Agricultural Strategic Plan

for the

Virginia Coalfield Economic Development Authority

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Acknowledgements

This plan is the result of a year-long strategic planning process that involved over 200 stakeholders from every county and independent city in the VCEDA region. What follows is information about the current state of agriculture in the region, areas of focus, suggested strategies, and associated action items that will help agriculture continue to be an economic driver. This strategic plan would not be possible without all of the assistance and input from the dedicated regional agricultural and 4-H agents and specialists from Virginia Cooperative Extension. In addition, we would like to recognize the hard work of our advisory group:

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John Kilgore	Scott County EDA	**Sadly, Mr. Osborne passed away in January 2017. We remain grateful for his input and commitment to regional agriculture*	

Executive Summary

Agriculture is the largest sector in Virginia's economy, providing more than 334,000 jobs and contributing over $70 billion annually to the Commonwealth[1]. Farmers, ranchers, agricultural equipment operators, extension agents, researchers, scientists, teachers, bankers, and insurance agents are all employed directly and indirectly by the sector. Agriculture production supports businesses that sell produce and livestock directly to consumers or through wholesalers, and in addition, is an input to many industries, including food and beverage manufacturing. As for international trade, Virginia exported more than $2.5 billion in agriculture to just 20 countries in 2014, and in total agriculture and forestry exports topped $2.7 billion in 2016[2]. The economic importance of agriculture for the Commonwealth holds true to a majority of the regional economies, including the counties and city covered by VCEDA: Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, Wise, and the City of Norton.

Virginia's 2012 Agriculture Census showed there were 4,240 farms in the VCEDA region. Most of these farms are considered "small" in sales and in size; 85% had sales of less than $25,000, 11% between $25,000 – $100,000, and 4% had more than $100,000 in 2012. 3,331 farms (79%) have less than 180 acres. These farms employ roughly 4,000 part and full time individuals directly in agriculture production (crop or animal), an employment number that has stayed consistent over the past five years, while employment in some other sectors has declined. Agriculture is identified as being a competitive industry and key to promoting economic growth in the VCEDA

- Beef cattle brought the region $53.1 million in sales
- 154,499 cattle and calves in 2012 was the highest inventory ever recorded
- Tobacco sales totaled $1.9 million in 2012
- Corn and Vegetable production were valued at $1.38 million and $860,000, respectively, in 2012.

[1] Virginia Department of Agriculture and Consumer Services (VDACS; 2017*). Virginia Agricultural Facts and Figures*. Available at http://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml.

[2] VDACS (2017). *Virginia's Top Agricultural Export Markets*. Retrieved from http://www.vdacs.virginia.gov/agriculture-exports.shtml. VDACS (2017*). Virginia Agriculture in the Global Marketplace*. Available at http://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml.

region, according to the VCEDA Business Development Plan and the Region 1 GO Virginia *Growth and Diversification Plan*. Employment, size, and annual value of sales of VCEDA farms are comparable to the rest of Virginia, however the region has a particular strength and advantage in livestock production.

In 2012, there were roughly 2,140 beef cattle farms in VCEDA. The cattle and calf inventory grew by 17% from 2007 to 2012, and the 154,559 cattle and calves was the highest inventory in record. In terms of economic value, the livestock industry brought the region $53.1 million in 2012, about $44.3 million from the sales of the beef and calves and $8.8 million from the sales of feed for livestock (hay, grass seed, and green chop). Other important agriculture products include tobacco, corn, and vegetables, which had market values of $1.9 million, $1.38 million, and $860,000 respectively. With this in mind VCEDA commissioned this strategic plan for regional agriculture to create ways of building on assets and cultivating new opportunities.

This strategic plan builds on work already underway by VCEDA. While wood products has always been a target sector for the Authority, agriculture was added more broadly and in a formal way in July 2016. Since that time, VCEDA has conducted marketing outreach to greenhouse firms, food processing companies, commercial chicken operations, and has continued outreach to wood companies. In addition to adding agriculture as a formal target, VCEDA also has a Seed Capital Matching grant program, for which agriculture businesses are eligible to apply. Two companies have already been funded from that pool of money: a medicinal roots and herbs startup, and a brewing company.

The strength of the region in agriculture, together with the selection of agriculture as a target sector by both VCEDA and the larger GO Virginia Region 1 council provides an opportunity to develop the sector and drive economic growth throughout the region. To develop this strategic plan, VCEDA selected the Virginia Tech Office of Economic Development (OED), which engaged over 200 regional stakeholders through interviews, producer meetings, and surveys to better understand the contemporary issues and trends occurring in the agriculture economy. The data collected was then presented to the 30+ member advisory committee in order to identify the strengths, weaknesses, opportunities, and threats (SWOT) in the regional agriculture sector. OED added supplementary quantitative data and input from Virginia Tech agricultural extension agents and research faculty to help finalize plan. From this process three economic development focus areas were identified as being key to promote agriculture:

- **A: Cultivate new agricultural business opportunities for the local population**
- **B: Attract large-scale agricultural related businesses from outside the region**
- **C: Provide assistance for existing agriculture related businesses**

These focus areas are overlapping and share similarities across different agriculture sub-sectors or crops. For instance the region needs to support current livestock producers who play an important role in the economy (C: assist existing businesses). In turn, the strength of the current beef cattle industry can be leveraged to attract large meat processing facilities to the region (B. business attraction). Finally, meat processing and livestock production lead to bi-product or value-added products that present opportunities for local entrepreneurs (A. create new businesses). There are many other examples that exist for producers and regional agricultural products. The purpose of these focus areas is to help the region prioritize investments and focus on supporting strategies that contribute to economic growth through agriculture. For this reason, OED, VCEDA, the SWCC, and stakeholders from the advisory committee developed seven strategies, each accompanied by individual action steps, to aid regional stakeholders:

1. **Form and support an agricultural advisory group of stakeholders**
2. **Enhance support for agricultural development and marketing**
3. **Promote agriculture and financial education**
4. **Help producers diversify and differentiate**
5. **Expand meat processing**
6. **Develop and support cooperatives**
7. **Reimagine reclaimed mine land and existing industrial sites**

There is often a thought that there is a single agricultural product or strategy that a region can invest in that will change the economy. History has taught us that while one product or crop might be good for a short time, in order to achieve true sustained economic prosperity, a region needs to both play to its strengths, and also diversify. The existing agricultural assets in the VCEDA region, together with the willingness to work together to grow agriculture is a solid foundation on which to build. In order to grow existing businesses and create new ones, there are several products that have more potential than others, given the current marketplace and existing resources. Some of the more promising products for the region include goats, beer/wine inputs and production, medicinal roots and herbs, and grass-finished beef. It is important to exercise caution when pursuing these projects and products – consider each of the strategies listed above in regards to education, marketing, diversification and cooperatives. Even though the markets for those promising products have signs of growth, the markets for many of them are still relatively small. This means that there may be limited room, at least initially, to maintain high prices and market quality. Successful collaboration between everyone in the VCEDA region can ensure that the region grows in a smart and sustainable way.

Introduction and background

The Virginia Coalfield Economic Development Authority (VCEDA) commissioned the Virginia Tech Office of Economic Development (OED) to assist in the development of a Strategic Plan for Agriculture for the counties of Lee, Scott, Wise, Dickenson, Buchanan, Tazewell, Russell and the city of Norton. The region encompasses two separate Planning District Commissions (PDC) regions in their entirety: the LENOWISCO PDC, which includes Lee, Norton, Wise, and Scott and the Cumberland Plateau PDC which includes Russell, Tazewell, Dickenson, and Buchanan.

Despite the region's strong background in mineral extraction, changes to the nature of the coal industry over the past twenty years have caused significant losses in employment. More recently, the region has worked towards diversifying the economy through the recruitment of new industries and technologies as well as incentivizing entrepreneurial development and innovation. Economic development efforts have also focused on marketing the region as a tourist destination, replete with rich cultural heritage and outdoor recreation opportunities.

In addition to these efforts, the region looks to capitalize on its agricultural economy. The agriculture and forestry industry sector remains critical to the region's future economic vitality. The Virginia Food System Council has reported that for every job within the state's agricultural and forestry sector, another 1.5 jobs is supported as an indirect economic benefit and impact. Moreover, the increasing demand for locally grown and regionally identifiable food offers multiple economic opportunities for agricultural producers, associated industries, and entrepreneurs.

The Virginia Beef Quality Assurance (BQA) program and corresponding Virginia Quality Assured Feeder Cattle program (VQA) is one example of an innovation that has contributed a large and distributed economic impact for the agricultural sector in the region. Through education, the formation of cooperatives, and connection to markets, producers in the southwest Virginia region have been able to receive higher returns for higher quality feeder cattle. The VQA program returns on average a $80-$100 per head premium on calves sold. Besides higher prices for the calves, participants of both programs have been able to elevate herd health, expand their operations, and report greater feelings of pride and self-efficacy. The programs are estimated to have an average economic impact of **$497,800** through direct and indirect effects in 2017 (Appendix 8 provide more detail on the economic impacts of the BQA and VQA programs). It is precisely this kind of multi-faceted and well-coordinated strategy that will allow other agricultural sectors to thrive in the region.

To grow existing agricultural businesses and facilitate new business development, the three elements of *education*, *coordination*, and *connection to markets* must be present. Some activities already exist in these three areas in the region. Virginia Cooperative Extension (VCE)

coordinates the VQA and BQA programs and connects Virginia Tech and Virginia State research to agricultural producers through a network of specialists and agents. These individuals provide training and on-farm assistance to producers throughout Southwest Virginia. However, given limited funding and personnel constraints, they may not be able to reach everyone currently engaged in, or interested in agriculture. For this reason, stronger partnerships with community colleges, such as Southwest Virginia Community College or Mountain Empire Community College may be beneficial. In terms of access to markets, Appalachian Sustainable Development (ASD), a non-profit organization based in Abingdon, VA, has numerous programs that work to connect growers to markets. One of those programs is Appalachian Harvest, a food hub facility in Duffield, Virginia that aggregates and markets a variety of organic and non-organic produce to regional buyers.

It is critical to expand the work already underway by these organizations, as well as others, in order to have a more prosperous and economically viable agricultural sector in the VCEDA region. This strategic plan outlines the current state of the agricultural economy both nationally and in the VCEDA region. It describes the strengths, weaknesses, opportunities and threats to growing agriculture in the region, as identified by stakeholders through an intensive survey and interview process. The plan then lists strategies connected to business attraction, growing existing business, and cultivating new business that can be taken by regional actors, including VCEDA to grow the agricultural economy.

Method

This strategic plan is the result of a 9-month collaborative process that included over 200 stakeholders from the VCEDA region. The process was designed to garner a diverse array of input and encourage widespread support and interest. This planning process had three main components:

- Analyzing economic and agricultural data
- Mapping assets
- Facilitating collaboration

Data comes in both primary and secondary forms. Both types of data are critical to collect and analyze in tandem in order to develop a complete and holistic understanding of a particular situation. In this case, we used secondary data from publicly available sources such as the US Census Bureau, the 2012 agricultural census, and crop insurance data. An overview of the region's agricultural economy using this secondary data is highlighted in the next section.

