,243 M	\$2,151 M	36.6%	63.4%
West Virginia	\$754 M	\$153 M	\$601 M	20.3%	79.7%

¹ This column is repeated from Table 3.1, Agriculture Sales (Millions), for reference.

Map 3.4. Animal and Animal Products Sales, 2017



Map 3.5. Crop Sales, 2017

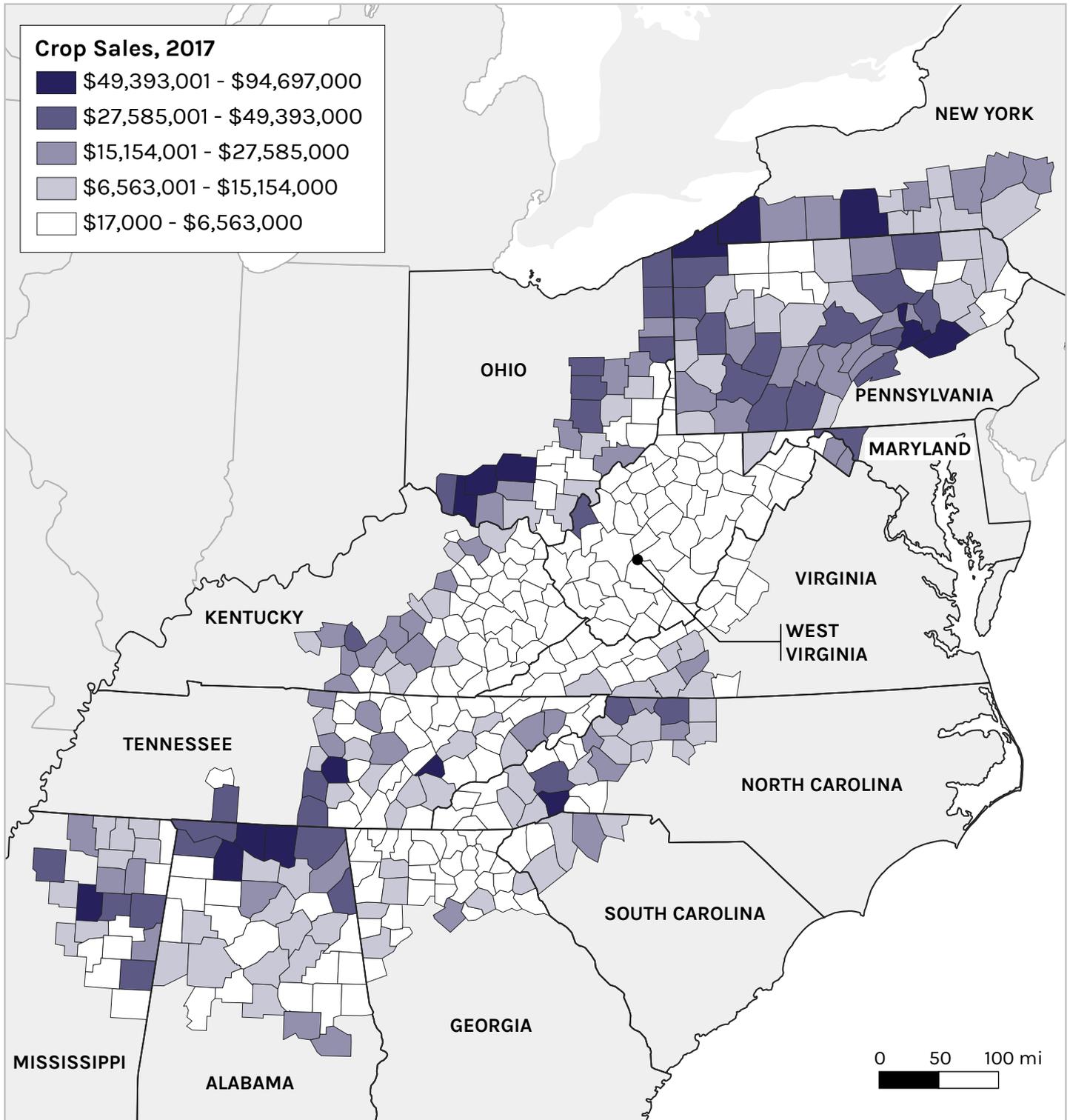


Table 3.3. Sales Detail: All Grain Crop Sales, 2017

	Sales (Millions) ¹							
	All Grain	Corn	Wheat	Soy	Sorghum	Barley	Rice	Other Grains
United States	\$106,868 M	\$51,220 M	\$7,883 M	\$40,304 M	\$1,576 M	\$685 M	\$2,123 M	\$3,076 M
Appalachian Region	\$2,130 M	\$1,029 M	\$91 M	\$976 M	\$3.2 M	\$5.6 M	\$6.0 M	\$18 M
Subregions								
Northern Appalachia	\$806 M	\$504 M	\$29 M	\$254 M	\$1.5 M	\$4.5 M	\$0	\$14 M
North Central Appalachia	\$380 M	\$152 M	\$7.4 M	\$219 M	\$0.09 M	\$0.27 M	\$0	\$0.65 M
Central Appalachia	\$167 M	\$69 M	\$3.2 M	\$94 M	\$0.05 M	\$0.16 M	\$0	\$0.44 M
South Central Appalachia	\$246 M	\$116 M	\$13 M	\$115 M	\$0.90 M	\$0.53 M	\$0	\$0.69 M
Southern Appalachia	\$531 M	\$189 M	\$38 M	\$294 M	\$0.75 M	\$0.14 M	\$6.0 M	\$2.5 M
County Types								
Large Metros (pop. 1 million +)	\$236 M	\$96 M	\$6.7 M	\$130 M	\$0.21 M	\$0.38 M	\$0	\$2.8 M
Small Metros (pop. <1 million)	\$547 M	\$268 M	\$47 M	\$225 M	\$1.1 M	\$1.8 M	\$0	\$4.4 M
Nonmetro, Adjacent to Large Metros	\$539 M	\$252 M	\$17 M	\$259 M	\$0.53 M	\$0.69 M	\$6.0 M	\$4.9 M
Nonmetro, Adjacent to Small Metros	\$455 M	\$263 M	\$15 M	\$169 M	\$1.2 M	\$2.1 M	\$0	\$4.1 M
Rural (nonmetro, not adj. to a metro)	\$353 M	\$150 M	\$5.3 M	\$194 M	\$0.16 M	\$0.54 M	\$0	\$2.2 M
Appalachian States								
Alabama	\$336 M	\$152 M	\$35 M	\$147 M	\$0.63 M	\$0.12 M	\$0	\$1.8 M
Appalachian Alabama	\$275 M	\$113 M	\$33 M	\$128 M	\$0.35 M	\$0.08 M	\$0	\$0.45 M
Non-Appalachian Alabama	\$62 M	\$39 M	\$1.9 M	\$19 M	\$0.28 M	\$0.04 M	\$0	\$1.4 M
Georgia	\$283 M	\$204 M	\$13 M	\$57 M	\$4.4 M	\$0.03 M	\$0	\$4.9 M
Appalachian Georgia	\$24 M	\$13 M	\$1.8 M	\$9.2 M	\$0.13 M	\$0	\$0	\$0.40 M
Non-Appalachian Georgia	\$259 M	\$191 M	\$11 M	\$48 M	\$4.3 M	\$0.03 M	\$0	\$4.5 M
Kentucky	\$1,871 M	\$825 M	\$113 M	\$926 M	\$1.1 M	\$1.4 M	\$0	\$4.3 M
Appalachian Kentucky	\$151 M	\$60 M	\$2.7 M	\$88 M	\$0.03 M	\$0.16 M	\$0	\$0.42 M
Non-Appalachian Kentucky	\$1,720 M	\$765 M	\$110 M	\$838 M	\$1.0 M	\$1.2 M	\$0	\$3.9 M
Maryland	\$575 M	\$281 M	\$47 M	\$237 M	\$3.8 M	\$5.8 M	\$0	\$0.80 M
Appalachian Maryland	\$31 M	\$17 M	\$2.3 M	\$11 M	\$0.20 M	\$0.51 M	\$0	\$0.10 M
Non-Appalachian Maryland	\$545 M	\$264 M	\$45 M	\$227 M	\$3.6 M	\$5.2 M	\$0	\$0.70 M
Mississippi	\$1,558 M	\$346 M	\$6.6 M	\$1,106 M	\$1.7 M	\$0	\$97 M	\$1.5 M
Appalachian Mississippi	\$223 M	\$61 M	\$1.9 M	\$152 M	\$0.09 M	\$0	\$6.0 M	\$1.4 M
Non-Appalachian Mississippi	\$1,335 M	\$285 M	\$4.7 M	\$954 M	\$1.6 M	\$0	\$91 M	\$0.10 M
New York	\$572 M	\$399 M	\$33 M	\$116 M	\$0.55 M	\$2.1 M	\$0	\$21 M
Appalachian New York	\$95 M	\$77 M	\$3.6 M	\$10 M	\$0.15 M	\$0.52 M	\$0	\$3.3 M
Non-Appalachian New York	\$476 M	\$321 M	\$30 M	\$106 M	\$0.40 M	\$1.6 M	\$0	\$18 M
North Carolina	\$1,244 M	\$493 M	\$108 M	\$631 M	\$5.6 M	\$1.9 M	\$0	\$5.3 M
Appalachian North Carolina	\$58 M	\$33 M	\$3.5 M	\$21 M	\$0.45 M	\$0.48 M	\$0	\$0.18 M
Non-Appalachian North Carolina	\$1,186 M	\$460 M	\$104 M	\$610 M	\$5.1 M	\$1.4 M	\$0	\$5.1 M
Ohio	\$4,553 M	\$2,032 M	\$152 M	\$2,334 M	\$0.23 M	\$1.2 M	\$0	\$34 M
Appalachian Ohio	\$548 M	\$237 M	\$12 M	\$297 M	\$0.04 M	\$0.12 M	\$0	\$2.0 M
Non-Appalachian Ohio	\$4,005 M	\$1,795 M	\$140 M	\$2,037 M	\$0.19 M	\$1.0 M	\$0	\$32 M
Pennsylvania	\$981 M	\$619 M	\$47 M	\$287 M	\$3.1 M	\$10 M	\$0	\$14 M
Appalachian Pennsylvania	\$475 M	\$303 M	\$17 M	\$141 M	\$1.1 M	\$3.4 M	\$0	\$9.3 M
Non-Appalachian Pennsylvania	\$506 M	\$316 M	\$31 M	\$146 M	\$2.0 M	\$6.9 M	\$0	\$4.6 M
South Carolina	\$341 M	\$188 M	\$17 M	\$131 M	\$2.3 M	\$0.13 M	\$0.11 M	\$3.2 M
Appalachian South Carolina	\$8.8 M	\$1.8 M	\$1.6 M	\$5.0 M	\$0.17 M	\$0.06 M	\$0	\$0.21 M
Non-Appalachian South Carolina	\$333 M	\$186 M	\$15 M	\$126 M	\$2.2 M	\$0.06 M	\$0.11 M	\$3.0 M
Tennessee	\$1,289 M	\$447 M	\$89 M	\$748 M	\$2.9 M	\$0.20 M	\$0.32 M	\$1.9 M
Appalachian Tennessee	\$188 M	\$78 M	\$10 M	\$99 M	\$0.22 M	\$0.02 M	\$0	\$0.48 M
Non-Appalachian Tennessee	\$1,102 M	\$369 M	\$79 M	\$649 M	\$2.7 M	\$0.19 M	\$0.32 M	\$1.5 M
Virginia	\$510 M	\$229 M	\$40 M	\$234 M	\$3.6 M	\$2.5 M	\$0	\$1.7 M
Appalachian Virginia	\$16 M	\$14 M	\$0.43 M	\$1.5 M	\$0.25 M	\$0.03 M	\$0	\$0.04 M
Non-Appalachian Virginia	\$494 M	\$215 M	\$39 M	\$232 M	\$3.4 M	\$2.5 M	\$0	\$1.6 M
West Virginia	\$37 M	\$22 M	\$1.3 M	\$14 M	\$0.09 M	\$0.22 M	\$0	\$0.10 M

¹ Sales values below \$10,000 are displayed as \$0

Table 3.4. Sales Detail: All Non-Grain Crop Sales, Fruit & Vegetable Sales Percent of All Sales, 2017

	Sales (Millions) ¹							Fruit & Vegetable Share of Total Sales
	Tobacco	Cotton Lint & Seed	Vegetable	Fruit, Tree Nut, and Berry	Horticulture (Nursery, greenhouse, floriculture, sod)	Cut Christmas Trees & Short Term Woody Crops	Other Field Crops Incl. Hay	
United States	\$1,474 M	\$6,686 M	\$19,584 M	\$28,581 M	\$16,174 M	\$386 M	\$13,793 M	12%
Appalachian Region	\$158 M	\$226 M	\$455 M	\$248 M	\$839 M	\$119 M	\$900 M	4%
Subregions								
Northern Appalachia	\$2.6 M	\$0	\$157 M	\$137 M	\$216 M	\$22 M	\$445 M	6%
North Central Appalachia	\$3.6 M	\$0	\$26 M	\$26 M	\$46 M	\$1.4 M	\$84 M	4%
Central Appalachia	\$100 M	\$0.05 M	\$24 M	\$3.7 M	\$28 M	\$0.28 M	\$103 M	2%
South Central Appalachia	\$52 M	\$1.6 M	\$127 M	\$49 M	\$369 M	\$94 M	\$121 M	5%
Southern Appalachia	\$0	\$224 M	\$122 M	\$31 M	\$181 M	\$1.1 M	\$146 M	2%
County Types								
Large Metros (pop. 1 million +)	\$22 M	\$8.7 M	\$38 M	\$15 M	\$75 M	\$3.0 M	\$79 M	3%
Small Metros (pop. <1 million)	\$35 M	\$85 M	\$127 M	\$107 M	\$351 M	\$14 M	\$219 M	5%
Nonmetro, Adjacent to Large Metros	\$3.3 M	\$27 M	\$52 M	\$69 M	\$157 M	\$3.2 M	\$160 M	3%
Nonmetro, Adjacent to Small Metros	\$68 M	\$40 M	\$114 M	\$44 M	\$202 M	\$33 M	\$297 M	2%
Rural (nonmetro, not adj. to a metro)	\$30 M	\$65 M	\$125 M	\$14 M	\$53 M	\$66 M	\$145 M	5%
Appalachian States								
Alabama	\$0	\$260 M	\$59 M	\$18 M	\$294 M	\$1.0 M	\$243 M	1%
Appalachian Alabama	\$0	\$128 M	\$29 M	\$7.4 M	\$75 M	\$0.33 M	\$64 M	1%
Non-Appalachian Alabama	\$0	\$132 M	\$31 M	\$11 M	\$220 M	\$0.72 M	\$178 M	2%
Georgia	\$53 M	\$777 M	\$566 M	\$422 M	\$322 M	\$1.5 M	\$847 M	10%
Appalachian Georgia	\$0	\$1.8 M	\$14 M	\$11 M	\$71 M	\$0.41 M	\$43 M	1%
Non-Appalachian Georgia	\$53 M	\$775 M	\$552 M	\$411 M	\$252 M	\$1.1 M	\$804 M	16%
Kentucky	\$351 M	\$0	\$34 M	\$8.0 M	\$83 M	\$0.33 M	\$194 M	1%
Appalachian Kentucky	\$79 M	\$0	\$8.8 M	\$2.3 M	\$12 M	\$0.12 M	\$78 M	1%
Non-Appalachian Kentucky	\$273 M	\$0	\$25 M	\$5.7 M	\$71 M	\$0.21 M	\$117 M	1%
Maryland	\$1.4 M	\$0	\$71 M	\$24 M	\$230 M	\$2.0 M	\$44 M	4%
Appalachian Maryland	\$0	\$0	\$2.6 M	\$7.5 M	\$2.1 M	\$0.20 M	\$10 M	5%
Non-Appalachian Maryland	\$1.4 M	\$0	\$69 M	\$16 M	\$228 M	\$1.8 M	\$34 M	4%
Mississippi	\$0	\$453 M	\$102 M	\$17 M	\$55 M	\$0.87 M	\$105 M	2%
Appalachian Mississippi	\$0	\$94 M	\$74 M	\$1.6 M	\$11 M	\$0.16 M	\$29 M	9%
Non-Appalachian Mississippi	\$0	\$359 M	\$29 M	\$15 M	\$44 M	\$0.71 M	\$75 M	1%
New York	\$0	\$0	\$379 M	\$400 M	\$386 M	\$9.1 M	\$363 M	14%
Appalachian New York	\$0	\$0	\$37 M	\$56 M	\$29 M	\$2.4 M	\$116 M	9%
Non-Appalachian New York	\$0	\$0	\$341 M	\$344 M	\$356 M	\$6.7 M	\$247 M	16%
North Carolina	\$732 M	\$240 M	\$553 M	\$109 M	\$552 M	\$87 M	\$218 M	5%
Appalachian North Carolina	\$43 M	\$0	\$56 M	\$32 M	\$124 M	\$85 M	\$25 M	6%
Non-Appalachian North Carolina	\$689 M	\$240 M	\$497 M	\$77 M	\$428 M	\$2.2 M	\$193 M	5%
Ohio	\$3.6 M	\$0	\$149 M	\$45 M	\$485 M	\$4.9 M	\$186 M	2%
Appalachian Ohio	\$3.6 M	\$0	\$29 M	\$15 M	\$29 M	\$1.3 M	\$90 M	3%
Non-Appalachian Ohio	\$0.01 M	\$0	\$120 M	\$30 M	\$456 M	\$3.6 M	\$96 M	2%
Pennsylvania	\$36 M	\$0	\$187 M	\$172 M	\$1,016 M	\$29 M	\$361 M	5%
Appalachian Pennsylvania	\$2.6 M	\$0	\$103 M	\$63 M	\$169 M	\$18 M	\$264 M	5%
Non-Appalachian Pennsylvania	\$33 M	\$0	\$84 M	\$109 M	\$847 M	\$11 M	\$97 M	4%
South Carolina	\$47 M	\$153 M	\$153 M	\$42 M	\$208 M	\$1.3 M	\$151 M	6%
Appalachian South Carolina	\$0	\$0.14 M	\$5.5 M	\$11 M	\$23 M	\$0.22 M	\$9.3 M	5%
Non-Appalachian South Carolina	\$47 M	\$153 M	\$147 M	\$30 M	\$185 M	\$1.1 M	\$141 M	7%
Tennessee	\$99 M	\$235 M	\$93 M	\$18 M	\$300 M	\$1.3 M	\$146 M	3%
Appalachian Tennessee	\$28 M	\$1.7 M	\$70 M	\$10 M	\$232 M	\$1.0 M	\$81 M	5%
Non-Appalachian Tennessee	\$71 M	\$234 M	\$23 M	\$7.8 M	\$67 M	\$0.31 M	\$64 M	1%
Virginia	\$108 M	\$62 M	\$111 M	\$76 M	\$328 M	\$11 M	\$155 M	5%
Appalachian Virginia	\$2.7 M	\$0	\$15 M	\$8.1 M	\$28 M	\$8.7 M	\$39 M	4%
Non-Appalachian Virginia	\$105 M	\$62 M	\$97 M	\$68 M	\$300 M	\$2.3 M	\$115 M	5%
West Virginia	\$0	\$0	\$11 M	\$22 M	\$33 M	\$1.2 M	\$50 M	4%