However, secondary data only shows one side of a situation. For that reason, OED engaged over 200 stakeholders through interviews, producer meetings, and surveys to better understand

what the on-the-ground reality is for current and potential producers, as well as those who have positions that allow them to see agriculture as one facet of a multidimensional economy. The results of the data gathering and analysis were shared widely with our 20+ member advisory committee in order to identify the strengths, weaknesses, opportunities, and threats (SWOT) to growing agriculture in the region. An analysis of the data together with input from the advisory committee fed into the strategies and implementation recommendations as well.

On behalf of VCEDA, OED visited stakeholders in each county and independent city in the VCEDA region. For many, the visits helped introduce VCEDA as a willing and open partner to continued agricultural economic development. This is important since none of the strategies in this plan can happen in isolation without a coalition of interested parties willing to work with one another to find solutions to the many challenges facing the region. This plan is intended to be a dynamic document spurring further refinement and discussion, beginning with the Fall 2017 Agricultural Summit sponsored by Southwest Virginia Community College. The summit highlighted the agricultural and economic development of the region and help underscore the commitments of SWCC, VCEDA and others to helping this critical economic sector.

Regional agricultural overview

The Virginia Coalfield Economic Development Authority (VCEDA) is a regional economic development organization and represents the counties of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, Wise, and the City of Norton. The total population of VCEDA was 199,216 in 2015. Similar to most rural regions throughout the United States, between 2005 and 2015, the region's population decreased by 4%. Population trends indicate an aging population in the region, which could have a significant effect on the agriculture and forestry industries in the region. This, combined with the natural agricultural assets listed in the following section indicates that strategies related to increasing young people's interest in agricultural careers could be very beneficial for the region as a whole.

There are four agriculture related industries in the 3-digit NAICS-level. Table 1 below shows the percent of people employed within these four industries in each VCEDA locality. Lee and Scott counties have a higher number of people employed and a higher percentage of total employment in Crop Production. Lee, Russell, and Tazewell counties have more people employed in Animal Production and Aquaculture. Support Activities for Agriculture and Forestry have a low presence in all eight localities. In Lee, Scott, and Tazewell, agriculture related industries are among the top five highest employed industries in the county.

Table 1: Employment by Agriculture Industry in the VCEDA Region[3]

Industry	Buchanan	Dickenson	Lee	Scott	Russell	Tazewell	Wise	Norton City
Crop Production	0.7% (58)	1.7% (73)	7.0% (503)	14.9% (1,123)	Info unavailable	Info unavailable	0.5% (72)	<0.1% (<10)
Animal Production and Aquaculture	0.4% (32)	1.2% (52)	4.9% (352)	Info unavailable	8.8% (873)	2.6% (508)	0.3% (46)	<0.1% (<10)
Fishing, Hunting and Trapping	<0.1% (<10)	0	0	<0.1% (<10)	0	<0.1% (<10)	0	0
Support Activities for Agriculture and Forestry	<0.1% (<10)	<0.1% (<10)	0.4% (30)	0.4% (29)	0.3% (32)	0.1% (29)	<0.1% (<10)	<0.1% (<10)

There are a number of ways to explore industry and employment data, and one useful measure is location quotient (LQ). The LQ of an industry is a way of quantifying how "concentrated" an industry is in a region compared to a larger geographic area, such as the state or nation. A location quotient greater than one indicates that the economy is self-sufficient, and may even be exporting the good or service of that particular industry.[4]

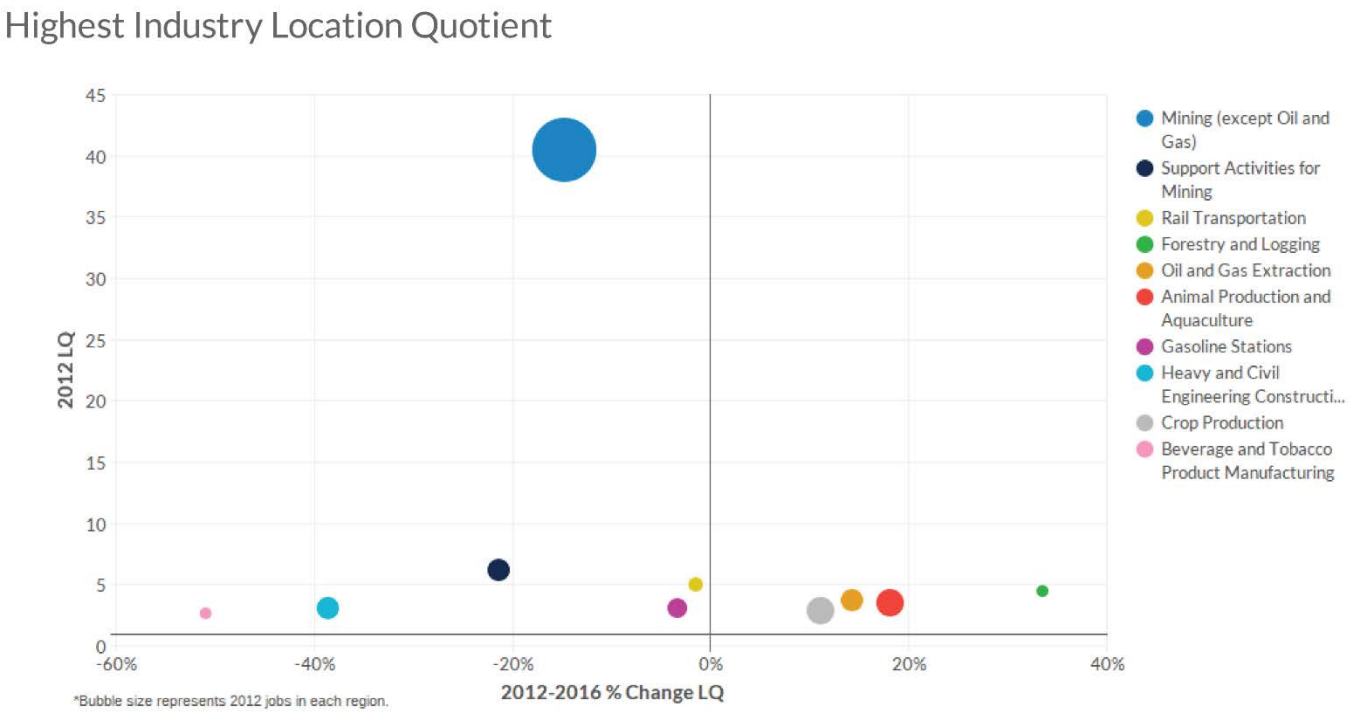
Looking at the VCEDA region as a whole, the top ten industries (3-digit level) in terms of concentration or LQ can be identified and are depicted visually on the figure below. The ten industries with the highest concentration are represented as differently colored dots or

[3] Source: Emsi data based primarily on the Quarterly Census of Employment and Wages (QCEW) from the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA).

[4] Penn State. Using Location Quotients to Identify Local Strengths, Opportunities, and Industry Clusters

"bubbles". The bigger the bubble, the more jobs in that industry in 2012. The bubbles to the right of the vertical axis represent industries that experienced an increase in jobs from 2012-2016. Agriculture related industries such as Crop Production, Animal Production and Aquaculture experienced 10% and 18% increases between 2012 and 2016.

Figure 1: Highest Industry Location Quotient for VCEDA Region[5]



Agriculture-economy in the VCEDA Region

Historically and today, agriculture is the largest industry in Virginia, providing 334,000 jobs and an annual economic impact of $70 billion.[6] Nearly 44,800 farms occupy 32% of Virginia's total land area, a total of 8.1 million acres.[7] Since the 1970's the number of farms and total acres of farmland have declined. Data showing Virginia farm trends from 1975 to 2005 indicates the number of farms has decreased from 52,699 to 46,030. Meanwhile, the average farm size increased from 1975-2000 from 184 acres to 200 acres before experiencing a decline

[5] Source: EMSI data based on QCEW (Quarterly Census of Employment and Wages), with supplemental estimates from County Business Patterns and Current Employment Statistics.

[6] Virginia Department of Agriculture and Consumer Services. *Virginia Agricultural Facts and Figures*. Available at http://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml.

[7] *Ibid*

throughout the late 1990's and 2000's to an average size of 180 acres in 2012, due to farm consolidation and then to the sale of farmland.[8]

As shown in Table 3, there were 4,240 farms in VCEDA in 2012 (most recent Census of Agriculture), the majority of which ranged in size from 50 to 179 acres. [9] The size of farms is consistent with the entire state of Virginia. In 1997, there were 4,329 farms in VCEDA and this number experienced a slight uptick in 2002 (4,623 farms). In 2007 the number of farms in VCEDA decreased to 4,490 and has been steadily but moderately decreasing since then. The amount of land in farms has fluctuated in recent years; in 2002 there were 633,561 acres of farmland in VCEDA. That number dipped to 622,740 acres in 2007 and then rose again in 2012 to 663,867 acres. The average size of farms also followed this pattern, with an average of 137 acres in 2002, dipping slightly to an average of 134 acres in 2007, and rising again in 2012 to an average of 148 acres. [10]

Table 3: Number of Farms by Size and Percentage, 2012[11]

Farms Size (in acres)	VCEDA Number	VCEDA %	Virginia Number	Virginia %
1 to 9 acres	241	6%	3,343	7%
10 to 49 acres	1,316	31%	14,425	31%
50 to 179 acres	1,774	42%	16,850	37%
180 to 499 acres	652	15%	7,884	17%
500 to 999 acres	170	4%	2,173	5%
1,000 acres or more	87	2%	1,375	3%
Total	4,240	100%	46,050	100%

[8] United State Department of Agriculture. (2014). *Census of Agriculture 2012 State and County Data*. Retrieved from http://www.agcensus.usda.gov/Publications/2012; United State Department of Agriculture. (1981). *1978 Census of Agriculture: Volume 1 State and County Data Part 46: Virginia*. Retrieved from http://agcensus.mannlib.cornell.edu/AgCensus/censusParts.do?year=1978; United State Department of Agriculture. (1977). *1974 Census of Agriculture Volume 1 Part 46: Virginia State and County Data*. Retrieved from http://agcensus.mannlib.cornell.edu/AgCensus/censusParts.do?year=1974

[9] United States Department of Agriculture. Census of Agriculture 2012 State and County Data. Retrieved from www.agcensus.usda.gov/Publications/2012.

[10] United States Department of Agriculture. Census of Agriculture State and County Data. Retrieved from www.agcensus.usda.gov/Publications/2012.

[11] United States Department of Agriculture. Census of Agriculture 2012 State and County Data. Retrieved from www.agcensus.usda.gov/Publications/2012.

The value of farm sales is another useful indicator of regional agriculture (Table 3). Over half of the farms in the region receive under $4,999 in annual sales. Most of those, and 41% of all farms, bring in less than $2,500 in annual sales. [12] This is consistent with national trends that show that the majority of farms are smaller while the value of agricultural production is concentrated on a relatively few large farms. In 2012, 75 percent of all farms in the United States had sales of less than $50,000 but together these farms produced only 3 percent of the total value of agricultural products sold. [13]

In the VCEDA region in 2012, there were 672 farms with sales ranging from $5,000 to $9,999. Of the roughly 4,200 farms in the region, 186 had sales of more than $100,000. The USDA defines small family farms as having less than $250,000 in gross annual sales and large family farms as having between $250,000 and $500,000 in gross annual sales. 90 percent of farms in the United States are small family farms. Any farm grossing more than $500,000 in annual sales is categorized as very large to the USDA. The majority of farms in VCEDA, as well as the state, are small family farms. In 2012, the USDA Ag census counted a total of 82 large family farms in the VCEDA region, with the majority of large farms located in Lee, Russell, and Tazewell.

Table 4: Farms by Value of Sales and Percentage, 2012[14]

Value of Sales	VCEDA No. of Farms	VCEDA %	Virginia No. of Farms	Virginia %
Less than $2,500	1,779	41%	17,103	37%
$2,500 to $4,999	534	12%	5,063	11%
$5,000 to $9,999	672	16%	6,436	14%
$10,000 to $24,999	679	16%	6,940	15%
$25,000 to $49,000	294	7%	3,837	8%
$50,000 to $99,999	154	4%	2,220	5%
$100,000 or more	186	4%	4,431	10%

[12] United States Department of Agriculture. Census of Agriculture 2012 State and County Data. Retrieved from www.agcensus.usda.gov/Publications/2012.

[13] United State Department of Agriculture. 2012 Census Highlights. Accessed at https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Farm_Economics/

[14] United States Department of Agriculture. Census of Agriculture 2012 State and County Data. Retrieved from www.agcensus.usda.gov/Publications/2012.

Using the larger set of workers that includes extended proprietors (individuals who own farm businesses that may not be their sole source of income), agricultural employment can be divided into industry sub-sectors (Table 12). Looking at these classifications, by far the greatest number of workers are in crop production and animal production. Farm Labor Contractors is third, and the number of jobs in this sub-sector is significantly lower than the previous two subsectors.

Table 5: Crop and Animal Production Jobs by Sub-Sector (6 digit NAICS)[15]

Industry	2012 Jobs	2016 Jobs	Change in Jobs 2012-2016	% Change	2016 Earnings Per Worker
Animal Production and Aquaculture	1,900	1,946	46	2%	$22,840
Crop Production	1,942	1,886	-56	-3%	$15,104
Farm Labor Contractors and Crew Leaders	53	53	0	0%	$14,076
Support Activities for Animal Production	29	23	-6	-21%	$9,248
Soil Preparation, Planting, and Cultivating	26	18	-8	-31%	$19,684
Farm Management Services	<10	<10	Insufficient Data	Insufficient Data	Insufficient Data

Animal Production is the highest paying of the agriculture-related industry sectors in VCEDA, with 2016 earnings per worker of $22,840, followed by Soil Preparation, Planting, and Cultivating with $19,684 per worker. By comparison, the average 2016 earnings for workers in the Crop Production sub-sector is only $15,104.[16] These earnings are in general lower compared to the wages of these occupations in other parts of the state. Animal Production is the only agriculture-related subsector that experienced job growth between 2007 and 2012, with 2% increase adding 46 jobs.

Analysts can also approximate the competitiveness of an industry sector by measuring the actual change in jobs over a period against the expected change in jobs given national

[15] Source: EMSI 2017.1; QCEW Employees, Non-QCEW Employees, Self-Employed, and Extended Proprietors

[16] Source: EMSI 2016.2; QCEW Employees, Non-QCEW Employees, Self-Employed, and Extended Proprietors

performance and trends. The measure for this is termed the "competitive effect" and a number over zero is considered positive. By this measure, Animal Production stands out with "Competitive Effect" of 34, being the only agriculture-related industry subsector in VCEDA with "Competitive Effect" greater than zero. [17]

Another way to look at the agriculture industry is through occupations, or staffing patterns. Table 6 shows the top five occupations employed in crop and animal production in VCEDA. The numbers include the total number of people with those job titles employed in the 3-digit NAICS category for agriculture. The percent of jobs in the industry reveal what portion of all workers with those occupation titles in the region are actually employed in the 3-digit NAICS category for agriculture. (For instance, there are 12 heavy and tractor-trailer drivers employed in the region in agriculture but that number is only 0.3% of all heavy and tractor-trailer drivers in the region.)

Table 6: Top Five Occupations Employed in Agriculture and Training Required in VCEDA[18]

Description	Employed in Industry (2016)	% of Total Jobs in Industry (2016)	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Farmers, Ranchers, and Other Agricultural Managers	3,264	88%	High school diploma or equivalent	5 years or more	None
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	202	5.4%	No formal educational credential	None	Short-term on-the-job training
Bookkeeping, Accounting, and Auditing Clerks	24	0.6%	Some college, no degree	None	Moderate-term on-the-job training
Farmworkers, Farm, Ranch, and Aquacultural Animals	23	0.6%	No formal educational credential	None	Short-term on-the-job training
Agricultural Equipment Operators	20	0.5%	No formal educational credential	None	Short-term on-the-job training

[17] Source: EMSI 2016.2 data informed by NIOEM and long-term industry projections published by individual states.

[18] EMSI 2017.1; QCEW Employees, Non-QCEW Employees, Self-Employed, and Extended Proprietors

To understand the nature of agriculture production in VCEDA, the value and amounts of crops produced in the area are important data points. Tables 7 through 9 include the average value of output per acre for three of the five top agricultural products in the region: corn, hay, and tobacco. Table 7 illustrates the average value of a bushel of corn per acre in both 2007 and 2012. The value went up significantly over the 5-year period in all localities, and with the highest increases in Scott and Russell Counties.

Table 7: Average Value of Corn per Acre, 2007-2012[19]

Counties	Number of Farms		Total Acreage		Total Yields (bushels)		Unit Price ($/bushel)		Average Value of Product Per Acre	
	2007	2012	2007	2012	2007	2012	2007	2012	2007	2012
Lee	85	98	963	828	74,595	86,234	$4.05	$7.45	$314	$776
Scott	41	44	272	225	13,661	24,696	$4.05	$7.45	$203	$818
Wise	5	7	18	35	1,050	3,605	$4.05	$7.45	$236	$767
Russell	22	23	62	386	5,134	49,211	$4.05	$7.45	$335	$950
VCEDA	153	172	1,315	1,474	94,440	163,746	$4.05	$7.45	$272	$828*

* Buchanan (2007 and 2012), Dickenson (2007) and Tazewell (2012) counties are not included in this calculation due to the unavailability of data.

The average value of a bushel of hay per acre also increased significantly over the 5-year period, as seen in Table 8. Of the seven localities in the region, Lee County experienced the largest growth in average value of a bushel of hay per acre, with an increase of $168.64. Moreover, Lee County has the highest value of a bushel of hay per acre at $404.97, compared with the rest of VCEDA.

[19] United States Department of Agriculture. *Crop Values Summary, 2007 and 2012.* Retrieved from http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1050.

Table 8: Average Value of Hay per Acre, 2007-2012[20]

Counties	Number of Farms		Total Acreage		Total Yields (bushels)		Unit Price ($/bushel)		Average Value of Product Per Acre	
	2007	2012	2007	2012	2007	2012	2007	2012	2007	2012
Lee	716	663	22,841	20,957	37,228	53,377	$145	$159	$236.33	$404.97
Scott	932	941	22,993	24,599	46,480	53,613	$145	$159	$293.12	$346.54
Wise	98	100	2,599	2,587	3,581	4,423	$145	$159	$199.79	$271.84
Buchanan	5	45	843	817	1,229	1,452	$145	$159	$211.39	$282.58
Dickenson	79	77	1,610	1,790	2,465	3,029	$145	$159	$222.00	$269.06
Russell	715	714	22,571	26,305	41,872	69,149	$145	$159	$268.99	$417.97
Tazewell	340	374	17,370	21,437	32,913	53,357	$145	$159	$274.75	$395.75
VCEDA	2,885	2,914	90,827	98,492	165,768	238,400	$145	$159	$243.77	$341.24

Table 9 shows the average value of a bushel of tobacco per acre from 2007 to 2012, with Lee and Russell Counties having the highest average values compared to the other counties in VCEDA. Scott County lost value in tobacco over the five-year period, whereas Lee and Russell Counties' value grew by $261 per acre. VCEDA region as a whole experienced $181 increase in average value of tobacco product per acre, which is a 6% increase in value between 2007 and 2012.

Table 9: Average Value of Tobacco per Acre, 2007-2012[21]

* Buchanan (2012), Dickenson (2012), Tazewell (2007 and 2012), and Wise counties are not included in this calculation due to the unavailability of data

Counties	No. of Farms		Total Acreage		Total Yields (bu)		Unit Price ($/bu)		Avg. $ Product/acre	
	2007	2012	2007	2012	2007	2012	2007	2012	2007	2012
Lee	84	42	682	315	1,369,216	520,205	$1.54	$2.03	$3,090	$3,351
Scott	90	33	375	258	705,442	322,724	$1.54	$2.03	$2,895	$2,538
Wise	2	0	-	0	-	0	$1.54	$2.03	-	$0
Russell	67	30	317	121	558,415	199,811	$1.54	$2.03	$2,711	$3,351
VCEDA	243	105	1374	694	2,633,073	1,042,740	$1.54	$2.03	$2,899	$3,080*

[20] United States Department of Agriculture. *Crop Values Summary, 2007 and 2012.* Retrieved from http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1050.

[21] United States Department of Agriculture. *Crop Values Summary, 2007 and 2012.* Retrieved from http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1050.

Table 10 illustrates the top five agriculture products by market value for VCEDA and Virginia. The top agricultural product in VCEDA in terms of market value is cattle and calves. Although data is not available for Wise County, the market value for the other counties combined make it the highest of any other product, at $72.3 million. The category "Other crops like grass seed, greenchop and hay" comes in as the second most significant product in terms of market value in VCEDA with a value of $8.8 million[22].

Desegregate market value by type of vegetable is not available from the Census of Agriculture, and therefore, vegetables in Table 10 include all vegetables grown in the region. Tobacco, corn, and vegetables have lower market values than cattle and calves in VCEDA, each at $1.9 million or below. In fact, the four largest cattle and calve producing counties (Lee, Russell, Scott, Tazewell), receive more from livestock than all the other agriculture product combined (Table 10). In VCEDA, tobacco and corn have the highest market value in Lee County, compared to all other counties (Table 10.). Scott County produces the most vegetables in the region, in terms of market value.

Table 10: Market Value of Top Agriculture Products, 2012[23]

Agriculture Product	Buchanan County	Dickenson County	Lee County	Russell County	Scott County	Tazewell County	Wise County	VCEDA	Virginia
Cattle and calves	$149,000	$550,000	$13.1 million	$28 million	$8.5 million	$22 million	unknown	unknown	$708 million
Other crops like grass seed, greenchop and hay	$114,000	$145,000	$2.3 million	$1.9 million	$2.8 million	$1.4 million	$225,000	$8.8 million	$139.8 million
Tobacco	$0	$0	$981,000	$375,000	$603,000	$0	$0	$1.9 million	$100.9 million
Corn	unknown	unknown	$621,000	unknown	$259,000	$442,000	$57,000	unknown	$239.7 million
Vegetables	$3,000	$14,000	$234,000	$87,000	$466,000	$33,000	$23,000	$860,000	$92.3 million

[22] Note: Hay, greenchop, and grass seed are forages, which are primarily used as feed for cattle and calve operations throughout the region.