¹ Sales values below \$10,000 are displayed as \$0

Table 3.5. Sales Detail: All Animal and Animal Product Sales, 2017

	Sales (Millions)							
	Poultry & Eggs	Cattle and Calf	Milk	Hogs	Sheep & Goats (Incl. Wool, Mohair, & Milk)	Equine	Aquaculture	Specialty Animals
United States	\$49,210 M	\$77,189 M	\$36,724 M	\$26,267 M	\$1,028 M	\$1,500 M	\$1,779 M	\$1,279 M
Appalachian Region	\$9,239 M	\$2,534 M	\$2,034 M	\$541 M	\$54 M	\$85 M	\$163 M	\$98 M
Subregions								
Northern Appalachia	\$737 M	\$558 M	\$1,695 M	\$328 M	\$21 M	\$31 M	\$16 M	\$67 M
North Central Appalachia	\$391 M	\$258 M	\$78 M	\$31 M	\$9.3 M	\$8.7 M	\$4.6 M	\$2.8 M
Central Appalachia	\$270 M	\$540 M	\$67 M	\$5.0 M	\$6.6 M	\$14 M	\$1.4 M	\$2.5 M
South Central Appalachia	\$1,240 M	\$683 M	\$160 M	\$23 M	\$11 M	\$16 M	\$27 M	\$14 M
Southern Appalachia	\$6,602 M	\$496 M	\$33 M	\$154 M	\$6.1 M	\$16 M	\$114 M	\$11 M
County Types								
Large Metros (pop. 1 million +)	\$888 M	\$148 M	\$62 M	\$10 M	\$3.6 M	\$6.6 M	\$0.68 M	\$9.3 M
Small Metros (pop. <1 million)	\$2,147 M	\$610 M	\$521 M	\$81 M	\$18 M	\$30 M	\$64 M	\$57 M
Nonmetro, Adjacent to Large Metros	\$1,892 M	\$305 M	\$448 M	\$58 M	\$9.2 M	\$8.6 M	\$2.1 M	\$5.0 M
Nonmetro, Adjacent to Small Metros	\$3,476 M	\$838 M	\$739 M	\$217 M	\$14 M	\$20 M	\$23 M	\$16 M
Rural (nonmetro, not adj. to a metro)	\$837 M	\$634 M	\$263 M	\$173 M	\$9.0 M	\$20 M	\$73 M	\$9.7 M
Appalachian States								
Alabama	\$4,151 M	\$435 M	\$18 M	\$22 M	\$4.2 M	\$13 M	\$121 M	\$4.1 M
Appalachian Alabama	\$2,925 M	\$230 M	\$11 M	\$16 M	\$2.6 M	\$8.0 M	\$46 M	\$2.9 M
Non-Appalachian Alabama	\$1,226 M	\$204 M	\$6.1 M	\$6.1 M	\$1.6 M	\$5.1 M	\$75 M	\$1.2 M
Georgia	\$5,482 M	\$362 M	\$331 M	\$53 M	\$5.7 M	\$13 M	\$27 M	\$27 M
Appalachian Georgia	\$3,322 M	\$126 M	\$14 M	\$13 M	\$2.0 M	\$4.1 M	\$3.6 M	\$6.5 M
Non-Appalachian Georgia	\$2,160 M	\$236 M	\$318 M	\$40 M	\$3.7 M	\$8.7 M	\$23 M	\$21 M
Kentucky	\$1,310 M	\$1,002 M	\$167 M	\$128 M	\$12 M	\$466 M	\$3.4 M	\$108 M
Appalachian Kentucky	\$170 M	\$389 M	\$59 M	\$3.0 M	\$3.7 M	\$12 M	\$0.40 M	\$1.3 M
Non-Appalachian Kentucky	\$1,140 M	\$613 M	\$108 M	\$125 M	\$8.1 M	\$454 M	\$3.0 M	\$107 M
Maryland	\$1,181 M	\$75 M	\$174 M	\$7.3 M	\$3.7 M	\$23 M	\$18 M	\$42 M
Appalachian Maryland	\$5.8 M	\$29 M	\$56 M	\$0.83 M	\$1.5 M	\$1.1 M	\$0.15 M	\$39 M
Non-Appalachian Maryland	\$1,175 M	\$46 M	\$118 M	\$6.4 M	\$2.3 M	\$22 M	\$18 M	\$3.7 M
Mississippi	\$3,106 M	\$393 M	\$30 M	\$127 M	\$2.3 M	\$5.7 M	\$231 M	\$9.5 M
Appalachian Mississippi	\$133 M	\$113 M	\$2.6 M	\$123 M	\$0.95 M	\$1.5 M	\$64 M	\$0.69 M
Non-Appalachian Mississippi	\$2,973 M	\$280 M	\$28 M	\$3.9 M	\$1.3 M	\$4.2 M	\$167 M	\$8.8 M
New York	\$195 M	\$426 M	\$2,528 M	\$25 M	\$18 M	\$34 M	\$13 M	\$23 M
Appalachian New York	\$11 M	\$105 M	\$531 M	\$7.0 M	\$6.3 M	\$5.9 M	\$0.50 M	\$6.2 M
Non-Appalachian New York	\$183 M	\$321 M	\$1,997 M	\$18 M	\$11 M	\$28 M	\$13 M	\$17 M
North Carolina	\$5,414 M	\$275 M	\$185 M	\$3,217 M	\$7.0 M	\$22 M	\$31 M	\$15 M
Appalachian North Carolina	\$902 M	\$108 M	\$29 M	\$16 M	\$2.6 M	\$4.7 M	\$5.8 M	\$5.6 M
Non-Appalachian North Carolina	\$4,512 M	\$167 M	\$156 M	\$3,201 M	\$4.4 M	\$17 M	\$25 M	\$9.8 M
Ohio	\$1,082 M	\$681 M	\$1,002 M	\$1,011 M	\$23 M	\$48 M	\$9.3 M	\$59 M
Appalachian Ohio	\$203 M	\$211 M	\$265 M	\$74 M	\$8.5 M	\$16 M	\$0.52 M	\$5.4 M
Non-Appalachian Ohio	\$879 M	\$470 M	\$736 M	\$937 M	\$15 M	\$33 M	\$8.8 M	\$53 M
Pennsylvania	\$1,685 M	\$626 M	\$1,979 M	\$572 M	\$17 M	\$44 M	\$21 M	\$34 M
Appalachian Pennsylvania	\$520 M	\$299 M	\$898 M	\$275 M	\$9.2 M	\$11 M	\$16 M	\$18 M
Non-Appalachian Pennsylvania	\$1,165 M	\$326 M	\$1,081 M	\$297 M	\$8.0 M	\$34 M	\$5.3 M	\$15 M
South Carolina	\$1,653 M	\$109 M	\$57 M	\$69 M	\$3.0 M	\$12 M	\$6.5 M	\$3.7 M
Appalachian South Carolina	\$222 M	\$27 M	\$5.2 M	\$1.8 M	\$0.62 M	\$2.0 M	\$0.46 M	\$0.52 M
Non-Appalachian South Carolina	\$1,430 M	\$82 M	\$52 M	\$67 M	\$2.4 M	\$10 M	\$6.0 M	\$3.2 M
Tennessee	\$640 M	\$720 M	\$125 M	\$66 M	\$12 M	\$35 M	\$7.0 M	\$11 M
Appalachian Tennessee	\$408 M	\$389 M	\$87 M	\$5.9 M	\$6.7 M	\$10 M	\$4.4 M	\$7.4 M
Non-Appalachian Tennessee	\$231 M	\$331 M	\$38 M	\$61 M	\$5.3 M	\$25 M	\$2.6 M	\$3.9 M
Virginia	\$1,351 M	\$679 M	\$335 M	\$96 M	\$13 M	\$24 M	\$90 M	\$11 M
Appalachian Virginia	\$30 M	\$335 M	\$52 M	\$2.8 M	\$4.9 M	\$2.6 M	\$17 M	\$2.5 M
Non-Appalachian Virginia	\$1,321 M	\$344 M	\$282 M	\$93 M	\$7.7 M	\$22 M	\$73 M	\$8.6 M
West Virginia	\$388 M	\$172 M	\$23 M	\$1.3 M	\$5.0 M	\$6.4 M	\$4.3 M	\$1.7 M



4. Marketing Channels, Infrastructure, and Food Access

Table 4.1. Direct Sales and Value-Added Product Sales, 2017¹

	Retail Direct (Direct to Consumer)			Wholesale Direct (Direct to Retailer)			Value-Added Products		
	Percent of Farms	Sales (Millions)	Share of Total Agriculture Sales	Percent of Farms	Sales (Millions)	Share of Total Agriculture Sales	Percent of Farms	Sales (Millions)	Share of Total Agriculture Sales
United States	6.4%	\$2,805 M	0.7%	1.4%	\$9,036 M	2.3%	1.6%	\$4,043 M	1.0%
Appalachian Region	7.3%	\$242 M	1.2%	1.2%	\$250 M	1.3%	1.7%	\$164 M	0.8%
Subregions									
Northern Appalachia	11.1%	\$126 M	2.4%	2.2%	\$130 M	2.5%	3.0%	\$77 M	1.5%
North Central Appalachia	7.1%	\$24 M	1.8%	1.0%	\$6.8 M	0.5%	1.3%	\$6.1 M	0.5%
Central Appalachia	4.7%	\$11 M	0.9%	0.6%	\$6.7 M	0.5%	1.0%	\$4.9 M	0.4%
South Central Appalachia	7.3%	\$55 M	1.7%	1.3%	\$48 M	1.5%	1.8%	\$46 M	1.4%
Southern Appalachia	5.0%	\$26 M	0.3%	0.7%	\$58 M	0.7%	1.0%	\$29 M	0.3%
County Types									
Large Metros (pop. 1 million +)	8.3%	\$21 M	1.3%	1.3%	\$13 M	0.8%	1.8%	\$11 M	0.7%
Small Metros (pop. <1 million)	8.4%	\$100 M	2.0%	1.3%	\$73 M	1.5%	1.9%	\$73 M	1.5%
Nonmetro, Adjacent to Large Metros	7.6%	\$37 M	1.0%	1.2%	\$42 M	1.1%	2.0%	\$32 M	0.9%
Nonmetro, Adjacent to Small Metros	6.7%	\$54 M	0.8%	1.2%	\$80 M	1.2%	1.6%	\$31 M	0.5%
Rural (nonmetro, not adj. to a metro)	5.7%	\$30 M	1.0%	1.1%	\$42 M	1.5%	1.4%	\$16 M	0.6%
Appalachian States									
Alabama	4.5%	\$9.4 M	0.2%	0.6%	\$6.1 M	0.1%	0.8%	\$5.5 M	0.1%
Appalachian Alabama	4.5%	\$5.5 M	0.1%	0.5%	\$2.8 M	0.1%	0.9%	\$4.5 M	0.1%
Non-Appalachian Alabama	4.4%	\$3.9 M	0.2%	0.7%	\$3.3 M	0.2%	0.6%	\$1.0 M	0.0%
Georgia	5.9%	\$36 M	0.4%	1.1%	\$219 M	2.3%	1.1%	\$60 M	0.6%
Appalachian Georgia	6.5%	\$11 M	0.3%	0.9%	\$49 M	1.3%	1.4%	\$20 M	0.5%
Non-Appalachian Georgia	5.6%	\$25 M	0.4%	1.2%	\$170 M	2.9%	0.9%	\$41 M	0.7%
Kentucky	5.0%	\$29 M	0.5%	0.8%	\$14 M	0.2%	1.2%	\$12 M	0.2%
Appalachian Kentucky	4.8%	\$7.5 M	0.8%	0.6%	\$1.8 M	0.2%	1.1%	\$2.4 M	0.3%
Non-Appalachian Kentucky	5.1%	\$21 M	0.4%	0.9%	\$12 M	0.3%	1.2%	\$9.2 M	0.2%
Maryland	10.8%	\$54 M	2.2%	2.6%	\$63 M	2.6%	4.1%	\$45 M	1.8%
Appalachian Maryland	8.8%	\$8.2 M	4.4%	2.1%	\$3.0 M	1.6%	4.0%	\$5.6 M	3.0%
Non-Appalachian Maryland	11.2%	\$46 M	2.0%	2.6%	\$60 M	2.6%	4.1%	\$40 M	1.7%
Mississippi	3.1%	\$7.0 M	0.1%	0.6%	\$18 M	0.3%	0.5%	\$2.1 M	0.0%
Appalachian Mississippi	2.8%	\$2.2 M	0.3%	0.6%	\$5.7 M	0.7%	0.5%	\$0.21 M	0.0%
Non-Appalachian Mississippi	3.3%	\$4.8 M	0.1%	0.6%	\$12 M	0.2%	0.5%	\$1.9 M	0.0%
New York	17.0%	\$223 M	4.1%	4.7%	\$316 M	5.9%	5.9%	\$182 M	3.4%
Appalachian New York	15.3%	\$31 M	3.1%	3.8%	\$32 M	3.2%	5.1%	\$23 M	2.2%
Non-Appalachian New York	17.8%	\$191 M	4.4%	5.2%	\$284 M	6.5%	6.3%	\$160 M	3.7%
North Carolina	8.7%	\$70 M	0.5%	2.0%	\$176 M	1.4%	2.3%	\$31 M	0.2%
Appalachian North Carolina	10.2%	\$21 M	1.4%	2.6%	\$15 M	1.0%	2.9%	\$11 M	0.7%
Non-Appalachian North Carolina	8.1%	\$49 M	0.4%	1.7%	\$161 M	1.4%	2.0%	\$21 M	0.2%
Ohio	7.9%	\$79 M	0.9%	1.2%	\$118 M	1.3%	1.7%	\$23 M	0.2%
Appalachian Ohio	7.5%	\$27 M	1.8%	1.2%	\$12 M	0.8%	1.5%	\$9.9 M	0.7%
Non-Appalachian Ohio	8.1%	\$53 M	0.7%	1.3%	\$107 M	1.4%	1.8%	\$13 M	0.2%
Pennsylvania	12.0%	\$174 M	2.2%	2.7%	\$280 M	3.6%	3.3%	\$95 M	1.2%
Appalachian Pennsylvania	11.3%	\$73 M	2.3%	2.1%	\$88 M	2.8%	2.9%	\$41 M	1.3%
Non-Appalachian Pennsylvania	13.3%	\$101 M	2.2%	3.9%	\$192 M	4.2%	4.0%	\$54 M	1.2%
South Carolina	6.1%	\$30 M	1.0%	1.2%	\$45 M	1.5%	1.1%	\$72 M	2.4%
Appalachian South Carolina	7.2%	\$6.9 M	2.2%	1.3%	\$0.70 M	0.2%	1.5%	\$4.7 M	1.5%
Non-Appalachian South Carolina	5.8%	\$23 M	0.9%	1.1%	\$44 M	1.6%	1.0%	\$68 M	2.5%
Tennessee	5.4%	\$35 M	0.9%	0.7%	\$30 M	0.8%	1.1%	\$16 M	0.4%
Appalachian Tennessee	5.8%	\$20 M	1.3%	0.7%	\$16 M	1.0%	1.1%	\$7.5 M	0.5%
Non-Appalachian Tennessee	4.9%	\$14 M	0.6%	0.7%	\$14 M	0.6%	1.1%	\$8.6 M	0.4%
Virginia	8.3%	\$102 M	2.6%	1.9%	\$101 M	2.5%	2.7%	\$123 M	3.1%
Appalachian Virginia	5.8%	\$18 M	3.1%	1.2%	\$22 M	4.0%	1.6%	\$31 M	5.4%
Non-Appalachian Virginia	9.4%	\$84 M	2.5%	2.2%	\$78 M	2.3%	3.2%	\$93 M	2.7%
West Virginia	7.2%	\$11 M	1.5%	0.9%	\$2.6 M	0.3%	1.4%	\$4.3 M	0.6%