[23] United States Department of Agriculture. *Census of Agriculture 2012 State and County Data*. Retrieved from www.agcensus.usda.gov/Publications/2012.

We can also look at the number of farms in the region, by the type of industry in which they are categorized:

Figure 2: Number of VCEDA Farms by Industry Category (2002-2012)[24]

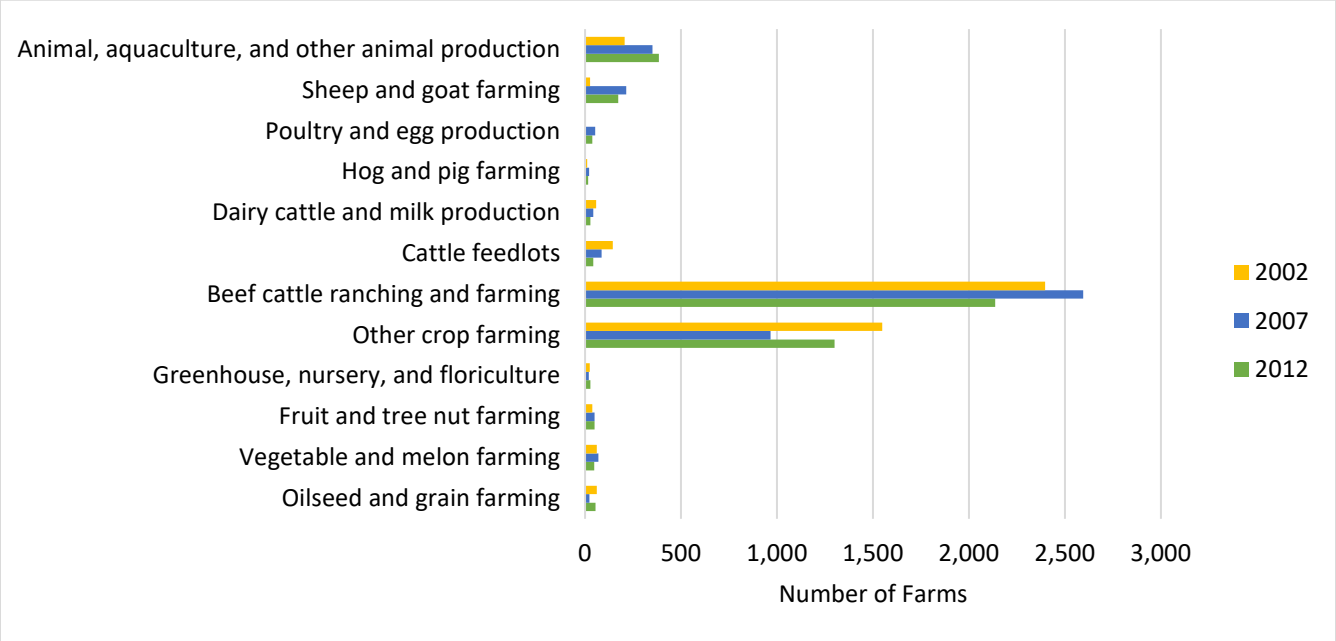


Table 10 shows that cattle and calves are the largest agricultural product in the region, and the largest number of farms are in beef cattle ranching. There were nearly 2,140 beef cattle farms in the region in 2012. Looking at changes over time, the number of farms for many crops increased from 2002 to 2007; including areas such as beef cattle, sheep and goat farming, vegetable and melon farming, and poultry and egg production. Many of these same crops, experienced a decline in the number of farms from 2007 to 2012.

Markets are a critical consideration for agricultural producers. How and where do producers sell their products? Home gardens and other small-scale production continues to be important in the region, but often this is for family use, and not for sale of products. For most area producers, commodity production is more typical and involves selling product to intermediaries or wholesalers, who then sell products to consumers or processors. The costs and logistics of transporting products to markets for sale to either consumers or wholesalers must be considered. The map below includes some of the markets where regional products are taken or sold:

[24] USDA National Agricultural Statistics Service, Quick Stats http://quickstats.nass.usda.gov.

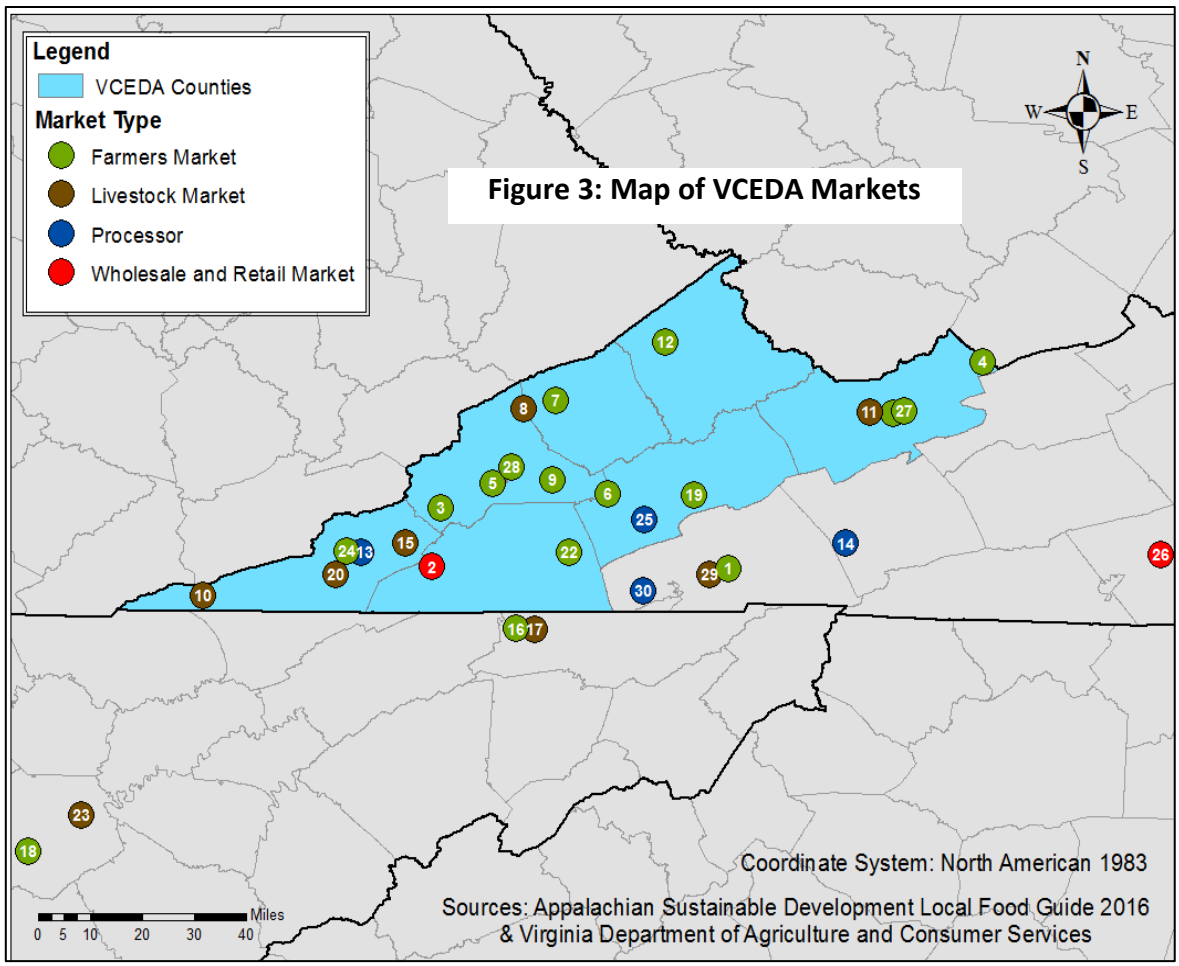


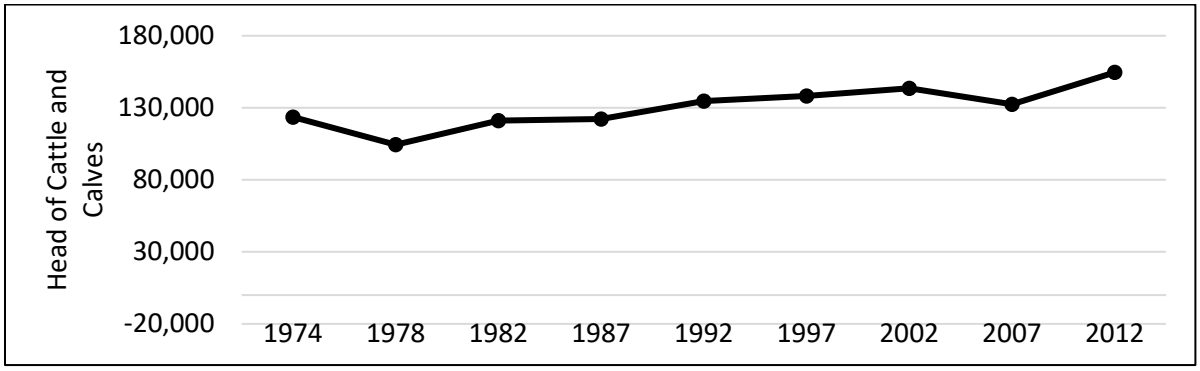
Figure 3: Map of VCEDA Markets

Livestock and cattle in the VCEDA Region

1. Abingdon Farmers Market
2. Appalachian Harvest Food Hub
3. Big Stone Gap Farmers Market
4. Bluefield Virginia Farmers Market
5. City of Norton Farmers Market
6. Clinch River Farmers Market
7. Clintwood Farmers Market
8. Coalfield Agricultural Center
9. Coeburn Farmers Market
10. Ewing Farmers Market
11. Farmers Livestock Market
12. Grundy Farmers Market
13. Hammonds Custom Slaughtering
14. Joines Meat Processing
15. Kevin Slemp Cattle
16. Kingsport Farmers Market
17. Kingsport Livestock Auction
18. Knoxville Farmers Market
19. Lebanon Farmers Market
20. Lee Farmer's Livestock Market
21. Main Street Farmers Market (Tazewell)
22. Nickelsville Farmers Market
23. Knoxville Livestock Auction Center, Inc.
24. Pennington Gap Farmers Market
25. Russell Meat Packaging
26. Southwest VA Farmers Market
27. Tazewell Farmers Market
28. Town of Wise Farmers Market
29. Tri-State Livestock Auction
30. Washington County Meat Packing

From the data, a substantial part of the region's agriculture industry (past and present) relates to cattle and other livestock production. While the number of farms has decreased moderately in the region, the number of cattle and calves in the VCEDA region have appeared to increase steadily, but modestly, in the twenty-five year period from 1987-2012, as visualized in the Figure 4 below.

Figure 4: VCEDA Cattle and Calf Inventory (1974-2012)[25]



Most cattle farms in VCEDA are commercial cow/calf operations, which maintain and breed females and bulls and oversee birth of an annual "crop" of feeder calves. Farmers have options concerning the point at which they market and sell these calves. Many are sold after weaning (7 to 9 months, or a weight of 400-650 pounds is typical). [26] Others may be retained and sold at heavier calf weights (referred to as stockers/backgrounding) or, more rarely, as finished cattle. Forage and feed is essential to these operations and grass hay is often the largest single cash expense. In Virginia, cow/calf herds often operate at 2 to 2 1/2 acres of pasture per cow/calf unit with an additional 1/2 to 3/4 of an acre for hay production. Cow/calf operators experience cyclical and variable economic returns, and the enterprise requires significant medium to long-term capital investment. [27] There is an established system of graded, commingled feeder sales operated by local, regional and state cattle associations. These allow smaller livestock producers to benefit from the price advantage of selling feeder cattle in larger, more uniform lots. However, with only a small portion of Virginia's feeder cattle being finished here, the state's producers are dependent on out of state cattle feeders for a market outlet.

[25] Source: USDA National Agricultural Statistics Service, Quick Stats http://quickstats.nass.usda.gov.

[26] Source: Mckinnon, B. & Snodgrass, H. *Getting Started in the Cattle Business in Virginia*. Virginia Cooperative Extension. Publication 400-790.

[27] Ibid.

Goal areas

In order to strengthen the economy of the VCEDA region through agriculture, investment and focus must be placed in three key areas: cultivating new business opportunities for the local population; attracting large-scale agriculture related businesses from out of the region; and providing assistance for existing businesses.

New business

Regional stakeholders repeatedly cited the importance of helping new businesses form. Entrepreneurship is a critical piece of the southwest Virginia economy, and agriculture and food-related enterprises are a fertile arena for aspiring ventures. Entrepreneurship in this sector may take many forms: beginning farmers; home-based food businesses; breweries; processors; or other value chain intermediaries.

Business attraction

Attracting larger-scale agricultural businesses or food and beverage processors would have several benefits for the region. First, the businesses would create jobs for local workers. Second, the businesses might rely in part on local inputs, increasing the viability of input suppliers. Agriculture-related businesses that have potential for attraction to the VCEDA region include large-scale produce greenhouse operations, aquaculture facilities, and food and beverage processors. The region is well positioned for mid-sized operations, particularly in regional locations with existing infrastructure assets such as roads, water, and prepared sites.

Assistance for existing businesses

The desire to attract and create new businesses in the VCEDA region should not eclipse the strategies designed to assist existing agricultural, forestry, and food-related businesses. Strategies to assist existing business include those that allow producers to get higher prices for the products, reduce their input and marketing costs, and ultimately expand their operations. This can include education, marketing assistance, and the formation of cooperative networks.

Livestock production is a leading agriculture industry sector in the region, and initiatives to help existing producers can yield a number of positive impacts. This may include processing capacities, marketing assistance, reduced land costs, or expansion of beneficial programs such as the Virginia Beef Quality Assured program. Currently, fewer than half of the region's cattle producers are BQA certified, suggesting a large opportunity to bring more economic benefits to the region. By some estimates and given the market demand for BQA feeder cattle, expansion

of BQA certification in the region would result in a direct economic impact that could top $1 million annually. Likewise, GAP certification is both an opportunity and a barrier for area vegetable producers which represents another avenue for assisting existing farmers.

Strategies

In order to support the creation of new businesses, attract existing businesses to the region, and assist current producers, this report identifies a series of strategies for regional stakeholders to consider. The table below summarizes these strategies and associated actions. The section that follows provides more details on the recommendations. Associated strengths, weaknesses, opportunities, and threats within each strategic area are also included for context. These mini SWOT assessments are summaries of stakeholder feedback.

Table 21: Key Strategies and Associated Action Items

Key Strategies	Action Items
1. Form and support an agricultural advisory group of stakeholders	Continue the work of current advisory committee and divide into subgroups, one for each strategy below
	Recruit additional members at SWCC Ag summit
	Support the advisory group through formal appointment by respective employers, provision of funding and space for group to meet quarterly, with reports on progress submitted to an agricultural development point person (see strategy 2)
2. Enhance support for agricultural development and marketing	Support a point person with an agriculture focus to help plan and coordinate activities.
	Connect with the central SWVA tourism office around agritourism, and consider adding add agritourism as fifth “SWVA – A Different Side of Virginia” component. Coordinate with other regional tourism actors.
	Encourage involvement in “Rooted in Appalachia” branding
	Continue to expand VCEDA Seed Fund program for ag-related entrepreneurs. Connect participants with other regional marketing programs.
	Support cooperatives, meat processing, and diversification strategies and related action items listed below.
3. Promote agricultural and financial education	Develop partnership between the two community colleges (SWCC and MECC) and VCE to deliver existing curriculum, including Virginia Master Cattleman Course; Virginia Master Forester Course.

Key Strategies	Action Items
	Deliver agriculture and entrepreneur financial management training at the community college level. This training could serve credential/for-credit students as well as non-credit continuing education students
	Support and promote the delivery of Virginia Beginning Farmer and Rancher program and related non-credit, non-credential programs through the community colleges
	Bolster existing efforts to incorporate 4H and other agricultural programing in the K-12 classroom
4. Help producers diversify and differentiate	Disseminate market information and trends to farmers through a centralized sources, especially to beginning farmers who do not currently participate in any associations or groups.
	Provide support for producers seeking to gain national/state/regional certifications and branding
	Facilitate and promote the expansion of Virginia Quality Assured Feeder Cattle (BQA) Program and related Virginia Beef Quality Assurance initiative throughout the region
	Provide funding or other forms of incentives for niche and specialty crop production
	Connect current livestock producers and other farmers with value-added processors and businesses throughout the region
	Create or support a dedicated grant or loan program specifically for farmers seeking to diversify or differentiate their products and farms
	Provide education programs on food safety guidelines for value-added producers and producers looking to diversify
5. Expand meat processing	Conduct a feasibility study for a meat processing facility in VCEDA
	Coordinate cattle producers in the region to operations capable of finishing cattle (grass-fed beef)
	Establish a regional grass-fed beef or grazing animal association
	Provide Education programs for Grass-Fed Beef Certification and production
	Develop training courses for meat processing and food safety
6. Develop and support cooperatives	Support the creation or further development of cooperatives in key agricultural niche areas: • Goats and sheep • Wine and beer industry inputs (grapes, barley, hops)

Key Strategies	Action Items
	• Medicinal roots and herbs • Grass-finished beef
	Provide mini-grants to cooperatives on a yearly basis to support marketing, infrastructure, and branding efforts
	Meet yearly with cooperative producer groups to assess new needs – respond to those needs through promotion of additional training classes and/or infrastructure funding.
7. Reimagine reclaimed mine land, existing industrial sites	Conduct asset analysis that expands and updates a map and inventory of industrial and reclaimed mine sites for ag-related industry
	Further develop marketing information to relevant economic development authorities for ag-related business/industry attraction
	Upgrade current industrial sites for food and beverage manufacturing facilities and other ag-related industry
	Upgrade reclaimed mines to be used for ag-related industry and production
	Develop Education programs for workforce development in food and beverage manufacturing and agriculture related industries
	Dedicate industrial space and funding for smaller ag-related manufacturing facilities and businesses

Strategy One: Form agricultural advisory group of stakeholders

In order to take advantage of the agricultural opportunities outlined in the report, a collaborative group of stakeholders is needed to act and execute the plan. The advisory committee is currently based on voluntary participation, however can serve as the foundation for a formalized entity to take ownership of the development of the plan.

The group can help coordinate regional actions, aid in securing resources for agriculture-related businesses (farmers, entrepreneurs, etc.), and facilitate a discussion on the next steps. OED recommends the current advisory group recruit additional members, and split into sub-groups focused on executing the remaining six strategies. In addition, this group should meet regularly and update the community on the progress of the plan.

Strategy Two: Enhance agricultural development and marketing

This strategy area concerns the need to better support current and new agriculture-related enterprises and producers, through the transmission of information on production practices, market opportunities, and current resources available for producers. Stakeholders identified that agricultural development and marketing has the following SWOT:

Table 13: Agricultural Development and Marketing - SWOT

STRENGTHS	WEAKNESSES
• Regional classes through the SBDC on product marketing • Research has shown that the "made in Virginia" brand is highly regarded nationally. • VCE agents and specialists with expertise. • Existing producers and businesses with experience. • The SBDC's history of supporting producers. • Support for entrepreneurs and agri-tourism related ventures through DHCD and VTC.	• Lack of dedicated focus on supporting agriculture-related business development in the region. • Gaps in the ecosystem of assistance resources for new and existing producers. Lack of scale-up assistance for agriculture ventures. • Lack of locally based marketing assistance • Producers find it hard to meet the requirements to sell to a large purchaser in the region • Awareness of marketing opportunities, limited time for direct marketing, perception of no cooperative marketing systems
OPPORTUNITIES	**THREATS**
• An agriculture development and marketing person in the region could help assess viability of new ventures, alleviate barriers to entry, help producers pursue niche opportunities such as goat and sheep meat markets. • A new position could help local businesses start-up and scale-up. Assistance could mitigate risks to producers for direct marketing – more steps are involved, it's a new way of doing business, hard to assure sales amount, and makes the operation harder to reliably predict in terms of cost/benefit	• Competitive environment for start-ups and scale-ups. • Regulatory environment is challenging. • Market competition. • Marketing value added or niche products directly to local consumers is a challenge in the region – there are fewer consumers here with disposable income.

Table 14: Enhance Support for Agricultural Development and Marketing – Action Items

Action Items	***Description***
Support a point person with an agriculture focus to help plan and coordinate activities	An individual is needed to coordinate the marketing activities of agricultural producers in the region, as well as provide technical business assistance. Position would work in conjunction with VCE and VDACS to help producers with: • niche products – technical assistance connect to on-campus VSU and VT specialist • form cooperatives, • business planning, • finding markets There are several models of agricultural development and marketing type positions in the state that could be followed: • VCE Agricultural Marketing and Agritourism Specialist (see the VCE Southern District) • Regional Agricultural Development Officer (see county-level agricultural development officer positions in Halifax, Loudon, etc.)
Connect with SWVA tourism office around agritourism	Add agritourism to the "Different Side of Virginia" branding campaign, alongside Crooked Road and Round the Mountain. In addition, VCEDA should coordinate with other regional tourism offices and integrate agritourism into the offices marketing efforts.
Support local branding efforts	Connect VCEDA producers to, and support the work of "Rooted in Appalachia" brand
Continue and Expand VCEDA Seed Fund program	VCEDA Seed Fund program has supported many beginning businesses started by entrepreneurs in the region. Stakeholder continued to echo the sentiments that this type of funding was crucial in the development of ag-related businesses. Therefore, VCEDA could expand or dedicate a piece of funding that would support ag-related businesses and entrepreneurs.
Support cooperatives, meat processing and diversification strategies and related action items listed below.	Stakeholders has identified formation of cooperative, expansion of meat processing, and diversifications as key strategies to help develop and foster agriculture growth in the region. All of these strategies, will rely on some marketing and coordination across producers and sectors.

Strategy Three: Promote agricultural and financial education

Education on agriculture (practices/techniques/crops/etc.) and financial acumen will benefit the agriculture sector and therefore, the regional economy. Thus, the region stands to gain from promoting and developing additional classes and education curriculum on the two subjects.

Regional stakeholders identified the region as having a strong history and presence of VCE programming, including experienced extension agents, courses and curriculum to train farmers, and an extensive 4-H network. Additional regional strengths include a K-12 agriculture education initiative, Lincoln Memorial University (LMU) - College of Veterinary Medicine, and agribusiness consortia curriculum developed by SWCC, UVa-Wise, and Virginia Tech. The following SWOT were identified by stakeholders for agricultural and financial education.