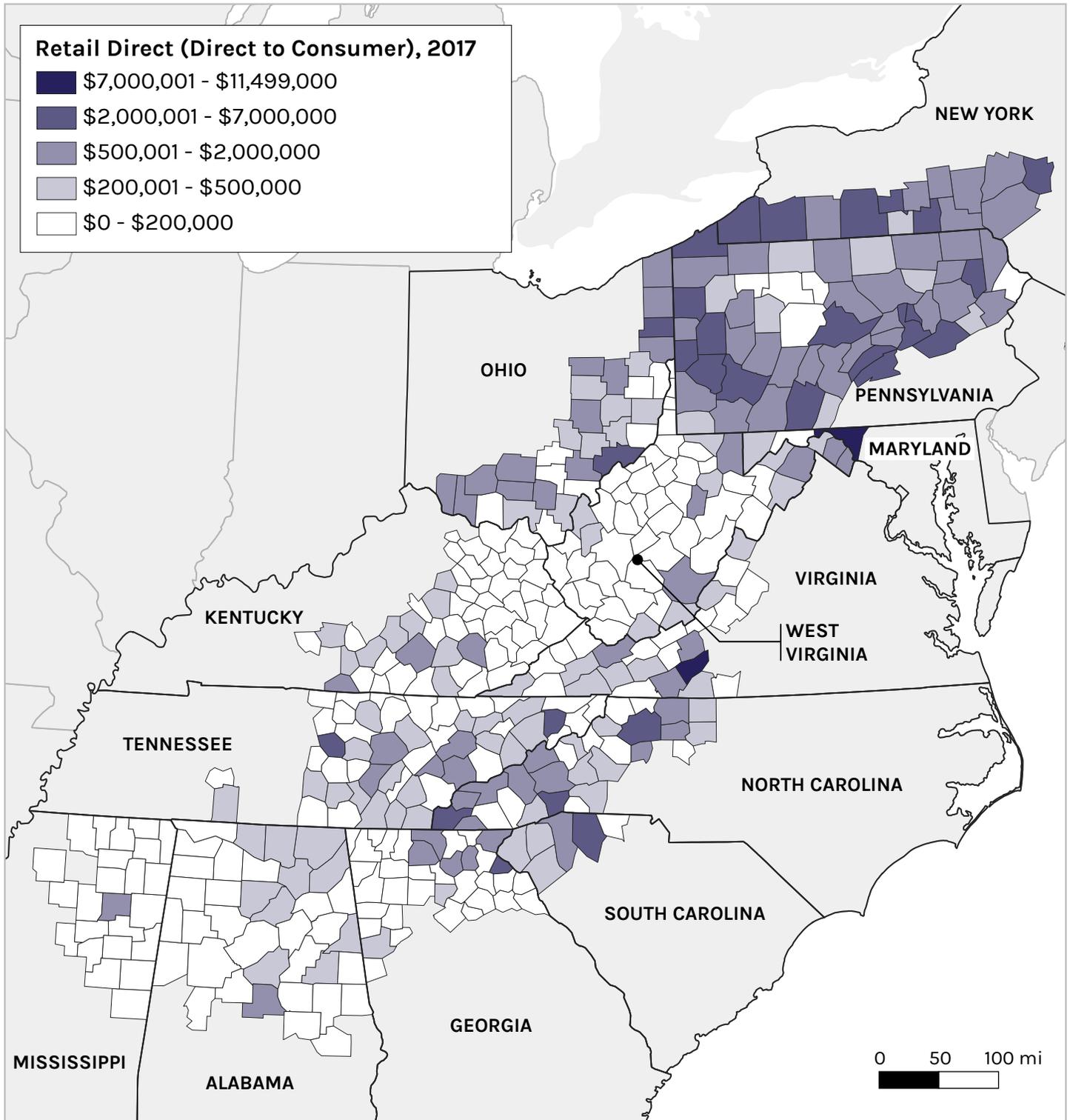
¹ See following page for definitions of table headers.

Retail Direct (Direct to Consumer): “Data represent the value of edible products, including value added products, produced and sold for human consumption directly to consumers at farmers markets, on-farm stores or farm stands, roadside stands or stores, u-pick, CSA (Community Supported Agriculture), online marketplaces, etc.” (Definition from USDA Census of Agriculture 2017, Appendix B.)

Wholesale Direct (Direct to Retailer): “Data represent the value of products, including value added products, produced and sold for human consumption directly to retail markets, institutions, or food hubs for locally or regionally branded products. Examples include supermarkets, restaurants, caterers, independently owned grocery stores, food cooperatives, K-12 schools, colleges or universities, hospitals, workplace cafeterias, prisons, food banks, etc.” (Definition from USDA Census of Agriculture 2017, Appendix B.)

Value-Added Products Sales: “Data represent the value of products that originated from crop or livestock commodities produced on the operation. Through further manufacture or processing, these items are transformed into products worth more than the originally produced commodity.” (Definition from USDA Census of Agriculture 2017, Appendix B.)

Map 4.1. Retail Direct (Direct to Consumer), 2017



Map 4.2. Wholesale Direct (Direct to Retailer), 2017

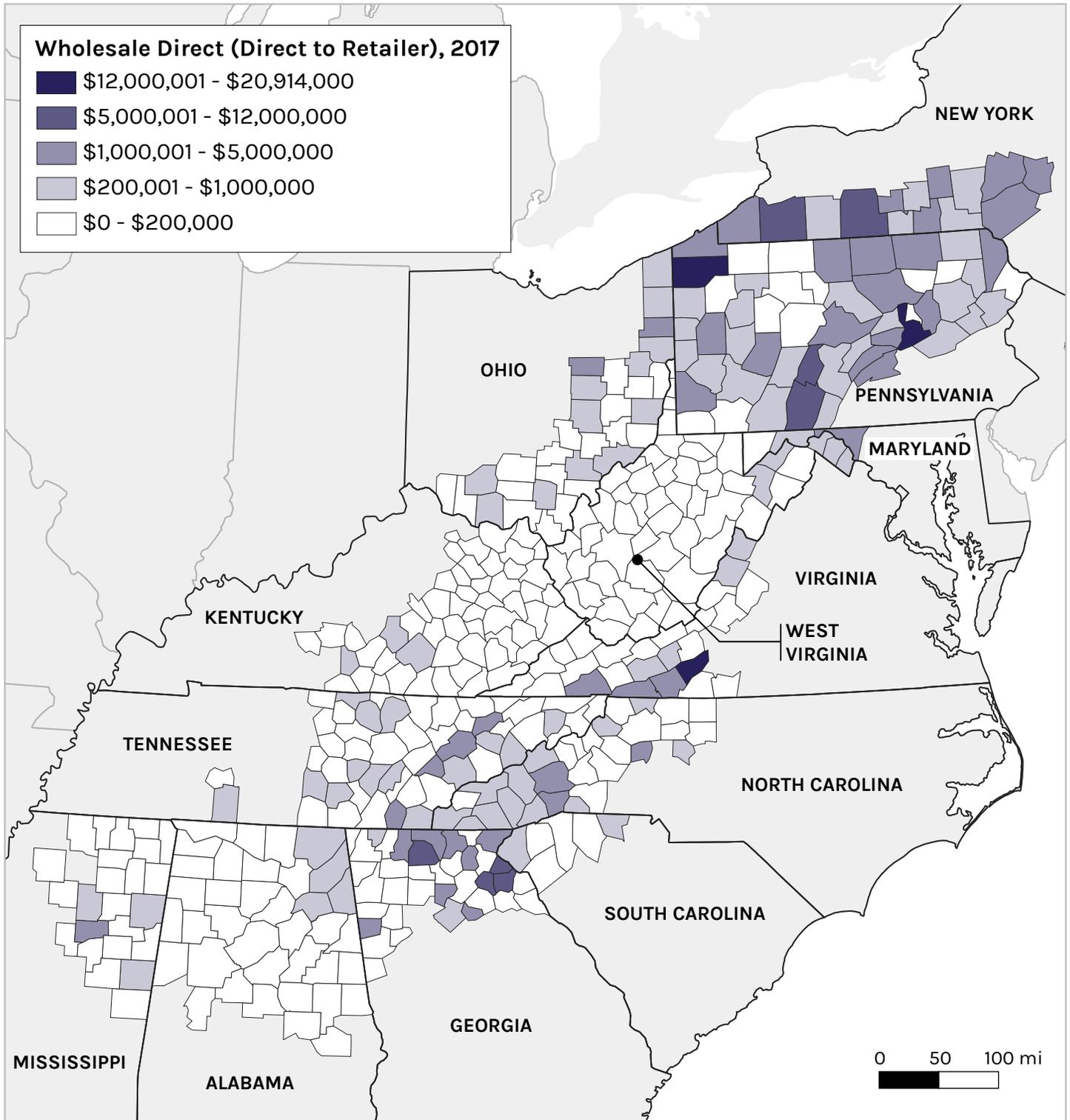


Table 4.2. Retail Direct and Agritourism Sales per Capita, 2017

	Retail Direct (Direct to Consumer)		Agritourism	
	Sales (Millions) ¹	Sales per Capita	Sales (Millions)	Sales per Capita
United States	\$2,805 M	\$8.57	\$949 M	\$2.90
Appalachian Region	\$242 M	\$9.44	\$50 M	\$1.95
Subregions				
Northern Appalachia	\$126 M	\$15.44	\$16 M	\$1.96
North Central Appalachia	\$24 M	\$9.94	\$4.2 M	\$1.76
Central Appalachia	\$11 M	\$6.15	\$1.8 M	\$0.99
South Central Appalachia	\$55 M	\$11.27	\$14 M	\$2.90
Southern Appalachia	\$26 M	\$3.08	\$14 M	\$1.66
County Types				
Large Metros (pop. 1 million +)	\$21 M	\$3.38	\$7.8 M	\$1.28
Small Metros (pop. <1 million)	\$100 M	\$9.20	\$19 M	\$1.71
Nonmetro, Adjacent to Large Metros	\$37 M	\$16.99	\$5.8 M	\$2.64
Nonmetro, Adjacent to Small Metros	\$54 M	\$13.66	\$13 M	\$3.40
Rural (nonmetro, not adj. to a metro)	\$30 M	\$12.05	\$4.5 M	\$1.79
Appalachian States				
Alabama	\$9.4 M	\$1.92	\$6.8 M	\$1.39
Appalachian Alabama	\$5.5 M	\$1.76	\$2.6 M	\$0.83
Non-Appalachian Alabama	\$3.9 M	\$2.20	\$4.2 M	\$2.39
Georgia	\$36 M	\$3.47	\$28 M	\$2.67
Appalachian Georgia	\$11 M	\$3.37	\$10.0 M	\$3.04
Non-Appalachian Georgia	\$25 M	\$3.52	\$18 M	\$2.50
Kentucky	\$29 M	\$6.45	\$17 M	\$3.81
Appalachian Kentucky	\$7.5 M	\$6.44	\$1.2 M	\$1.00
Non-Appalachian Kentucky	\$21 M	\$6.46	\$16 M	\$4.80
Maryland	\$54 M	\$8.95	\$9.9 M	\$1.64
Appalachian Maryland	\$8.2 M	\$32.69	\$0.14 M	\$0.57
Non-Appalachian Maryland	\$46 M	\$8.84	\$9.8 M	\$1.88
Mississippi	\$7.0 M	\$2.33	\$6.6 M	\$2.20
Appalachian Mississippi	\$2.2 M	\$3.50	\$0.66 M	\$1.06
Non-Appalachian Mississippi	\$4.8 M	\$2.02	\$5.9 M	\$2.50
New York	\$223 M	\$11.40	\$37 M	\$1.89
Appalachian New York	\$31 M	\$30.70	\$2.5 M	\$2.43
Non-Appalachian New York	\$191 M	\$10.33	\$34 M	\$1.86
North Carolina	\$70 M	\$6.74	\$24 M	\$2.29
Appalachian North Carolina	\$21 M	\$11.91	\$4.9 M	\$2.79
Non-Appalachian North Carolina	\$49 M	\$5.68	\$19 M	\$2.19
Ohio	\$79 M	\$6.79	\$14 M	\$1.16
Appalachian Ohio	\$27 M	\$13.34	\$4.0 M	\$2.02
Non-Appalachian Ohio	\$53 M	\$5.45	\$9.6 M	\$0.99
Pennsylvania	\$174 M	\$13.57	\$27 M	\$2.12
Appalachian Pennsylvania	\$73 M	\$12.81	\$11 M	\$1.87
Non-Appalachian Pennsylvania	\$101 M	\$14.17	\$17 M	\$2.33
South Carolina	\$30 M	\$5.90	\$6.2 M	\$1.22
Appalachian South Carolina	\$6.9 M	\$5.34	\$0.63 M	\$0.49
Non-Appalachian South Carolina	\$23 M	\$6.09	\$5.6 M	\$1.47
Tennessee	\$35 M	\$5.15	\$15 M	\$2.14
Appalachian Tennessee	\$20 M	\$7.00	\$7.4 M	\$2.53
Non-Appalachian Tennessee	\$14 M	\$3.75	\$7.2 M	\$1.86
Virginia	\$102 M	\$11.94	\$41 M	\$4.81
Appalachian Virginia	\$18 M	\$23.73	\$2.5 M	\$3.41
Non-Appalachian Virginia	\$84 M	\$12.66	\$38 M	\$5.79
West Virginia	\$11 M	\$6.20	\$3.0 M	\$1.68

Agritourism Sales: “This income includes income from recreational services such as hunting, fishing, farm or wine tours, hay rides, etc.” (Definition from USDA Census of Agriculture 2017, Appendix B.)

¹ This column is repeated from Table 4.1, Retail Direct Sales (Millions), for reference.