Table 15: Agricultural and Financial Education - SWOT

STRENGTHS	WEAKNESSES
• Strong VCE programming (4H, producer training) • Some high schools have room for agricultural operations • Lincoln Memorial University – College of Veterinary Medicine (equine training facility, vaccination clinics, producer trainings) • K-12 agricultural initiatives • VT-SWCC-UVA Wise agribusiness consortia curriculum	• Limited transfer of knowledge to younger generations • Lack of landowner knowledge • High number of high school dropouts • Lack of certified ag instructors • Lack of knowledge about on-farm financial management and record keeping
OPPORTUNITIES	**THREATS**
• Farmers and producers need help accessing funding, mentoring, etc • Land transfer information and encouragement • Expand community college programs in agriculture • Strengthen career pathways for agriculture • Provide food inspector certification programs	• Limited state-level funding for agricultural training programs • Limited funding for financial management education programs

Table 16: Agricultural and Financial Education – Action Items

Action Items	***Description***
Form SWCC & MECC – VCE partnership to roll out existing VCE Curriculum in areas including • *Master Cattleman Program* • *BQA Feeder Cattle certification* • *Landowner Management* • *Niche agricultural products*	VCE has developed evidence-based programming relevant to crop and livestock producers in the region. A partnership with SWCC and/or MECC to deliver that curriculum could allow more people to be reached, leading to greater adoption of herd health programs, participation in BQA, and subsequent higher profits directly to producers
Conduct a pipeline study or other type of pathway analysis illustrating existing agriculture related classes in the region and identify needs for future educational and training programs	An inventory of courses already offered in agriculture and financial education can help the community college develop an education plan. This analysis should identify the gap in curriculum in regards to the two interest areas and opportunities to incorporate agriculture in existing curriculum. For instance MECC has classes on Unmanned Aerial Systems and an ag-related component could be included in this curriculum. This analysis will have more impact if MECC and SWCC work collaboratively to identify the gaps and opportunities for education. Moreover, this analysis can aid 4-H and k-12 education programming on the gaps in education and the types of courses that should be offered throughout the region.
Community college (SWCC & MECC) delivers agriculture and entrepreneur financial management training and grant writing courses	On-farm financial management remains a challenge of many producers. There is some curriculum developed by groups such as Farm Bureau and Farm Credit. Similarly, there are grants available to producers for infrastructure improvements
Deliver Virginia Beginning Farmer and Rancher Curriculum - Whole Farm Planning Workshops	https://www.vabeginningfarmer.alce.vt.edu/ Currently delivered in this region by ASD, could be expanded to reach different audiences.
Bolster existing efforts to incorporate 4H and other agricultural related programming in the classroom or at schools, available to students during school time (i.e. school gardens/greenhouses/aquaponics)	

Strategy Four: Help producers diversify and differentiate

The region has a strong history in agriculture that includes production of non-cattle related agriculture. For example, vegetable and tobacco production brought farmers in the region more than $2.7 million in 2012[28]. Throughout the process innovative producers in niche and specialty products such as, honey, medicinal plants growers, and goat, have been vocal about the successes they experience and the opportunities they see for these types of products throughout the region. This diversification bodes well for the region as domestic red meat (beef and pork) consumption has fallen since 1996 (see appendix 5), while poultry, fresh produce and vegetable, and specialty dairy products have been experiencing large growth in domestic consumption. VCEDA region stands to gain from promoting and incentivizing producers to diversify and differentiate their current production practices. The following regional SWOT were identified for diversification and differentiation.

Table 17: Diversification and Differentiation - SWOT

STRENGTHS	WEAKNESSES
• Strong livestock sector (beef) • Active regional business network to support the production and marketing of fresh produce (example Appalachian Sustainable Development) • Available land • Abundant forests and forest related products (i.e. maple syrup and ginseng) • Strong Virginia Cooperative Extension network • Region is capable of producing specialty crops (i.e. hops) and plants native to the region (i.e. medicinal herbs and wild flower)	• Shorter growing season • Topography and limited flat land availability • High costs for productive farming land • Lack of access to capital • No established aggregation points, such as large farmers markets in the region • Lower income levels and high poverty rates limits the size of the local fresh and organic produce market and other value-added certified product (Grass Fed Beef)
OPPORTUNITIES	**THREATS**
• Domestic consumption trends show increases in fresh produce and organic produce items • Domestic consumption trends show increase in value added dairy items, such as cheeses and yogurt (see appendix 5) • Gap in meat processing and other value-added processing facility (see meat processing section) • Several products show promise in the region including goats, bees, and vineyards	• Declining domestic consumption in tobacco • Regulations on food safety • Cost associated with USDA certification of Organics, Good Agricultural Practices (GAP), Good Handling Practices (GHP), Grass Feed Beef, and other certifications.

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• Growing tourism throughout the region with incomes to support local and specialty foods. • Tourism searching for authentic Appalachian cuisine and produce	

Possible Tactics to increase farmers to diversify and differentiate their products:

Table 18: Diversification and Differentiation – Action Items

Action Items	Description
Disseminate market information and trends to farmers through a centralized source	Provided in Appendix 5 is analysis of domestic consumption trends that could help farmers plan future production. In general, there is no single commodity that will be able to be grown by farmers, but farmers can diversify their income streams by planting new crops, raising new animals (chickens or fish) or by seeking means of adding value to their current products. Coordinating with Extension Agents could provide more in-depth technical assistance and clarity on both the opportunities and risks associate with planting new unfamiliar crops. Strategy 2 outlines the need to have a point person to focus on the ag-development and marketing, and this individual can be the centralized sources or coordinate this market information.
Provide support for producers seeking gain national/state/regional certifications and branding	There are many certification programs that allow for producers to differentiate within products (i.e. organic certification). However, farmers are unable to pays the costs associated with these certification programs. Part of a strategy would be to coordinate producers together to take advantages of group certification programs (GAP and Organic Certification). Group certification also requires producers to coordinate across the value chain and may provide a platform to pursue future partnerships. Programs and training for certification courses can be held at a single locations (i.e. SWCC) and bring together groups of farmers that are growing similar or the same products. Training courses could be based around a specific certification or based on a product (example. Organic Fresh Berry Certification). Providing clear and concise guidelines, rules, and steps will aid individuals in evaluating whether a particular certification is right for the farmer. A one page communication document could be provided and disseminated throughout the region (at farmers markets, grocery stores, extension offices). This document could include dates for upcoming courses on certification, contact info

	of relevant certification experts, and businesses that sell certified products. There currently exist brands in the region (i.e. Appalachian Grown; does not allow for all the counties in VCEDA and Rooted in the Appalachia) that present an opportunity for some farmers to secure a stable market for products. Information about the process and cost of obtaining these certification should be made available. *See Marketing section for information.*
Facilitate and promote the expansion of Virginia Beef Quality Assurance (BQA) Program throughout the region	This strategy could involve an active outreach program by VCEDA to calve and feeder operations. Informational session and/or classes can be held through the region to provide the process of becoming BQA certified. BQA certification involves reaching the standards of certification and is an involved process. Extension agents in the region are willing and more than capable of providing the guidance and resources for farmers to obtain BQA certification. This strategy would have to involve coordination between producers as buyer of BQA cattle seek group purchases. http://www.apsc.vt.edu/extension/beef/programs/vabeef-quality-assurance/
Provide funding or other forms of incentives for niche and specialty crop production	Part of the strategy could involve reaching farmers and entrepreneurs currently operating in these niche and specialty products. This can be through outreach from VCEDA, or VCEDA could host a conference/fair for specialty crops bringing together researchers, producers, and businesses owners. A conference presents a forum for current producers and interested farmers to discuss the risks and benefits of growing specific crops and to form partnerships. VCEDA could also actively support and promote a network of mentor or an association of producer in these products. Regional cooperation is need to form a critical mass of producers to develop and reach markets.
Connect current livestock producers and other farmers with value-added processors and businesses throughout the region	Dairy producers, beef producers, and other animal producers stand to benefit from supplying local value-added manufactures. There are a presence of creameries, snack meat producers, and other value-added animal related product industry and these business should be engaged in the development of more businesses.
Dedicate grant or loan program specifically for farmer seeking to diversify or differentiate their products and farms	This program could provide funds or loans for small agriculture infrastructure (fencing, high tunnel materials, chicken coop material, greenhouse supply, cold storage, etc) to promote farmers to diversify or differentiate their current inventory. These initial costs dissuade farmers from taking risks to try new

	products, and a modest start-up fund could for example help beef producers raise goats (fencing) or chickens. Financial incentives could be based around specific farmers to promote increases in supply of a particular product (i.e. honey production fund).
Provide education programs on food safety guideline for value-added producers and producers looking to diversify	Food safety regulations can inhibit producers from selling to markets or consumer. An education program based around the safe handling and storing of food. Many products have specific temperature

Strategy Five: Expand meat processing

Livestock, especially cattle, is the largest agriculture activity in the region bringing over $72 million to the regions producers in 2012[29]. In addition, animal feed production is the second largest activity with an economic value of $8.8 million and hay (primarily used for animal feed) is grown on more than 2,900 farms throughout VCEDA in 2012[30]. Previously mentioned, animal production is an agriculture industry that the region is competitive in, which is partly due to the regions ability to support grazing animal. Similar to the rest of Virginia, VCEDA cattle operations are calve to feeder operations, with feeder cattle being shipped to Corn Belt States to be finished and processed.

Throughout our extensive research process, in surveys, interviews, and workshops with regional producers, local officials, and community members the lack of an adequate USDA certified meat processing facility was identified as major missed opportunity for the region. There are smaller meat processing operations, however they currently serve small scale famers and are not USDA certified. Moreover, the potential for animal slaughtering and processing facilities as a driver for economic growth has been identified by other regional stakeholders not associated with this strategic plan in the regional Go Virginia Growth and Diversification Plan[31]. Regional coordinated efforts are needed to establish a facility to serve the region and several examples of the capital investment, challenges faced, and success of other USDA meat processing facilities in Virginia are presented in Appendix 6. Additionally, expansion of the Virginia BQA program is a suggested strategy listed below. Appendix 7 has economic impact analysis of the current BQA program and the projected economic impacts of expanding the program. Below

[29] United States Department of Agriculture. *Crop Values Summary, 2007 and 2012.* Retrieved from http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1050.

[30] *Ibid*

[31] See: Region One's *Go Virginia Growth and Diversification Plan*. Retrieve from: http://www.dhcd.virginia.gov/images/GoVA/Region%201%20G&D%20Plan.pdf

highlights the current regional strengths, weakness, opportunities, and threats of establishing a USDA certified meat processor.