Map 4.3. Agritourism Sales, 2017

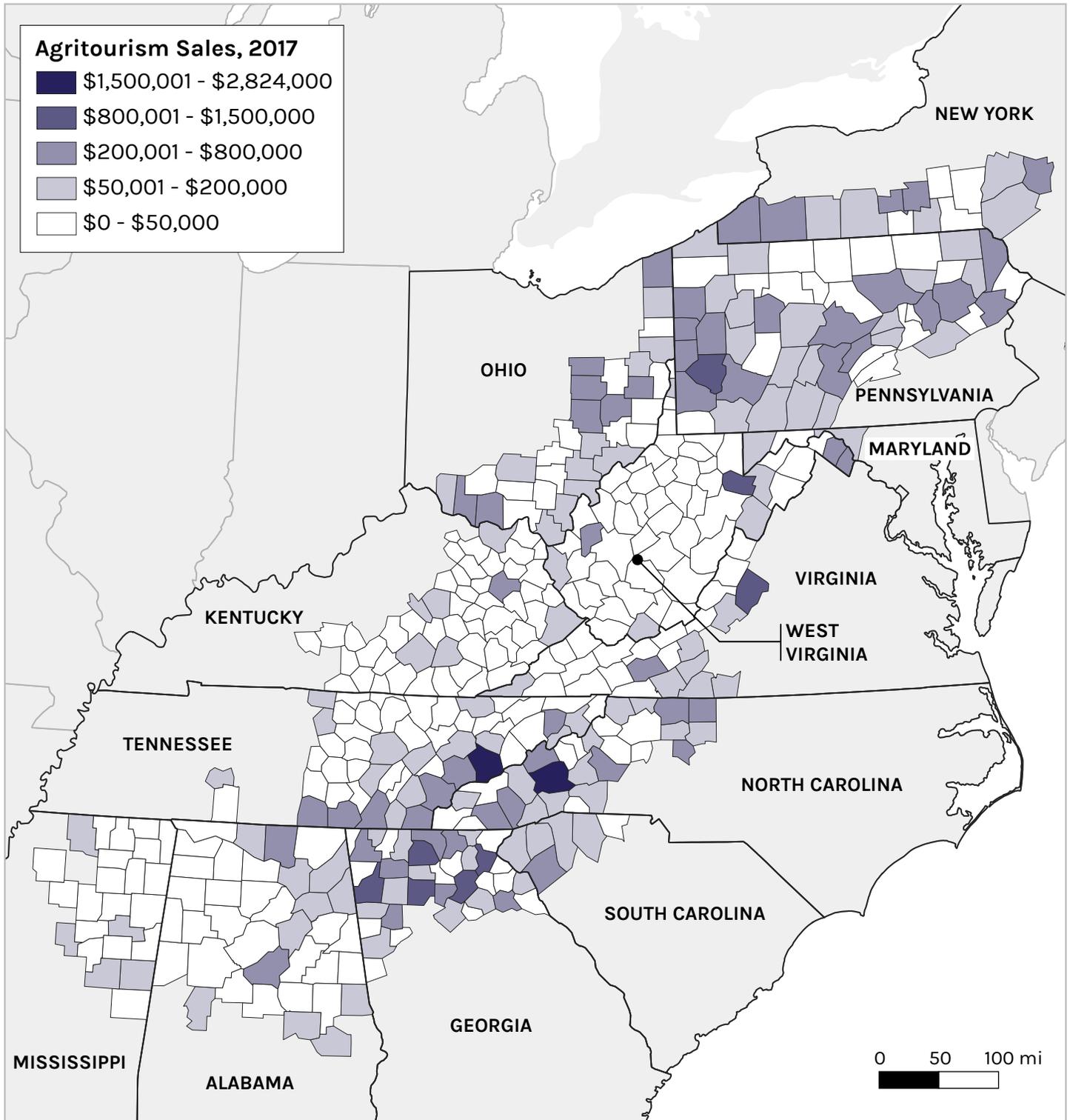


Table 4.3. Farmers' Markets, On-Farm Markets, and Food Hubs, 2017-2021¹

	SNAP (Food Stamps) and Farmers' Markets			USDA Registered Farmers' Markets ²	
	Percent of Households on SNAP	SNAP Authorized Farmers' Markets	SNAP Authorized Farmers' Markets per 100K Households on SNAP	USDA Registered Farmers' Markets	USDA Registered Farmers' Markets per 1M Population
United States	10%	2,738	22.0	1,370	4.2
Appalachian Region	13%	223	17.8	127	4.9
Subregions					
Northern Appalachia	12%	68	17.1	31	3.8
North Central Appalachia	15%	35	25.3	11	4.6
Central Appalachia	20%	30	19.9	31	16.6
South Central Appalachia	12%	56	24.3	26	5.3
Southern Appalachia	11%	34	10.2	28	3.4
County Types					
Large Metros (pop. 1 million +)	10%	30	13.0	23	3.7
Small Metros (pop. <1 million)	12%	91	18.1	33	3.0
Nonmetro, Adjacent to Large Metros	14%	18	14.9	17	7.7
Nonmetro, Adjacent to Small Metros	15%	52	22.8	22	5.6
Rural (nonmetro, not adj. to a metro)	17%	32	19.2	32	12.8
Appalachian States					
Alabama	13%	15	6.1	17	3.5
Appalachian Alabama	12%	12	8.4	11	3.5
Non-Appalachian Alabama	15%	3	2.9	6	3.4
Georgia	13%	58	12.5	33	3.1
Appalachian Georgia	10%	12	11.6	9	2.7
Non-Appalachian Georgia	14%	46	12.8	24	3.3
Kentucky	14%	48	20.2	68	15.2
Appalachian Kentucky	21%	17	17.5	28	24.1
Non-Appalachian Kentucky	11%	32	22.9	41	12.4
Maryland	9%	31	15.9	28	4.6
Appalachian Maryland	14%	2	15.1	0	0.0
Non-Appalachian Maryland	7%	21	15.7	26	5.0
Mississippi	15%	15	9.2	6	2.0
Appalachian Mississippi	14%	1	2.9	3	4.8
Non-Appalachian Mississippi	15%	14	10.9	3	1.3
New York	12%	158	17.5	76	3.9
Appalachian New York	12%	24	47.3	9	8.8
Non-Appalachian New York	12%	134	15.7	66	3.6
North Carolina	12%	80	17.1	41	3.9
Appalachian North Carolina	11%	25	31.6	14	7.9
Non-Appalachian North Carolina	12%	55	14.2	26	3.0
Ohio	11%	96	18.2	59	5.0
Appalachian Ohio	15%	13	11.2	6	3.0
Non-Appalachian Ohio	11%	83	20.3	54	5.6
Pennsylvania	11%	52	9.6	37	2.9
Appalachian Pennsylvania	11%	33	12.5	21	3.7
Non-Appalachian Pennsylvania	10%	19	6.9	17	2.4
South Carolina	12%	24	10.4	15	3.0
Appalachian South Carolina	11%	9	17.3	5	3.9
Non-Appalachian South Carolina	13%	15	8.4	10	2.6
Tennessee	13%	41	12.4	20	3.0
Appalachian Tennessee	14%	24	15.4	8	2.7
Non-Appalachian Tennessee	12%	17	9.7	12	3.1
Virginia	7%	105	46.1	58	6.8
Appalachian Virginia	12%	16	51.4	7	9.4
Non-Appalachian Virginia	6%	78	65.9	47	7.1
West Virginia	15%	35	32.5	6	3.3

¹ All calculations in Table 4.3 are based on the most recent available data, as follows: Demographic data (households on SNAP, population): ACS 2018 5-year estimates; Number of farms: 2017 USDA Census of Agriculture; SNAP Authorized Farmers' Markets; USDA Registered Farmers' Markets, On-Farm Markets, and Food Hubs: Accessed November 2020 - February 2021

² The USDA National Farmers' Market Directory is a voluntary registry that farmers' markets may opt into, but are not required to do so. Therefore, it is prone to undercounting absolute numbers of farmers' markets, but is useful in comparing registry numbers across regions.

Continued: Table 4.3. Farmers' Markets, On-Farm Markets, and Food Hubs, 2017-2021

	USDA Registered On-Farm Markets		USDA Registered Food Hubs		
	USDA Registered On-Farm Markets	USDA Registered On-Farm Markets per 10K Farms	USDA Registered Food Hubs	USDA Registered Food Hubs per 10K Farms	USDA Registered Food Hubs per 1M Population
United States	1,595	7.8	254	1.2	0.8
Appalachian Region	167	6.7	27	1.1	1.1
Subregions					
Northern Appalachia	67	11.0	12	2.0	1.5
North Central Appalachia	24	6.5	5	1.4	2.1
Central Appalachia	9	2.2	1	0.2	0.5
South Central Appalachia	36	6.7	7	1.3	1.4
Southern Appalachia	31	5.4	2	0.4	0.2
County Types					
Large Metros (pop. 1 million +)	21	9.9	2	0.9	0.3
Small Metros (pop. <1 million)	55	7.5	9	1.2	0.8
Nonmetro, Adjacent to Large Metros	34	10.0	2	0.6	0.9
Nonmetro, Adjacent to Small Metros	40	5.6	13	1.8	3.3
Rural (nonmetro, not adj. to a metro)	17	3.5	1	0.2	0.4
Appalachian States					
Alabama	16	3.9	1	0.2	0.2
Appalachian Alabama	10	3.8	1	0.4	0.3
Non-Appalachian Alabama	7	4.8	0	0.0	0.0
Georgia	22	5.2	7	1.6	0.7
Appalachian Georgia	8	5.8	0	0.0	0.0
Non-Appalachian Georgia	14	4.9	7	2.5	1.0
Kentucky	11	1.4	4	0.5	0.9
Appalachian Kentucky	4	1.4	0	0.0	0.0
Non-Appalachian Kentucky	7	1.5	3	0.6	0.9
Maryland	30	24.1	10	8.0	1.7
Appalachian Maryland	1	5.3	1	5.3	4.0
Non-Appalachian Maryland	27	25.6	9	8.5	1.7
Mississippi	9	2.6	4	1.1	1.3
Appalachian Mississippi	4	3.7	0	0.0	0.0
Non-Appalachian Mississippi	5	2.1	4	1.7	1.7
New York	70	20.9	14	4.2	0.7
Appalachian New York	10	9.7	3	2.9	2.9
Non-Appalachian New York	60	25.9	11	4.8	0.6
North Carolina	56	12.1	17	3.7	1.6
Appalachian North Carolina	7	4.8	4	2.8	2.3
Non-Appalachian North Carolina	49	15.3	13	4.1	1.5
Ohio	89	11.4	8	1.0	0.7
Appalachian Ohio	19	6.8	2	0.7	1.0
Non-Appalachian Ohio	70	14.0	6	1.2	0.6
Pennsylvania	70	13.2	14	2.6	1.1
Appalachian Pennsylvania	45	13.1	7	2.0	1.2
Non-Appalachian Pennsylvania	24	12.8	7	3.7	1.0
South Carolina	31	12.5	4	1.6	0.8
Appalachian South Carolina	9	14.6	1	1.6	0.8
Non-Appalachian South Carolina	22	11.8	3	1.6	0.8
Tennessee	35	5.0	6	0.9	0.9
Appalachian Tennessee	20	5.3	2	0.5	0.7
Non-Appalachian Tennessee	15	4.7	4	1.2	1.0
Virginia	72	16.7	11	2.5	1.3
Appalachian Virginia	14	10.3	2	1.5	2.7
Non-Appalachian Virginia	58	19.5	8	2.7	1.2
West Virginia	16	6.8	4	1.7	2.2

Table 4.4. SNAP Redemptions at Farmers' Markets (FM) and Direct Marketing Farmers (DMF), 2019

Due to limited data availability, all data in Table 4.4 are for entire states, not Appalachian subregions or portions of states.

	Households on SNAP	2019 SNAP Authorized FMs and DMFs	SNAP Redemptions at FMs and DMFs				
			2012	2019	Change 2012-2019	2019 Redemptions per SNAP Household	2019 Redemptions per SNAP FM/DMF
United States	12,467,061	3,660	\$16,588,777	\$22,679,787	37%	\$1.82	\$6,197
Appalachian States							
All Appalachian States	4,637,555	1,050	\$5,112,993	\$6,200,194	21%	\$1.34	\$5,905
Alabama	245,573	45	\$172,618	\$92,103	-47%	\$0.38	\$2,047
Georgia	462,598	84	\$1,593,692	\$265,733	-83%	\$0.57	\$3,163
Kentucky	237,158	63	\$70,259	\$71,885	2%	\$0.30	\$1,141
Maryland	195,567	49	\$281,400	\$164,415	-42%	\$0.84	\$3,355
Mississippi	162,465	39	\$80,150	\$200,837	151%	\$1.24	\$5,150
New York	903,842	223	\$1,850,974	\$2,953,033	60%	\$3.27	\$13,242
North Carolina	467,725	95	\$107,971	\$249,442	131%	\$0.53	\$2,626
Ohio	526,203	109	\$201,013	\$245,204	22%	\$0.47	\$2,250
Pennsylvania	539,038	97	\$227,776	\$1,377,339	505%	\$2.56	\$14,199
South Carolina	230,720	60	\$283,937	\$162,123	-43%	\$0.70	\$2,702
Tennessee	331,154	58	\$97,758	\$146,069	49%	\$0.44	\$2,518
Virginia	227,822	98	\$131,461	\$219,058	67%	\$0.96	\$2,235
West Virginia	107,690	30	\$13,984	\$52,953	279%	\$0.49	\$1,765

Appendix 4

State Profiles

Appalachian Alabama

Land Area

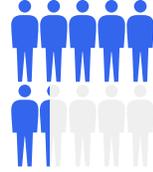
16,488,564 acres



51% of the state's land is in the Appalachian Region. It represents **13%** of land in Appalachia.

Population

3,133,777



64% of the state's population lives in the Appalachian Region. It represents **12%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

26,023

	Appalachian Alabama	Appalachian Region	United States
Change in Farmland, 2012-2017	-2.5%	-2.6%	-1.6%
Acres of Farmland per Capita	1.37	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	4.07	8.55	34.65

Average Farm Size (Acres)

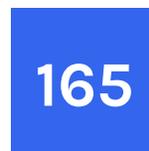
United States



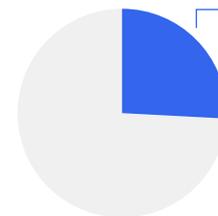
Appalachian Region



Appalachian Alabama



Farmland



26% of Appalachian Alabama's land is in farms. This represents **12%** of Appalachian farmland.

Farmers

Number of Farmers

41,922

	Appalachian Alabama	Appalachian Region	United States
Farmers per 1,000 Residents	13.4	15.8	10.4
Average Farmer Age	57.1	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	31%	28%	27%
% of Farms with Internet Access	74%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	40%	41%	44%

Appalachian Alabama

Sales

Total Agricultural Sales

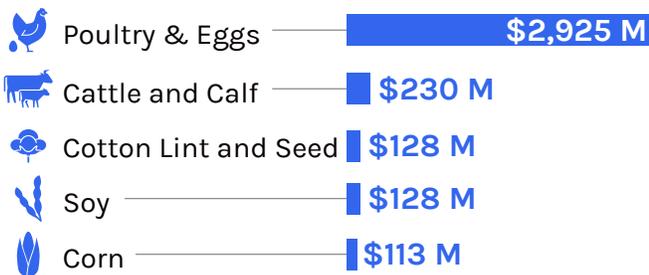
\$3,821,320,000



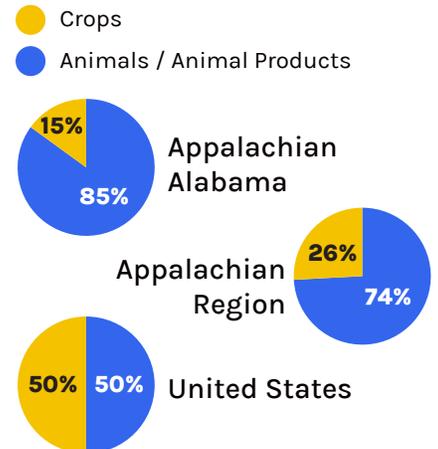
This represents **19%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Alabama	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$1.76	\$9.44	\$8.57
Sales per Acre	\$891	\$543	\$432
Net Income per Acre	\$235	\$143	\$98

92% of Agricultural Sales in Appalachian Alabama are from its **Top 5 Product Categories:**

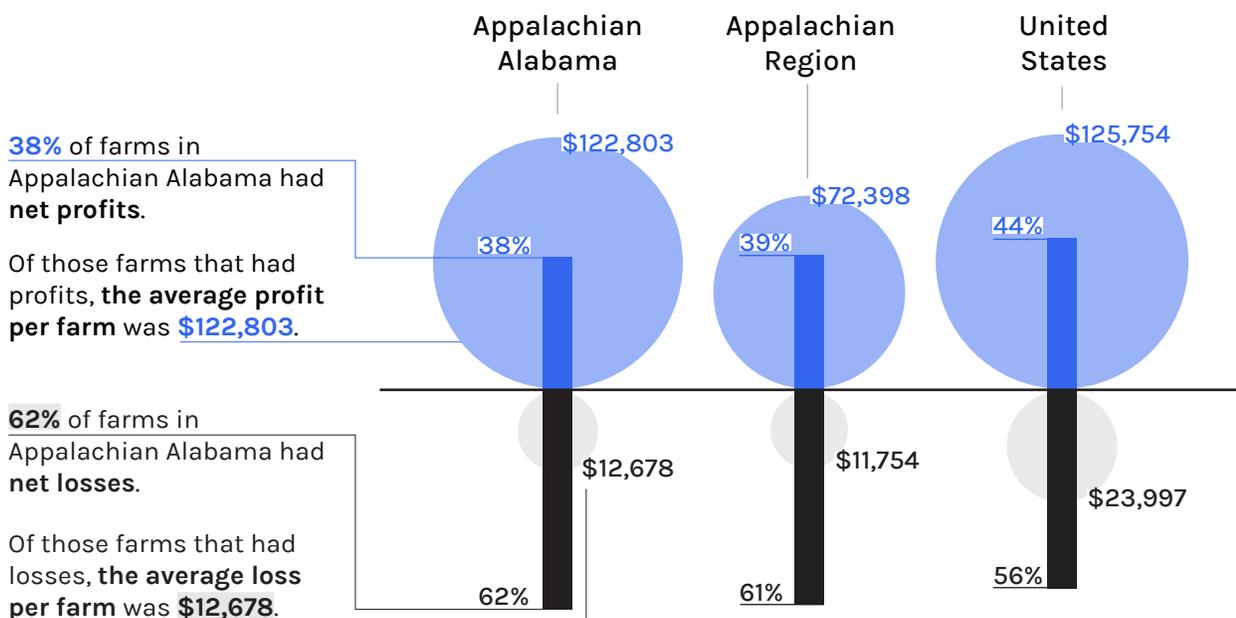


% of Agricultural Sales in Alabama from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian Georgia

Land Area

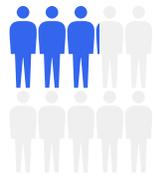
7,282,459 acres



20% of the state's land is in the Appalachian Region. It represents **6%** of land in Appalachia.