Table 19: Meat Processing - SWOT

STRENGTHS	WEAKNESSES
• VCEDA possess an established cattle and other grazing animal (sheep) industry • Land suitable for productive forage production • Strong Virginia Cooperative Extension network for grazing animal production	• Size of region makes it difficult for one facility to serve all the producers • Currently lack adequate supply of finished beef cattle and other meat animals • No established markets for local process meat or grass-fed beef • Lack of access to capital investment
OPPORTUNITIES	**THREATS**
• Goat production is on the rise and has potential to supply facility • Establishment of facility could service a larger region outside of VCEDA (including neighboring farmers in Kentucky, North Carolina, and Tennessee) • An increasing trend in domestic poultry consumption • Current meat processing in the facilities need upgrades to increase capacity and scale • Matching funding sources available (VCEDA) • Livestock byproducts can be repurposed for other industrial production	• A decline in domestic red meat (pork and beef) consumption • USDA certification increases both capital and operating costs • Federal and state regulations on food safety and meat processing facility • Feed prices are highly correlated with fuel prices

Table 10: Meat Processing Action Items

Action Items	Description
Conduct a feasibility study for a meat processing facility in VCEDA	There are several funding sources available for feasibility studies that could help reduce the cost of a study (appendix 9). A feasibility study could help secure additional state and local funding (see Appendix 6 case studies of Alleghany Meats, Seven Hills, and Landcraft Food Co.), provide transparency on the risks and costs associated with establishing a facility, help provide an inventory on the current grass-fed beef producers in the region, gauge the interests of other cattle producers, and provide livestock producers with information to start planning to supply a facility. In addition, a feasibility study would provide a business plan for an example facility, and outline the associated capital and operating costs. This business plan could attract investors and provide stakeholders with the information needed to establish a facility.
Coordinate cattle producers in the region to operations capable of finishing cattle (grass-fed beef)	A critical mass of cattle producers that finish cattle would be the primary supply for a meat processing facility in the region. Coordination across the region is needed in order to attract investment in a facility.
Establish a regional grass-fed beef or grazing animal association	A regional association could help coordinate producers and provide a single source of information for farmers interested in switching to finishing their livestock. This association could also aid in establishing a mentor network for new farmers or farmers looking to change their production practices. An association could also help with marketing and facilitate communication between producers.
Provide Education programs for Grass-Fed Beef Certification and production	USDA has a certification for grass-fed beef and a program curtailed for smaller producers. An education program would provide farmers with the necessary steps to gain certification. Most farmers in the region are not finishing their cattle, and an education course would provide farmers with the technical assistance to be able to finish their cattle. This is an important step in attracting investment for a facility and to increase the supply of farmers with Grass-Fed Beef.
Develop training courses for meat processing and food safety	Southwest Community College could partner with Virginia Cooperative Extension to provide a curriculum to properly train interested individuals in food safety standards and guidelines. Curriculum could also include butcher training to help prepare individuals to work in the industry or to provide an avenue for entrepreneurs to start their own smaller-scale meat processing businesses.

Strategy Six: Establish and bolster growers cooperatives

Economics show us that in order to have a successful agricultural business, a producer must either grow at an economy of scale, where the cost of large-scale production equipment and marketing is offset by the amount the producer can produce, OR the producer must significantly differentiate their product from another in order to make a space for themselves in the marketplace and achieve a higher return for that given product. In Southwest Virginia, land and capital constraints make the first type of agricultural production nearly impossible for a producer to do on their own. To either achieve economies of scale, or differentiate a product to get a higher price, the formation of cooperatives is often a beneficial strategy.

Agricultural Cooperatives (also known as coops) are an informal arrangement between farmers that can eventually turn into a formal business operation. Coops are managed by those who participate in the cooperative and can be operated on a cost basis or non-profit basis, with the primary goal being to help its participants with their businesses. Strengths of an agricultural cooperative include: farmers meeting the needs of the market, individuals, and other farmers; large purchases of resources drive the cost down on those resources to obtain the lowest price; allow farmers to enter the market in a less traditional way, participation in a cooperative allows farmers to try new products or expand on current products; and adds income to the farmers and their families establishing a stronger community by investing and spending locally. Weaknesses of cooperatives are: groups lacking information regarding decision making; problems with the distribution of the participant's income; and the potential for losses if they occur can dramatically alter the established cooperative.

There are models of regional cooperatives that are very successful, and there are regional examples of cooperatives that have been less successful. They can fail for a number of reasons, the number one being that members of the cooperative cannot collectively deliver a consistent product to the market. Though not considered a strict cooperative, one example of a successful cooperative-type initiative is the Virginia BQA program, where producers agree to specific standards, and record keeping, and work through a VCE and the VA Cattleman’s association to put lots together to sell to Midwest feed lots. Appendix 9 provides some resource in the formation of cooperatives in addition to some example cooperatives.

Table 11: Growers Cooperatives – Action Items

Action Item	**Description**
Support the creation or further development of cooperatives in key agricultural niche areas:	• Goats and sheep • Wine and beer industry inputs (grapes, barley, hops) • Medicinal roots and herbs • Grass-finished beef
Provide Funding	Provide mini-grants to cooperatives on a yearly basis to support marketing, infrastructure, and branding efforts
Promote professionalization of the growers groups	Meet yearly with cooperative producer groups to assess new needs – respond to those needs through promotion of additional training classes and/or infrastructure funding.

Strategy Seven: Reimagine reclaimed mine land, existing industrial sites, and promote agricultural manufacturing

One of the focus areas, business attraction, has been a primary interest of stakeholders involved in the strategic plan. The region has available space in established industrial sites, a unique regional asset in reclaimed coal mine land, and workforce with the skills needed for food and beverage manufacturing. Agriculture industries have the potential to bring in new jobs but also support local farmers throughout the region who have expressed demand for these types of industries. The VCEDA region has a diverse farmer population that can supply small scale food and beverage industries. Moreover, the region has been successful at attracting larger projects (aquaculture) and should continue to update industrial facilities to attract these types of industries. An increase expansion of tourism efforts would benefit from popular small scale beverage industries like breweries. Below are the regional strengths, weakness, opportunities, and threats for business attraction of agriculture related (ag-related) industries.

Table 12: Reclaimed Mine Land, Existing Industrial Sites, and Agricultural Manufacturing SWOT

STRENGTHS	WEAKNESSES
• Natural resources including water and land needed for large food and beverage manufacturing • Natural physical assets (mountains and forests) and a strong effort to improve tourism to attract a workforce • Industrial sites with available space for food and beverage manufacturing, and proximity to transportation infrastructure • Leadership eager to develop agricultural businesses • Large and dependable workforce with experience in manufacturing industry • Community college and technical programs geared towards manufacturing industry • Lower wages make region attractive for companies • Available funding for workforce development	• Declining and ageing workforce • Lack of access to capital for large facilities • A desire from industrial sites to be left open for larger industries • Industrial sites are not suitable for many food and beverage manufacturing industries
OPPORTUNITIES	**THREATS**
• Reclaimed coal mine lands provide additional sites for ag-related industry • Demand for small scale agriculture production machinery and inputs (fencing, high tunnels, etc.) • Demand from producers for meat processing (*see meat processing strategy*), freezing facility (produce and/or meat and dairy products) • Lack of local breweries, wineries, cideries, and distilleries • Local matching fund sources for businesses (VCEDA)	• Federal and state regulation on food safety, food processing, spirits production, other alcoholic beverage production and reclaimed land mines

GIS data can help narrow the focus of site selection down to a few rather than an overwhelming many. The average distance to road, railroads[32], waterways[33], populated areas[34] as well as slope[35], soil type[36], and surrounding land cover are all important factors which may be considered when choosing an appropriate land site or facility site. With this in mind, OED conducted a preliminary analysis to identify potential sites for agriculture manufacturing operations. There are twenty industrial property sites and 123,440 acres of reclaimed mine sites in the VCEDA area used for the analyses. The industrial sites vary in size and water, electric, sewage capacity. Most preferred reclaimed mine sites based on the parameters can be found in figure 5. The industrial sites were ranked by preference in figure 6, where the larger green dots show sites which are most preferred and the smaller red sites are least preferred. A further analysis may be conducted to determine if specific agricultural industry requirements are met for existing industrial sites.

Figure 5: Reclaimed Mine Site Suitability for Agriculture

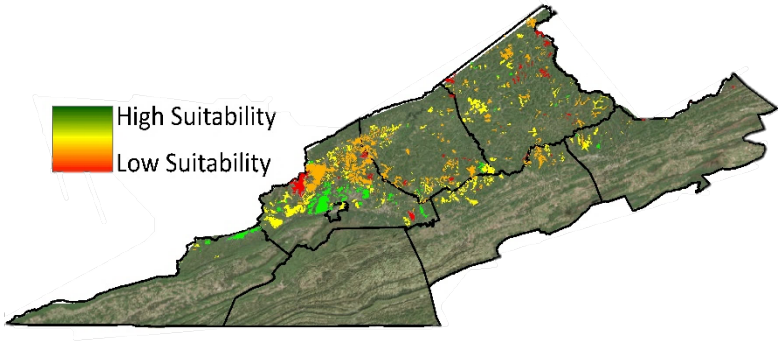
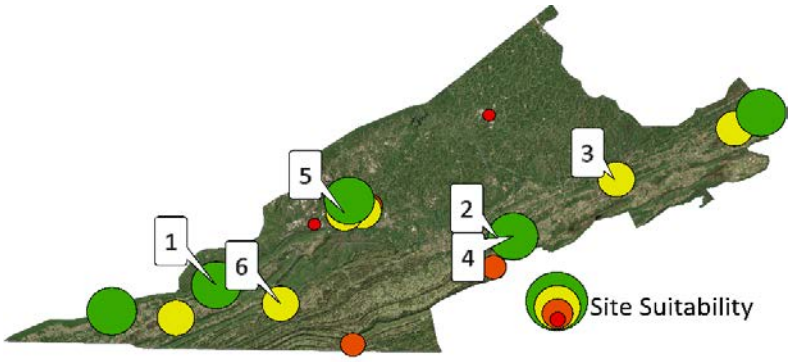


Figure 6: Industrial Site Suitability for Agriculture



[32] Derived from U.S. Department of Commerce, U.S. Census Bureau, Geography Division. TIGER 2015 Roads/Railroads

[33] Derived from U.S. Geological Survey (USGS), EROS Data Center. National Hydrography Dataset (NHD) 1:24,000

[34] Derived from U.S. Department of Commerce, Bureau of the Census. TIGER 2017 Block Population Estimates

[35] Derived from Virginia Department of Mines Minerals & Energy

[36] Derived from U.S. Geological Survey (USGS), SSURGO Dataset

In addition, a site analysis was conducted to determine greenhouse site suitability after determining suitability from the general site parameters listed above.[37] From the original twenty sites, ten were excluded because they did not meet specific site needs for greenhouses which is approximately 0.3 gallons/sq. ft.[38]. Slope orientation was specifically considered for greenhouses as it may improve or hinder a sites total amount of annual sunlight, thus altering the site's greenhouse seasonality. For instance, southern facing slopes may be more suitable for year-round production whereas eastern/western are limited to the winter months. Table 13 shows the top three sites with the highest value from the combined model layers for year-round and winter which can be matched to the labels in figure 6.