Population

3,284,939



31% of the state's population lives in the Appalachian Region. It represents **13%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

13,894

	Appalachian Georgia	Appalachian Region	United States
Change in Farmland, 2012-2017	3.6%	-2.6%	-1.6%
Acres of Farmland per Capita	0.45	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	1.17	8.55	34.65

Average Farm Size (Acres)

United States



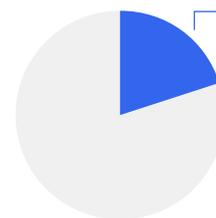
Appalachian Region



Appalachian Georgia



Farmland



20% of Appalachian Georgia's land is in farms.

This represents **4%** of Appalachian farmland.

Farmers

Number of Farmers

22,557

	Appalachian Georgia	Appalachian Region	United States
Farmers per 1,000 Residents	6.9	15.8	10.4
Average Farmer Age	57.5	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	34%	28%	27%
% of Farms with Internet Access	78%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	44%	41%	44%

Appalachian Georgia

Sales

Total Agricultural Sales

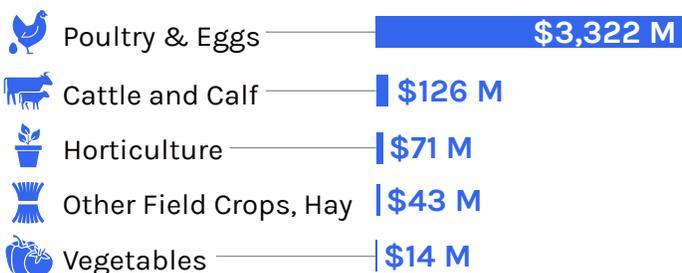
\$3,656,658,000



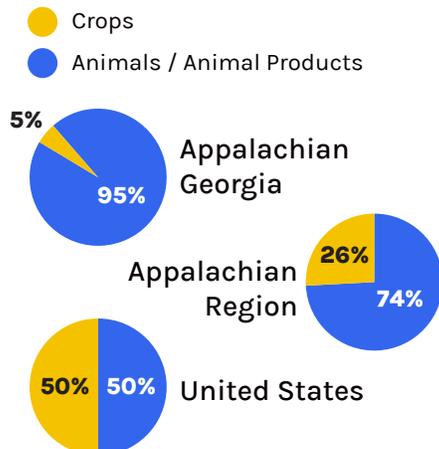
This represents **18%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Georgia	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$3.37	\$9.44	\$8.57
Sales per Acre	\$2,455	\$543	\$432
Net Income per Acre	\$811	\$143	\$98

98% of Agricultural Sales in Appalachian Georgia are from its **Top 5 Product Categories:**

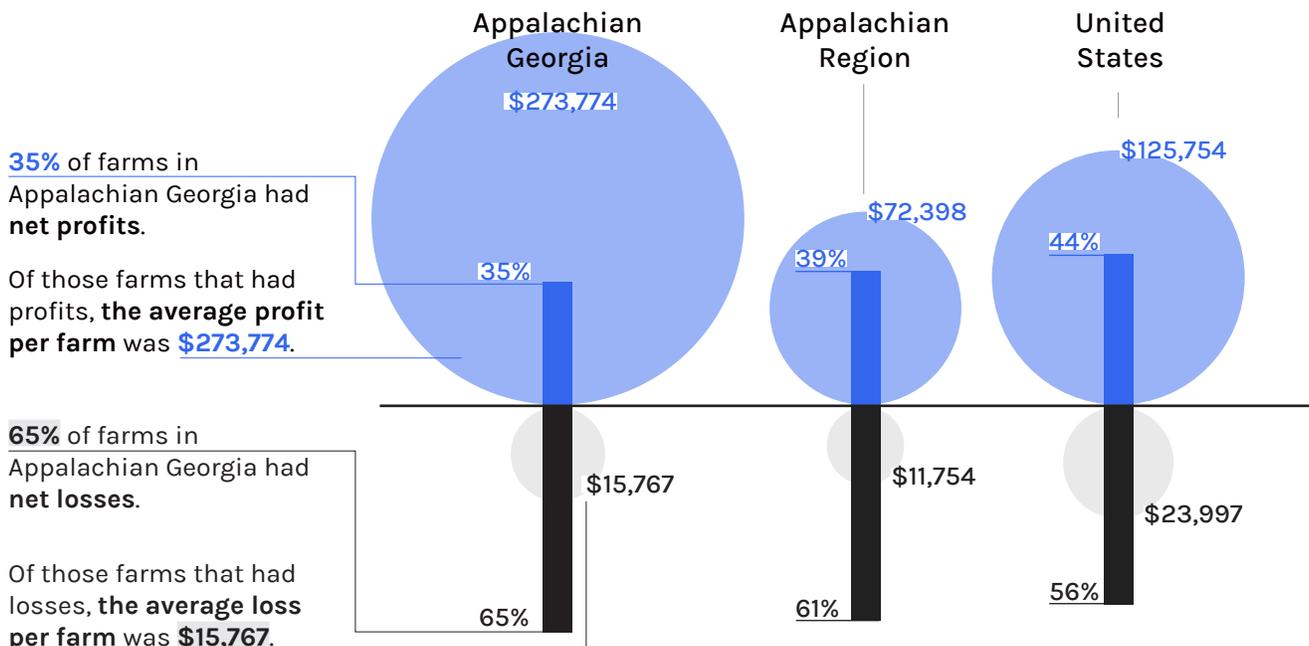


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



35% of farms in Appalachian Georgia had net profits. Of those farms that had profits, the **average profit per farm** was **\$273,774**.

65% of farms in Appalachian Georgia had net losses. Of those farms that had losses, the **average loss per farm** was **\$15,767**.

Appalachian Kentucky

Land Area

11,667,102 acres



46% of the state's land is in the Appalachian Region. It represents **9%** of land in Appalachia.

Population

1,163,748



26% of the state's population lives in the Appalachian Region. It represents **5%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

27,947

	Appalachian Kentucky	Appalachian Region	United States
Change in Farmland, 2012-2017	-1.7%	-2.6%	-1.6%
Acres of Farmland per Capita	3.6	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	3.12	8.55	34.65

Average Farm Size (Acres)

United States



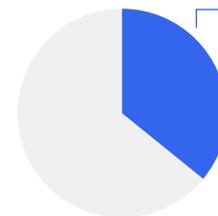
Appalachian Region



Appalachian Kentucky



Farmland



36% of Appalachian Kentucky's land is in farms. This represents **11%** of Appalachian farmland.

Farmers

Number of Farmers

44,927

	Appalachian Kentucky	Appalachian Region	United States
Farmers per 1,000 Residents	38.6	15.8	10.4
Average Farmer Age	56.1	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	28%	28%	27%
% of Farms with Internet Access	71%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	39%	41%	44%

Appalachian Kentucky

Sales

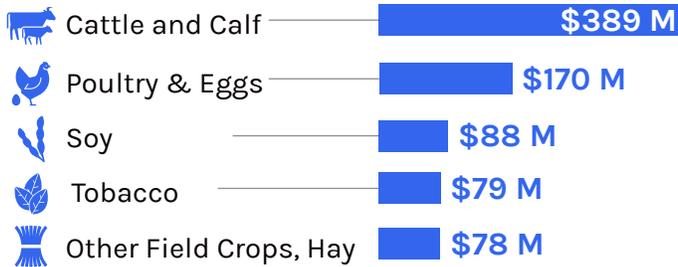
Total Agricultural Sales
\$968,649,000



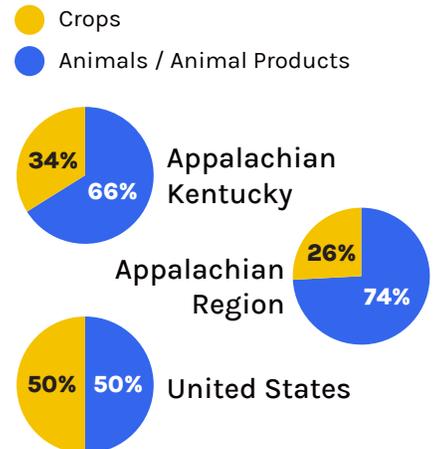
This represents **5%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Kentucky	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$6.44	\$9.44	\$8.57
Sales per Acre	\$231	\$543	\$432
Net Income per Acre	\$40	\$143	\$98

83% of Agricultural Sales in Appalachian Kentucky are from its **Top 5 Product Categories:**

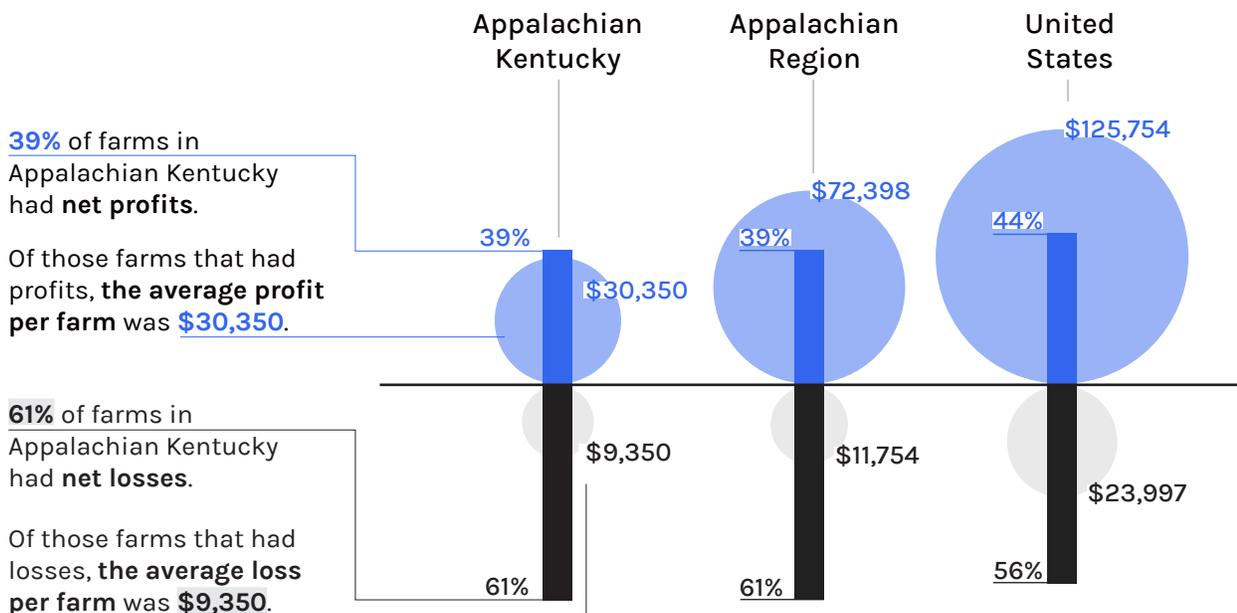


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian Maryland

Land Area

978,590 acres

Population

251,064



16% of the state's land is in the Appalachian Region. It represents **1%** of land in Appalachia.



4% of the state's population lives in the Appalachian Region. It represents **1%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

1,874

- Change in Farmland, 2012-2017
- Acres of Farmland per Capita
- Vegetable & Orchard Acreage per 1,000 residents

	Appalachian Maryland	Appalachian Region	United States
Change in Farmland, 2012-2017	-6.2%	-2.6%	-1.6%
Acres of Farmland per Capita	0.98	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	8.02	8.55	34.65

Average Farm Size (Acres)

United States



Appalachian Region



Appalachian Maryland



Farmland



25% of Appalachian Maryland's land is in farms. This represents **1%** of Appalachian farmland.

Farmers

Number of Farmers

3,237

- Farmers per 1,000 Residents
- Average Farmer Age
- % Beginning Farmers (0-10 yrs. experience)
- % of Farms with Internet Access
- % of Principal Producers whose Primary Occupation is Farming

	Appalachian Maryland	Appalachian Region	United States
Farmers per 1,000 Residents	12.9	15.8	10.4
Average Farmer Age	53.9	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	30%	28%	27%
% of Farms with Internet Access	66%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	42%	41%	44%

Appalachian Maryland

Sales

Total Agricultural Sales

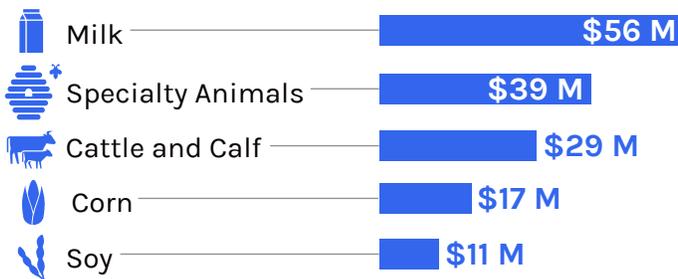
\$186,926,000



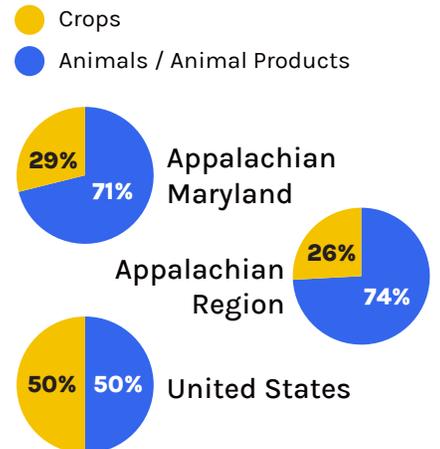
This represents **1%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Maryland	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$32.69	\$9.44	\$8.57
Sales per Acre	\$763	\$543	\$432
Net Income per Acre	\$213	\$143	\$98

81% of Agricultural Sales in Appalachian Maryland are from its **Top 5 Product Categories:**

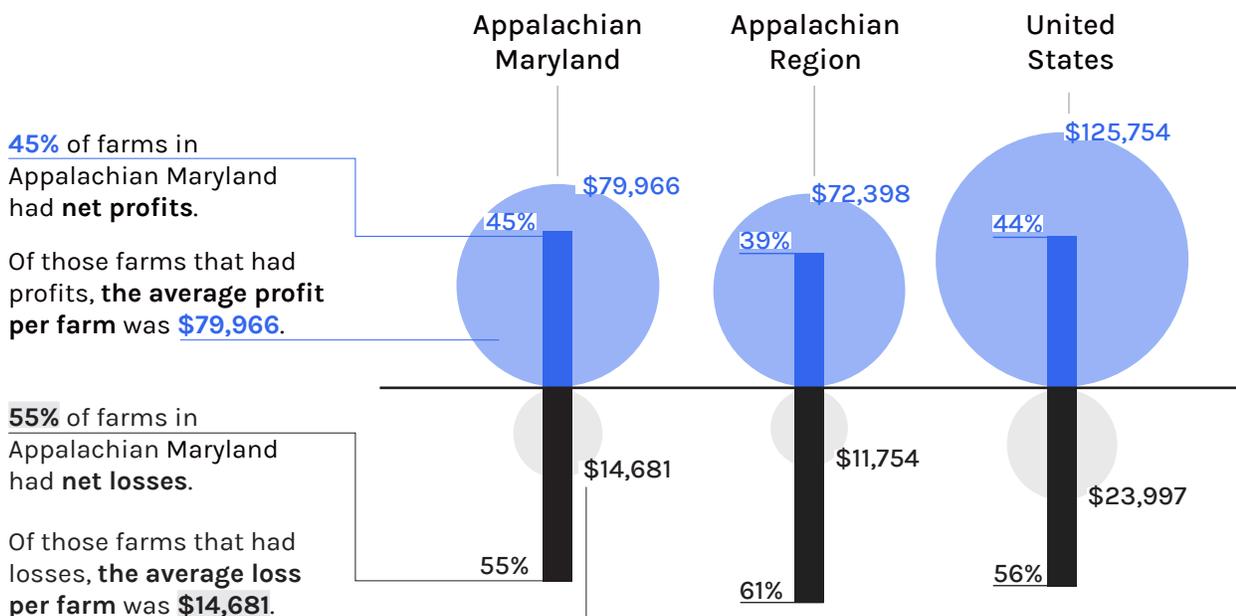


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



45% of farms in Appalachian Maryland had **net profits**.

Of those farms that had profits, **the average profit per farm** was **\$79,966**.

55% of farms in Appalachian Maryland had **net losses**.

Of those farms that had losses, **the average loss per farm** was **\$14,681**.

Appalachian Mississippi

Land Area

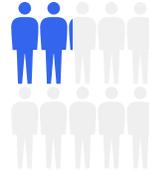
7,936,066 acres



26% of the state's land is in the Appalachian Region. It represents **6%** of land in Appalachia.

Population

625,041



21% of the state's population lives in the Appalachian Region. It represents **2%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

10,811

	Appalachian Mississippi	Appalachian Region	United States
Change in Farmland, 2012-2017	-7.4%	-2.6%	-1.6%
Acres of Farmland per Capita	4.61	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	66.7	8.55	34.65

Average Farm Size (Acres)

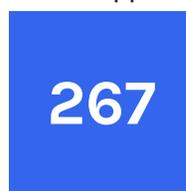
United States



Appalachian Region



Appalachian Mississippi



Farmland



36% of Appalachian Mississippi's land is in farms.

This represents **8%** of Appalachian farmland.

Farmers

Number of Farmers

16,453

	Appalachian Mississippi	Appalachian Region	United States
Farmers per 1,000 Residents	26.3	15.8	10.4
Average Farmer Age	59.7	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	26%	28%	27%
% of Farms with Internet Access	63%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	34%	41%	44%

Appalachian Mississippi

Sales

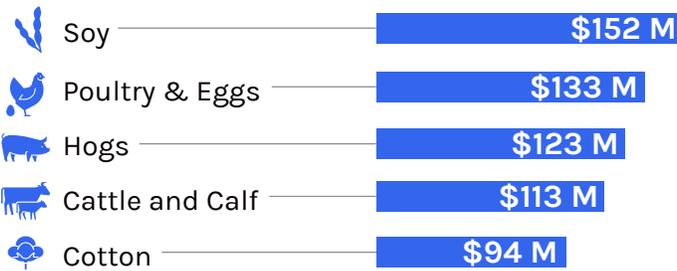
Total Agricultural Sales
\$871,866,000



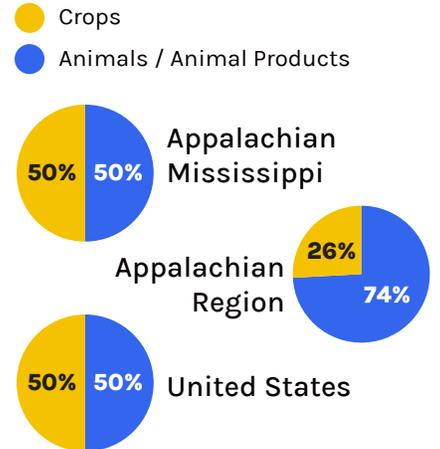
This represents **4%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Mississippi	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$3.50	\$9.44	\$8.57
Sales per Acre	\$302	\$543	\$432
Net Income per Acre	\$101	\$143	\$98

71% of Agricultural Sales in Appalachian Mississippi are from its **Top 5 Product Categories:**

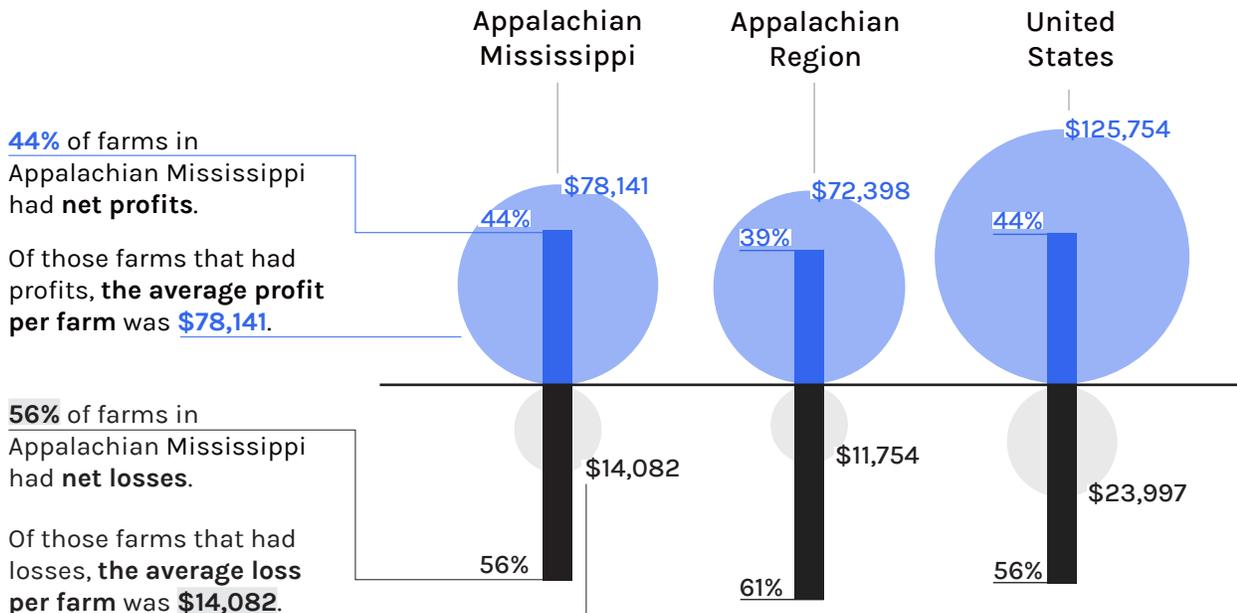


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
 ■ % of Farms with Loss ● Average Loss per Farm with Loss



44% of farms in Appalachian Mississippi had **net profits**.

Of those farms that had profits, **the average profit per farm** was **\$78,141**.

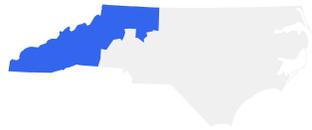
56% of farms in Appalachian Mississippi had **net losses**.

Of those farms that had losses, **the average loss per farm** was **\$14,082**.

Appalachian North Carolina

Land Area

7,606,932 acres



24% of the state's land is in the Appalachian Region. It represents **6%** of land in Appalachia.

Population

1,767,341



17% of the state's population lives in the Appalachian Region. It represents **7%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

14,458

	Appalachian North Carolina	Appalachian Region	United States
Change in Farmland, 2012-2017	+1%	-2.6%	-1.6%
Acres of Farmland per Capita	0.81	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	9.3	8.55	34.65

Average Farm Size (Acres)

United States



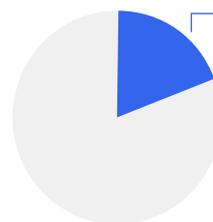
Appalachian Region



Appalachian North Carolina



Farmland



19% of Appalachian North Carolina's land is in farms.

This represents **4%** of Appalachian farmland.

Farmers

Number of Farmers

23,467

	Appalachian North Carolina	Appalachian Region	United States
Farmers per 1,000 Residents	13.3	15.8	10.4
Average Farmer Age	58.2	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	27%	28%	27%
% of Farms with Internet Access	74%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	44%	41%	44%

Appalachian North Carolina

Sales

Total Agricultural Sales

\$1,496,860,000



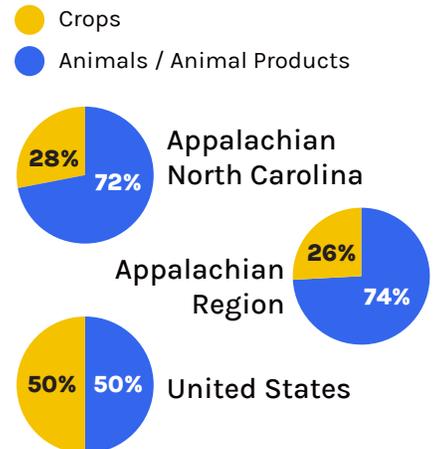
This represents **8%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian North Carolina	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$11.91	\$9.44	\$8.57
Sales per Acre	\$1,046	\$543	\$432
Net Income per Acre	\$322	\$143	\$98

85% of Agricultural Sales in Appalachian North Carolina are from its **Top 5 Product Categories:**

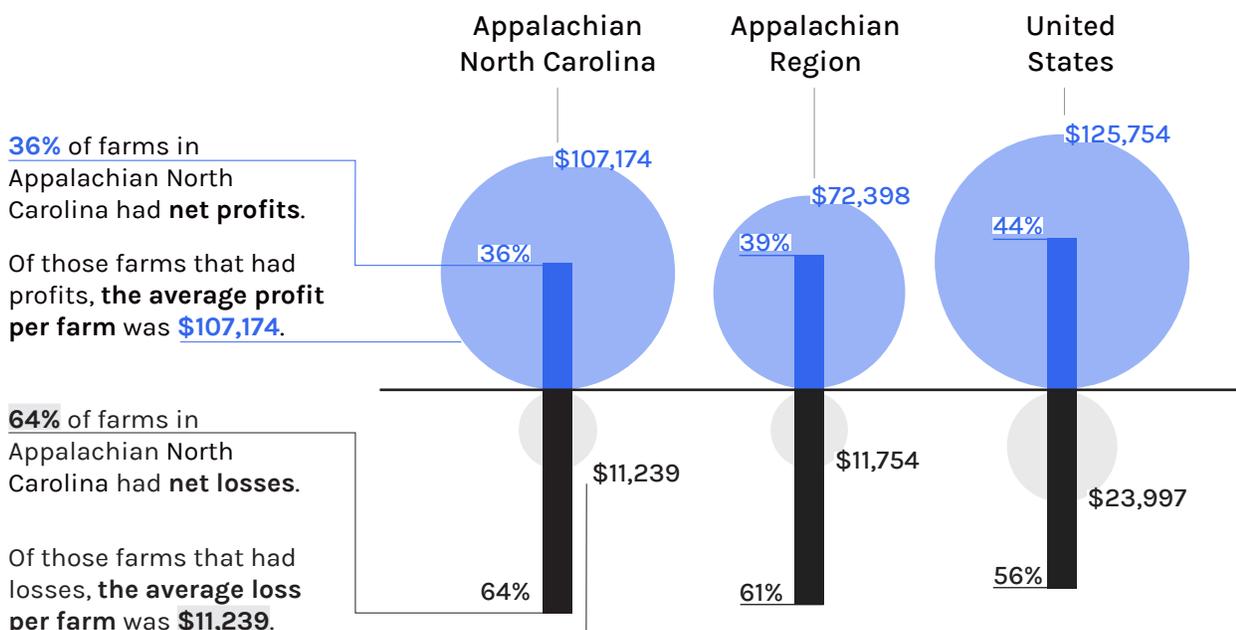


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian New York

Land Area

7,476,180 acres



25% of the state's land is in the Appalachian Region. It represents **6%** of land in Appalachia.

Population

1,022,915



5% of the state's population lives in the Appalachian Region. It represents **4%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

10,289

- Change in Farmland, 2012-2017
- Acres of Farmland per Capita
- Vegetable & Orchard Acreage per 1,000 residents

	Appalachian New York	Appalachian Region	United States
Change in Farmland, 2012-2017	-4%	-2.6%	-1.6%
Acres of Farmland per Capita	1.97	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	38.6	8.55	34.65

Average Farm Size (Acres)

United States



Appalachian Region



Appalachian New York



Farmland



27% of Appalachian New York's land is in farms.

This represents **6%** of Appalachian farmland.

Farmers

Number of Farmers

17,591

- Farmers per 1,000 Residents
- Average Farmer Age
- % Beginning Farmers (0-10 yrs. experience)
- % of Farms with Internet Access
- % of Principal Producers whose Primary Occupation is Farming

	Appalachian New York	Appalachian Region	United States
Farmers per 1,000 Residents	17.2	15.8	10.4
Average Farmer Age	56.3	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	26%	28%	27%
% of Farms with Internet Access	76%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	49%	41%	44%

Appalachian New York

Sales

Total Agricultural Sales

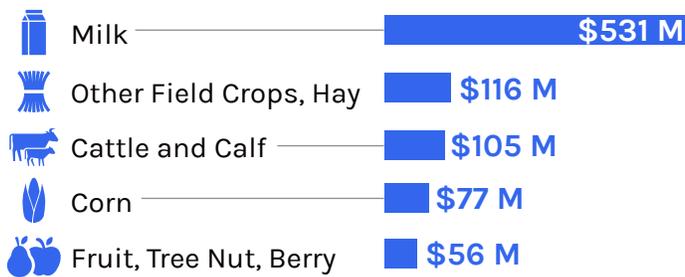
\$1,009,297,000



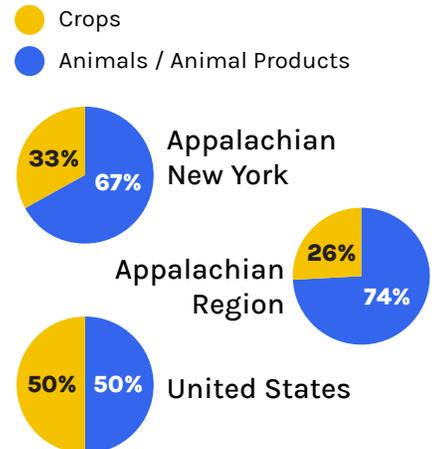
This represents **5%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian New York	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$30.70	\$9.44	\$8.57
Sales per Acre	\$500	\$543	\$432
Net Income per Acre	\$156	\$143	\$98

88% of Agricultural Sales in Appalachian New York are from its **Top 5 Product Categories:**

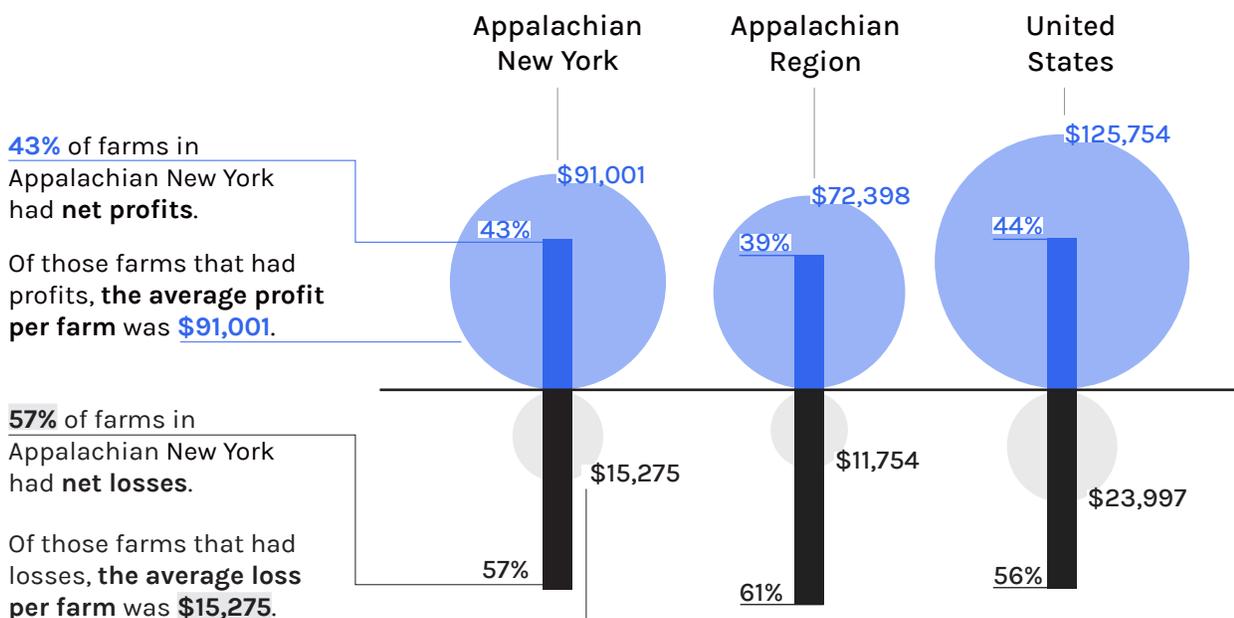


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



43% of farms in Appalachian New York had **net profits**.

Of those farms that had profits, **the average profit per farm** was **\$91,001**.

57% of farms in Appalachian New York had **net losses**.

Of those farms that had losses, **the average loss per farm** was **\$15,275**.

Appalachian Ohio

Land Area

10,226,025 acres



39% of the state's land is in the Appalachian Region. It represents **8%** of land in Appalachia.

Population

1,993,819



17% of the state's population lives in the Appalachian Region. It represents **8%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

27,896

- Change in Farmland, 2012-2017
- Acres of Farmland per Capita
- Vegetable & Orchard Acreage per 1,000 residents

	Appalachian Ohio	Appalachian Region	United States
Change in Farmland, 2012-2017	+1.5%	-2.6%	-1.6%
Acres of Farmland per Capita	1.99	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	4.9	8.55	34.65

Average Farm Size (Acres)

United States



Appalachian Region



Appalachian Ohio



Farmland



39% of Appalachian Ohio's land is in farms.

This represents **11%** of Appalachian farmland.

Farmers

Number of Farmers

46,675

- Farmers per 1,000 Residents
- Average Farmer Age
- % Beginning Farmers (0-10 yrs. experience)
- % of Farms with Internet Access
- % of Principal Producers whose Primary Occupation is Farming

	Appalachian Ohio	Appalachian Region	United States
Farmers per 1,000 Residents	23.4	15.8	10.4
Average Farmer Age	55.9	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	26%	28%	27%
% of Farms with Internet Access	68%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	39%	41%	44%

Appalachian Ohio

Sales

Total Agricultural Sales

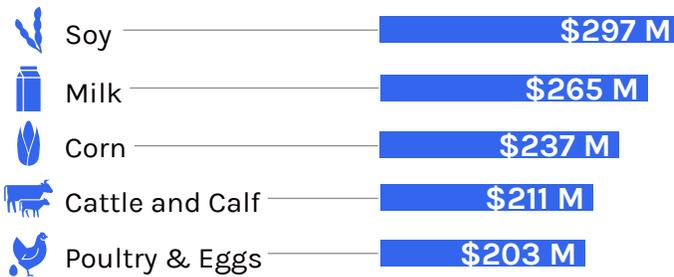
\$1,499,445,000



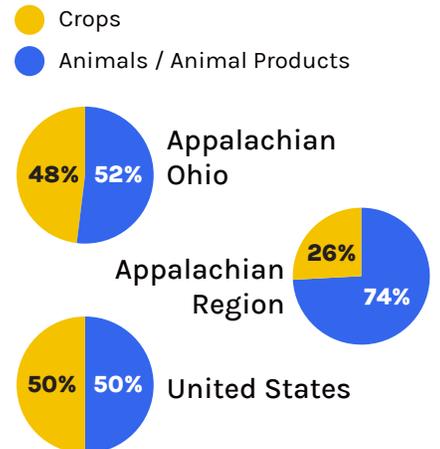
This represents **8%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Ohio	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$13.34	\$9.44	\$8.57
Sales per Acre	\$377	\$543	\$432
Net Income per Acre	\$71	\$143	\$98

81% of Agricultural Sales in Appalachian Ohio are from its **Top 5 Product Categories:**

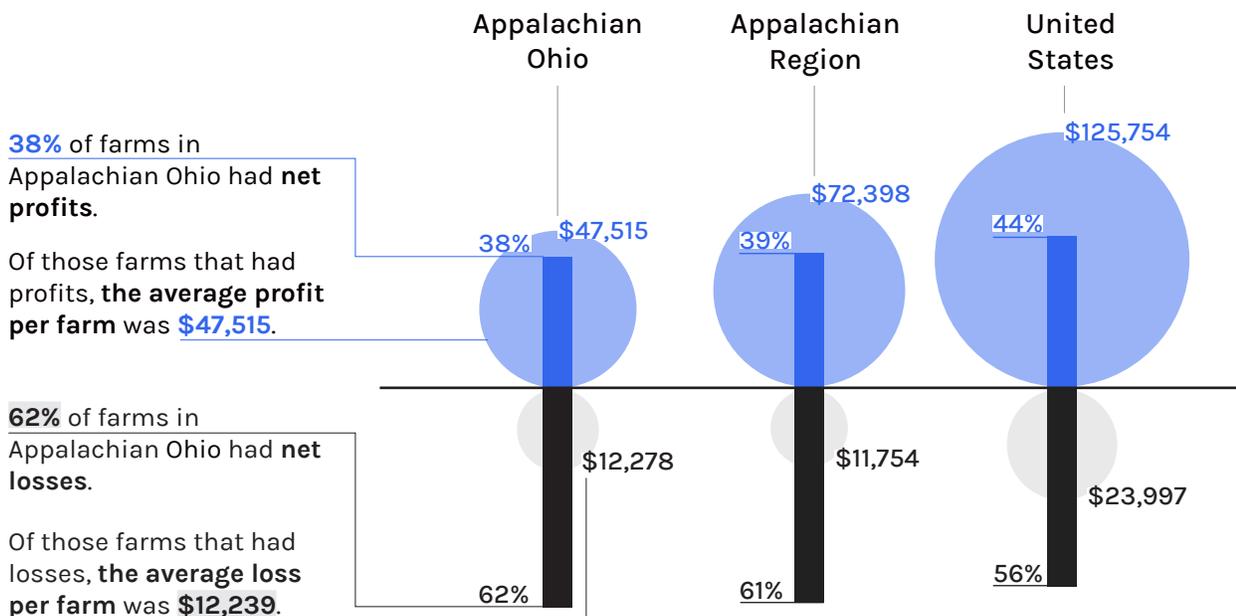


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian Pennsylvania

Land Area

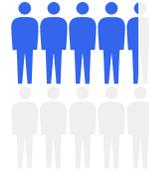
23,323,937 acres



81% of the state's land is in the Appalachian Region. It represents **18%** of land in Appalachia.

Population

5,666,957



44% of the state's population lives in the Appalachian Region. It represents **22%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

34,366

- Change in Farmland, 2012-2017
- Acres of Farmland per Capita
- Vegetable & Orchard Acreage per 1,000 residents

	Appalachian Pennsylvania	Appalachian Region	United States
Change in Farmland, 2012-2017	-5.5%	-2.6%	-1.6%
Acres of Farmland per Capita	0.92	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	9.39	8.55	34.65

Average Farm Size (Acres)

United States



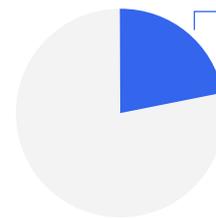
Appalachian Region



Appalachian Pennsylvania



Farmland



22% of Appalachian Pennsylvania's land is in farms.

This represents **14%** of Appalachian farmland.

Farmers

Number of Farmers

57,835

- Farmers per 1,000 Residents
- Average Farmer Age
- % Beginning Farmers (0-10 yrs. experience)
- % of Farms with Internet Access
- % of Principal Producers whose Primary Occupation is Farming

	Appalachian Pennsylvania	Appalachian Region	United States
Farmers per 1,000 Residents	10.2	15.8	10.4
Average Farmer Age	56.5	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	24%	28%	27%
% of Farms with Internet Access	71%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	46%	41%	44%

Appalachian Pennsylvania

Sales

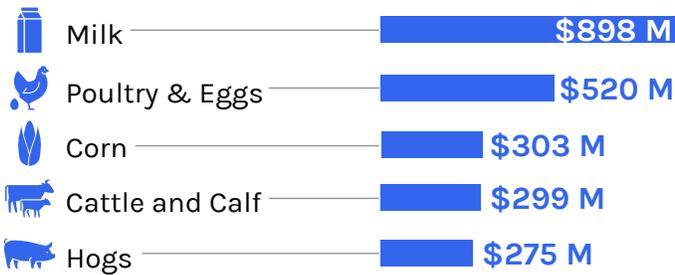
Total Agricultural Sales
\$3,140,311,000



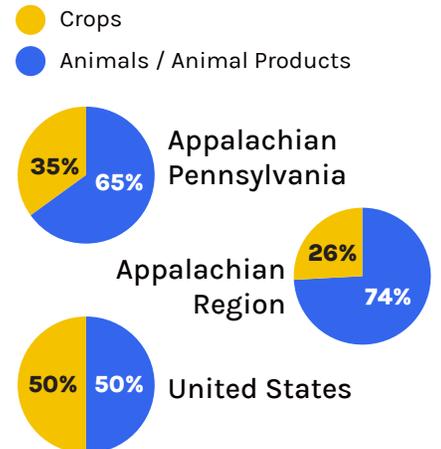
This represents **16%** of the overall Agricultural Sales in the Appalachian Region.

	Appalachian Pennsylvania	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$12.81	\$9.44	\$8.57
Sales per Acre	\$602	\$543	\$432
Net Income per Acre	\$176	\$143	\$98

73% of Agricultural Sales in Appalachian Pennsylvania are from its **Top 5 Product Categories:**

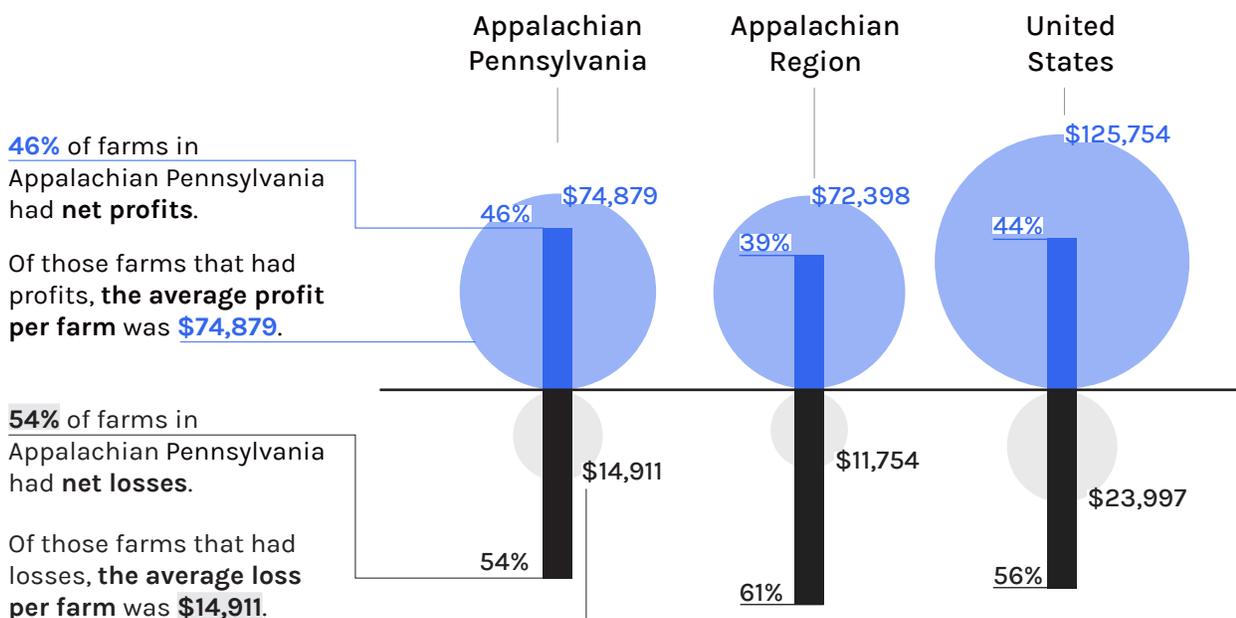


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian South Carolina

Land Area

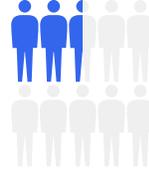
2,447,452 acres



13% of the state's land is in the Appalachian Region. It represents **2%** of land in Appalachia.

Population

1,288,972



25% of the state's population lives in the Appalachian Region. It represents **5%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

6,181

- Change in Farmland, 2012-2017
- Acres of Farmland per Capita
- Vegetable & Orchard Acreage per 1,000 residents

	Appalachian South Carolina	Appalachian Region	United States
Change in Farmland, 2012-2017	-1.8%	-2.6%	-1.6%
Acres of Farmland per Capita	0.39	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	3.71	8.55	34.65

Average Farm Size (Acres)

United States



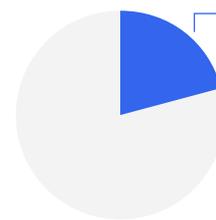
Appalachian Region



Appalachian South Carolina



Farmland



21% of Appalachian South Carolina's land is in farms.

This represents **1%** of Appalachian farmland.

Farmers

Number of Farmers

9,974

- Farmers per 1,000 Residents
- Average Farmer Age
- % Beginning Farmers (0-10 yrs. experience)
- % of Farms with Internet Access
- % of Principal Producers whose Primary Occupation is Farming

	Appalachian South Carolina	Appalachian Region	United States
Farmers per 1,000 Residents	7.7	15.8	10.4
Average Farmer Age	57.3	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	31%	28%	27%
% of Farms with Internet Access	74%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	34%	41%	44%

Appalachian South Carolina

Sales

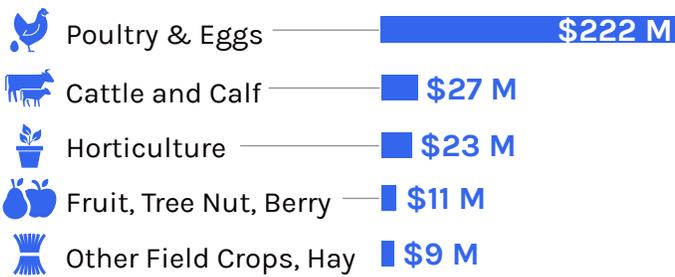
Total Agricultural Sales
\$318,423,000



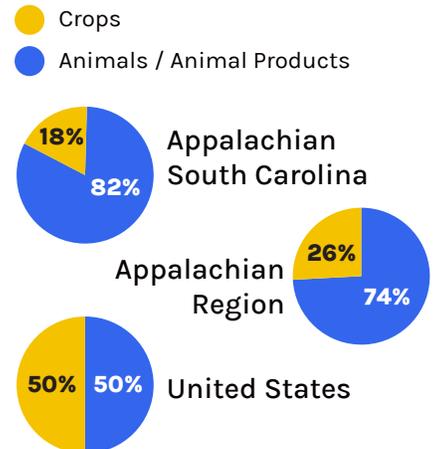
This represents **2%** of the overall Agricultural Sales in Appalachia.

	Appalachian South Carolina	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$5.34	\$9.44	\$8.57
Sales per Acre	\$634	\$543	\$432
Net Income per Acre	\$126	\$143	\$98

92% of Agricultural Sales in Appalachian South Carolina are from its **Top 5 Product Categories:**

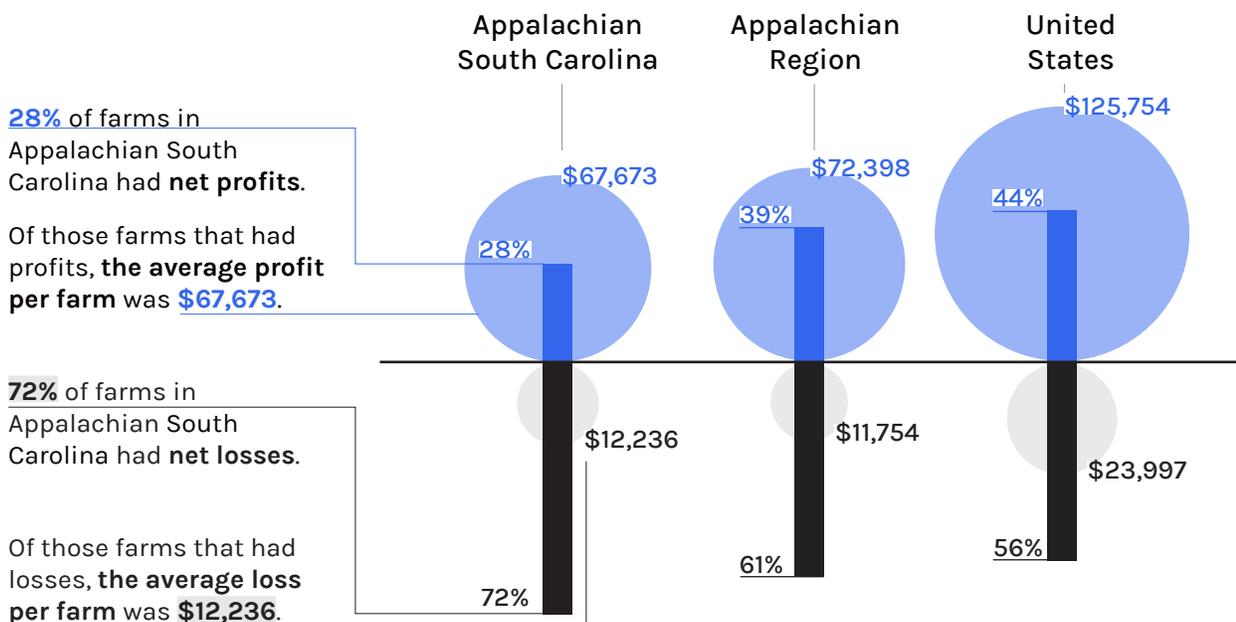


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
 ■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian Tennessee

Land Area

12,876,906 acres

49% of the state's land is in the Appalachian Region. It represents **10%** of land in Appalachia.

Population

2,913,462

43% of the state's population lives in the Appalachian Region. It represents **11%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

37,780 

	Appalachian Tennessee	Appalachian Region	United States
Change in Farmland, 2012-2017	-0.6%	-2.6%	-1.6%
Acres of Farmland per Capita	1.48	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	5.67	8.55	34.65

Average Farm Size (Acres)

United States



Appalachian Region



Appalachian Tennessee



Farmland



Farmers

Number of Farmers

60,946 

	Appalachian Tennessee	Appalachian Region	United States
Farmers per 1,000 Residents	20.9	15.8	10.4
Average Farmer Age	58.1	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	27%	28%	27%
% of Farms with Internet Access	72%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	39%	41%	44%

Appalachian Tennessee

Sales

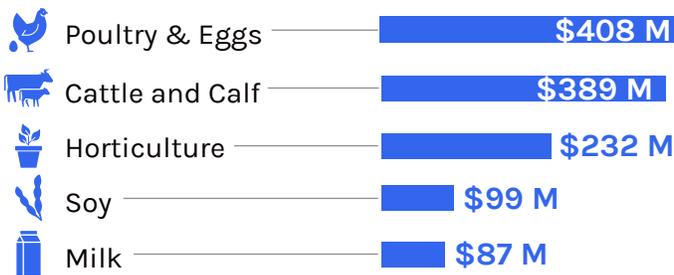
Total Agricultural Sales
\$1,532,014,000



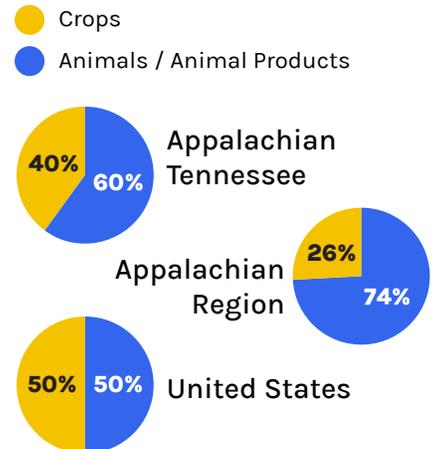
This represents **8%** of the overall Agricultural Sales in Appalachia.

	Appalachian Tennessee	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$7.00	\$9.44	\$8.57
Sales per Acre	\$355	\$543	\$432
Net Income per Acre	\$54	\$143	\$98

79% of Agricultural Sales in Appalachian Tennessee are from its **Top 5 Product Categories:**

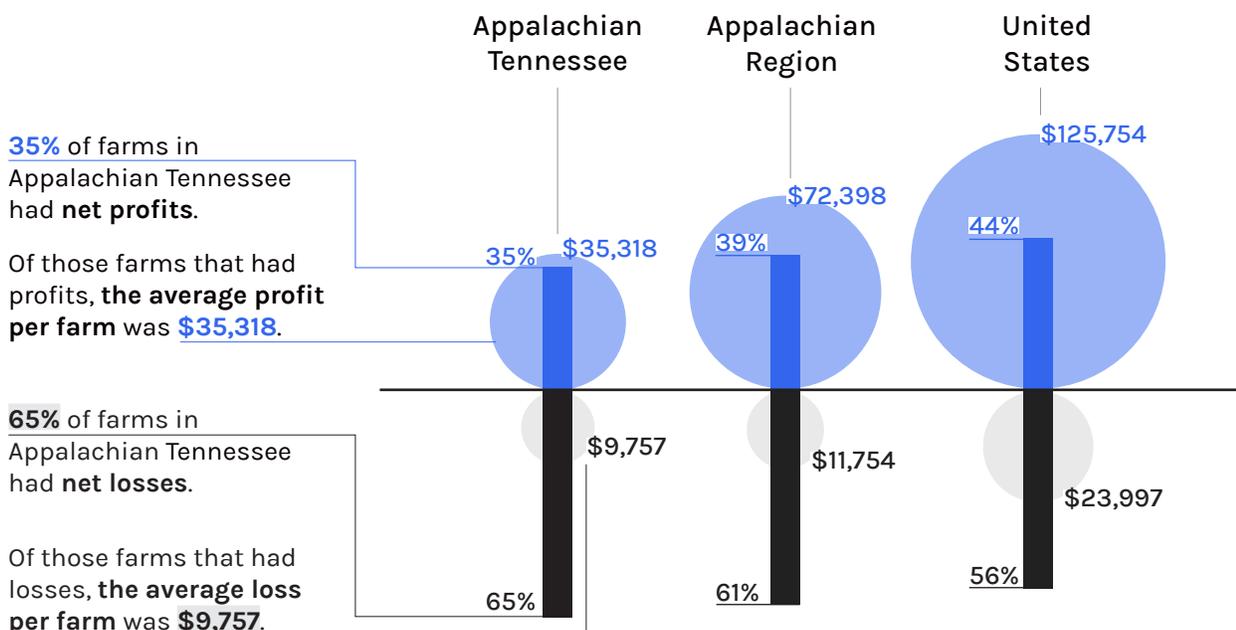


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
 ■ % of Farms with Loss ● Average Loss per Farm with Loss



Appalachian Virginia

Land Area

7,154,739 acres

28% of the state's land is in the Appalachian Region. It represents **5%** of land in Appalachia.



Population

745,390

9% of the state's population lives in the Appalachian Region. It represents **3%** of the entire Appalachian population.



Farms and Farmland

Number of Farms

13,540

	Appalachian Virginia	Appalachian Region	United States
Change in Farmland, 2012-2017	-11.4%	-2.6%	-1.6%
Acres of Farmland per Capita	3.04	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	8.29	8.55	34.65

Average Farm Size (Acres)

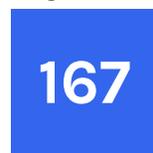
United States



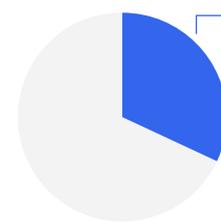
Appalachian Region



Appalachian Virginia



Farmland



32% of Appalachian Virginia's land is in farms.

This represents **6%** of Appalachian farmland.

Farmers

Number of Farmers

21,565

	Appalachian Virginia	Appalachian Region	United States
Farmers per 1,000 Residents	28.9	15.8	10.4
Average Farmer Age	58.6	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	24%	28%	27%
% of Farms with Internet Access	71%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	42%	41%	44%

Appalachian Virginia

Sales

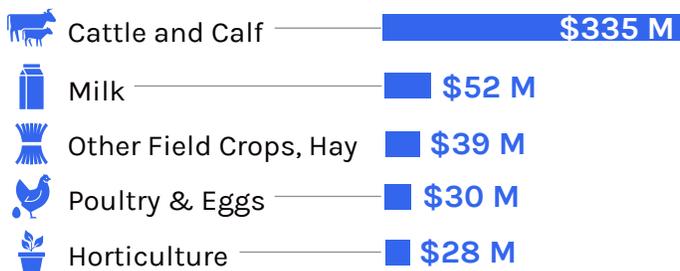
Total Agricultural Sales
\$565,633,000



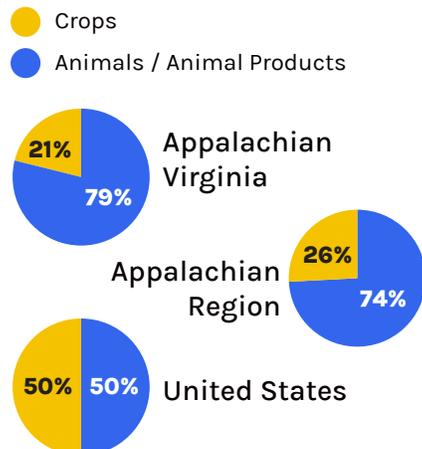
This represents **3%** of the overall Agricultural Sales in Appalachia.

	Appalachian Virginia	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$23.73	\$9.44	\$8.57
Sales per Acre	\$249	\$543	\$432
Net Income per Acre	\$35	\$143	\$98

86% of Agricultural Sales in Appalachian Virginia are from its **Top 5 Product Categories:**

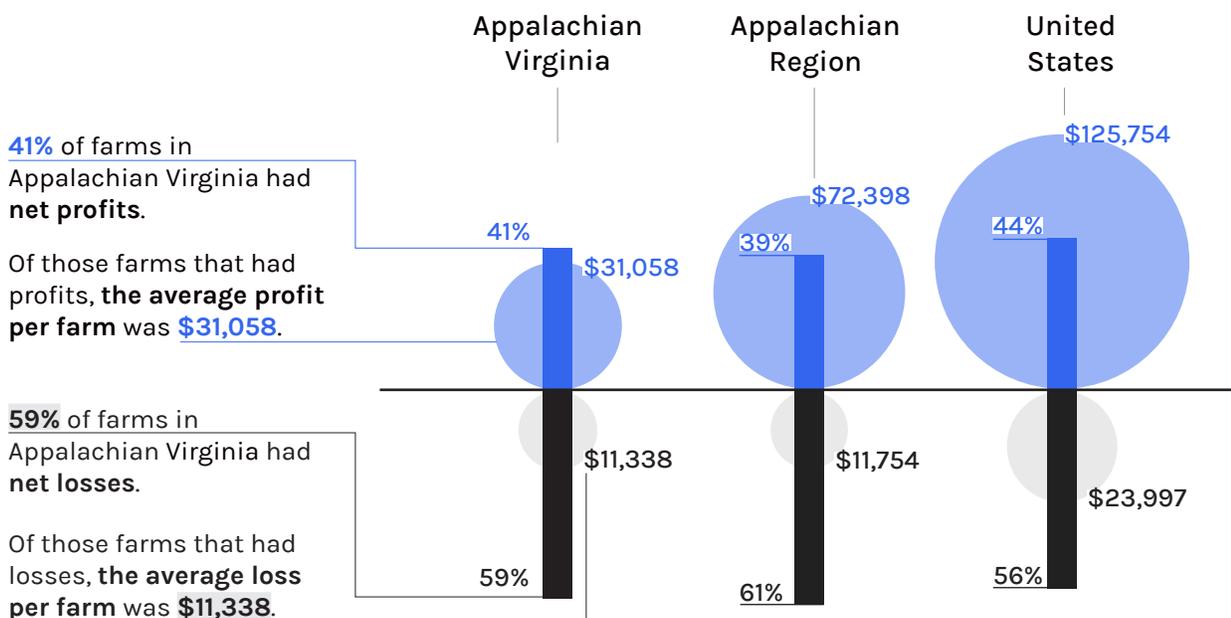


Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
■ % of Farms with Loss ● Average Loss per Farm with Loss



41% of farms in Appalachian Virginia had net profits.

Of those farms that had profits, the average profit per farm was **\$31,058**.

59% of farms in Appalachian Virginia had net losses.

Of those farms that had losses, the average loss per farm was **\$11,338**.

West Virginia

Land Area

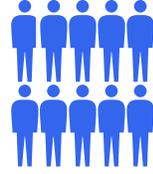
15,386,181 acres



100% of the state's land is in the Appalachian Region. It represents **12%** of land in Appalachia.

Population

1,805,832



100% of the state's population lives in the Appalachian Region. It represents **7%** of the entire Appalachian population.

Farms and Farmland

Number of Farms

23,622

	West Virginia	Appalachian Region	United States
Change in Farmland, 2012-2017	+1.5%	-2.6%	-1.6%
Acres of Farmland per Capita	2.03	1.42	2.75
Vegetable & Orchard Acreage per 1,000 residents	5.13	8.55	34.65

Average Farm Size (Acres)

United States



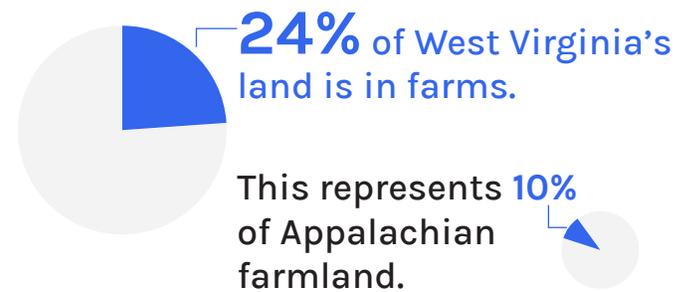
Appalachian Region



West Virginia



Farmland



Farmers

Number of Farmers

38,123

	West Virginia	Appalachian Region	United States
Farmers per 1,000 Residents	21.1	15.8	10.4
Average Farmer Age	57.5	57.2	57.5
% Beginning Farmers (0-10 yrs. experience)	31%	28%	27%
% of Farms with Internet Access	70%	71%	75%
% of Principal Producers whose Primary Occupation is Farming	39%	41%	44%

West Virginia

Sales

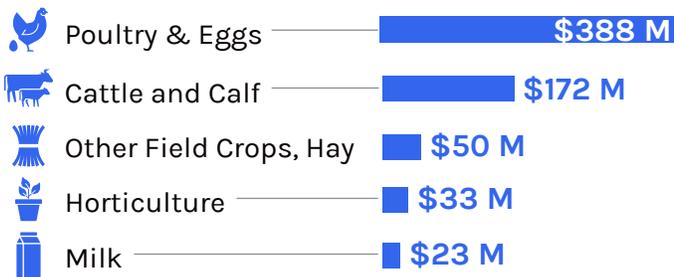
Total Agricultural Sales
\$754,279,000



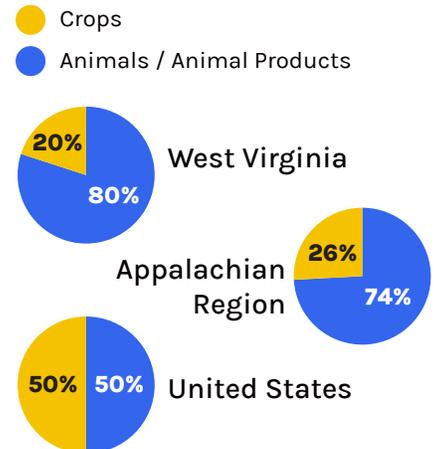
This represents **4%** of the overall Agricultural Sales in Appalachia.

	West Virginia	Appalachian Region	United States
Retail Direct (to Consumer) Sales per Capita	\$6.20	\$9.44	\$8.57
Sales per Acre	\$206	\$543	\$432
Net Income per Acre	\$37	\$143	\$98

88% of Agricultural Sales in West Virginia are from its **Top 5 Product Categories:**



Percent of Agricultural Sales from Crops and Animals / Animal Products



Farm Net Profits and Losses

■ % of Farms with Profit ● Average Profit per Farm with Profit
 ■ % of Farms with Loss ● Average Loss per Farm with Loss