Table 13: Greenhouse Suitability Rankings

Rank	Year Round		Winter
1	Summit Property	4	Russell Regional Business Technology Park
2	Russell County Industrial Park	5	Wise County Industrial Park
3	Simmons Development Claypool Hill	6	Scott County Regional Business and Technology Park

Possible Tactics for VCEDA to utilize current assets to attract agriculture related industries and businesses:

Table 14: Mine Land, Industrial Site, Ag. Manufacturing - Action Items

Action Items	Description
Conduct asset analysis that expands and update a map and inventory of industrial and reclaimed mine sites for ag-related industry	Provided in this plan is a preliminary asset analysis of both industrial site and reclaimed mines (see Appendix 3). In addition to this report, the region should assess the sites as they pertain specifically to ag-related industry and evaluate the state of their assets. An analysis would look more closely at sewage capacity and electricity availability at industrial sites to see if they match the needs of agriculture industry such as greenhouses, aquaculture, and food and beverage manufacturing. Additionally this would also list other relevant ag-related industrial facilities located in the region, and provide Reclaimed mines provide several opportunities as they are large open spaces that are away from residential areas, close to water sources, and have some transportation infrastructure in place. An inventory analysis would take a closer look at both the soils and water close to the sites. Physical soil samples are needed to asses suitability for crop production (greenhouses other crops) and soil types (aquaculture).

[37] Note: Site selection is based on the parameters and formula described in Appendix 3, and may differ from other studies conducted in the region.

[38] https://ag.umass.edu/greenhouse-floriculture/greenhouse-best-management-practices-bmp-manual/water-supply-sources

Action Items	Description
	Water quality samples of nearby streams and underground water sources, will assess the viability of water for agriculture production and aquaculture.
Develop marketing information to relevant economic development authorities for ag-related business/industry attraction	Development of a concise summary of the agriculture, labor, and industrial assets curtailed to industrial agriculture related business (aquaculture/aquaponics, greenhouses, meat processing, food and beverage manufacturing), could be provided to relevant regional economic development authorities engaged in business attraction activities. This would signal the regions commitment to establishing and attracting ag-related industries. Part of the strategy could include information on attracting particular industries; for example the region has had success in attracting aquaculture (Project Jonah) or attempt to attract meat processors as there is a strong demand for a facility. There are other neighboring counties that have attracted large food and beverage manufacturing facilities (Gatorade in Wythe County) and site visits to these facilities and localities can help identify a business attraction strategy. Coordination between tourism and current business attraction efforts will increase the effectiveness of marketing for ag-related industries.
Upgrade current industrial sites for food and beverage manufacturing facilities and other ag-related industry	An asset analysis should include an evaluation of current industrial site with suggestions for site improvement. Site should meet the water, electricity, and sewage capacity requirements.
Upgrade reclaimed mines to be used for ag-related industry and production	Reclaimed mines most notable assets in space availability, however they are not currently fitted for agriculture production and facilities. The asset analysis should provide a list of cost estimate and evaluation of which sites are the most suitable. Though these sites present a unique opportunity to the region, they also have unique problems. Reclaimed sites generally have no top soils and there could be traces of containments in the soil or water there. Moreover, though these sites may have roads, they may not be suitable to passenger cars.
Develop Education programs for workforce development in food and beverage manufacturing and agriculture related industries	Food and Beverage manufacturing requires different skills than other manufacturing industry, particularly in the space of food safety standards and regulations. Education course should be developed to prepare the workforce to be readily available to work in these industries. Current community college curriculum in manufacturing, welding, and machinists could incorporate an agriculture application.
Dedicate industrial space and funding for smaller ag-related	Many industrial sites are left dormant in the hope to attract large industrial facility. Agriculture related businesses provide an

Action Items	Description
manufacturing facilities and businesses	opportunity to fill available space and to help local agriculture entrepreneurs, and agriculture businesses can be smaller in scale. Funds, grants, and other incentives should be made available for entrepreneurs who seek to start smaller-scale agriculture business. In addition, an (mandatory) education program could either be part of financial incentive or a separate way to aid entrepreneurs in understanding regulations associated with food products.

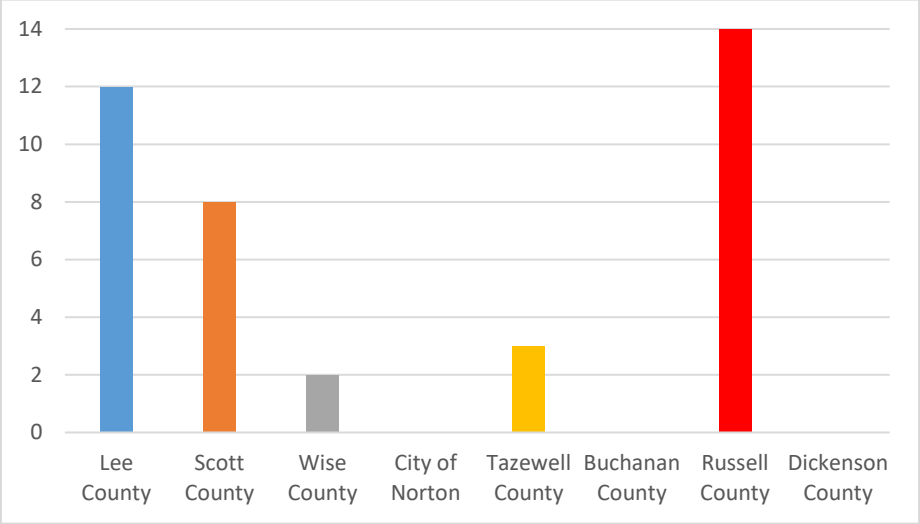
Appendixes

Appendix 1: Survey Results

VCEDA Region Agriculture and Forestry Survey Analysis

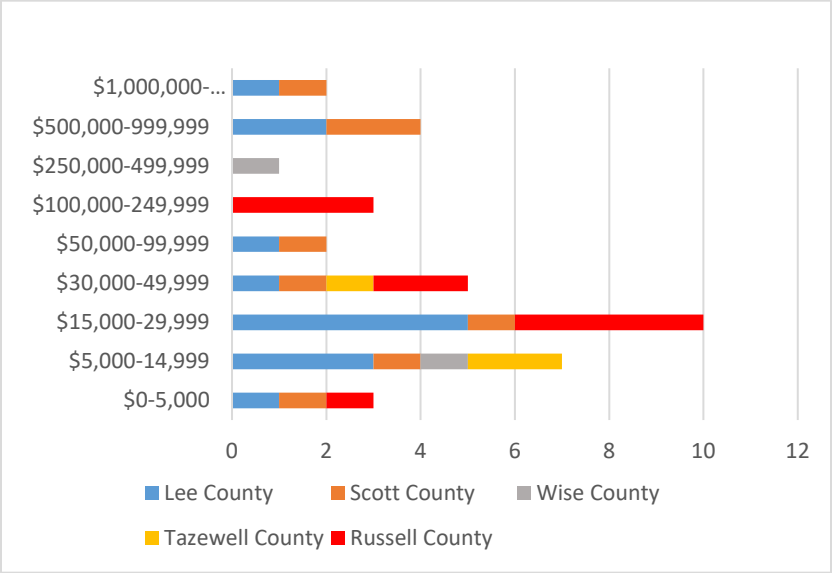
The Virginia Tech Office of Economic Development, in partnership with the Virginia Coalfield Economic Development Authority (VCEDA), conducted an online survey as part of an agricultural and forestry strategic plan for this region (the counties of Scott, Wise, Lee, Buchanan, Russell, Tazewell, Dickenson, and the city of Norton). OED asked owners or operators of an agriculture or forestry related business in the VCEDA region to take an online survey to learn about current business operations in the region, their plans for the future, and to understand more about opportunities and challenges with agriculture in the VCEDA region. About 39 agricultural business owners responded to OED's online survey between February and July of 2017.

Figure 1. Number of survey respondents from VCEDA counties



The majority of survey respondents live in Russell County, Lee County, and Scott County respectively. There were a few respondents from Tazewell County and Wise County and there were no responses from producers in the City of Norton, Buchanan County and Dickenson County, however producers in those regions provided the OED team feedback in other ways..

Figure 2. Annual sales of survey respondents' businesses by VCEDA counties



Of the business owners who responded, the following graph demonstrates the annual sales broken down by each county. The majority of those who answered the survey have annual sales ranging from $15,000 to $29,999 (Figure 2). Below in Figure 3, the survey respondents were asked to determine what percent of their household income is generated from their agriculture/forestry business. Only seven survey respondents noted that 100% of their household income comes from their business and three survey respondents answered that 70% of their household income comes from their business signifying that their agriculture/forestry businesses are their primary source of income. For about 26 survey respondents, their agriculture/forestry business acts as their secondary income since 50% or less of their household income is generated from their business.

Figure 3. Percent household Income from Agriculture/Forestry Businesses

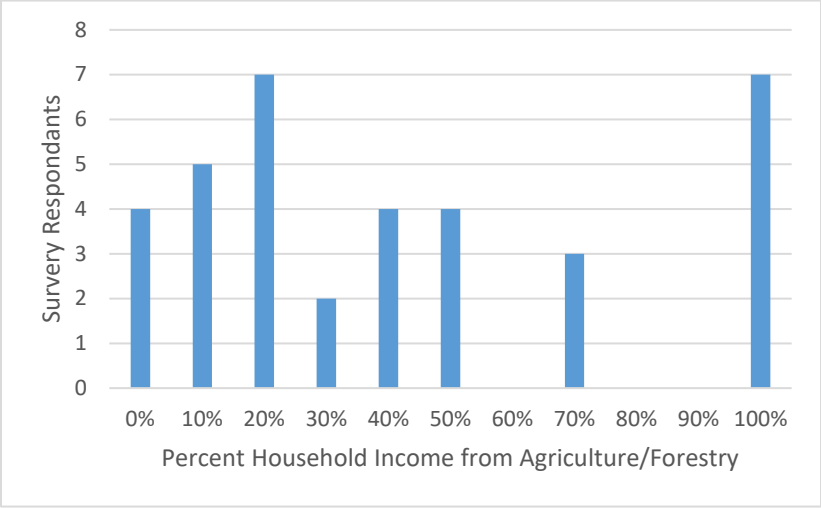


Figure 4 demonstrates the type of goods and/or services the businesses produce which is organized by county in which their businesses reside. Beef cattle ranching and farming is the dominant industry in the VCEDA region followed by other animal production including sheep, pigs, lamb, and goats. Vegetable and melon farming was the third most frequently cited industry, these products include produce like corn, tomatoes, cucumbers, peppers, and pumpkins. Other notable businesses include wine grape production, agritourism by means of a corn maze, veterinary services, horse breeding/training and beekeeping/honey production.

The beef cattle industry has a strong presence in VCEDA region. About 80% of producers who responded to OED's survey sell products from the beef cattle industry, including feeder cattle, grass-fed livestock, yearling calves. Over 75% of all respondents sell their products locally and in Southern and Southwest Virginia. Most of the cattle producers sell their livestock at Tri-state Livestock Market in Abingdon, VA, the Virginia Cattlemen's Association holds a Tel-O-Auction Weekly at this venue. Other venues mentioned include local markets, contract sales, and online auctions.

A little over a third of the survey respondents have had businesses established in the VCEDA region for over 35 years. The majority of their sales are local and in Southwest Virginia, represented by Figure 4 below. Most producers directly deliver their products with their own vehicles or the products are picked up at their farm. Only one producer exclusively uses other companies to haul their products. The producers seem hesitant about selling or expanding sales to include buyers that are not an end-consumer, about 42% of respondents said they were not interested, 29% said maybe, if certain barriers or conditions were met.

Figure 4. Type of products produced by survey respondents in VCEDA region counties.

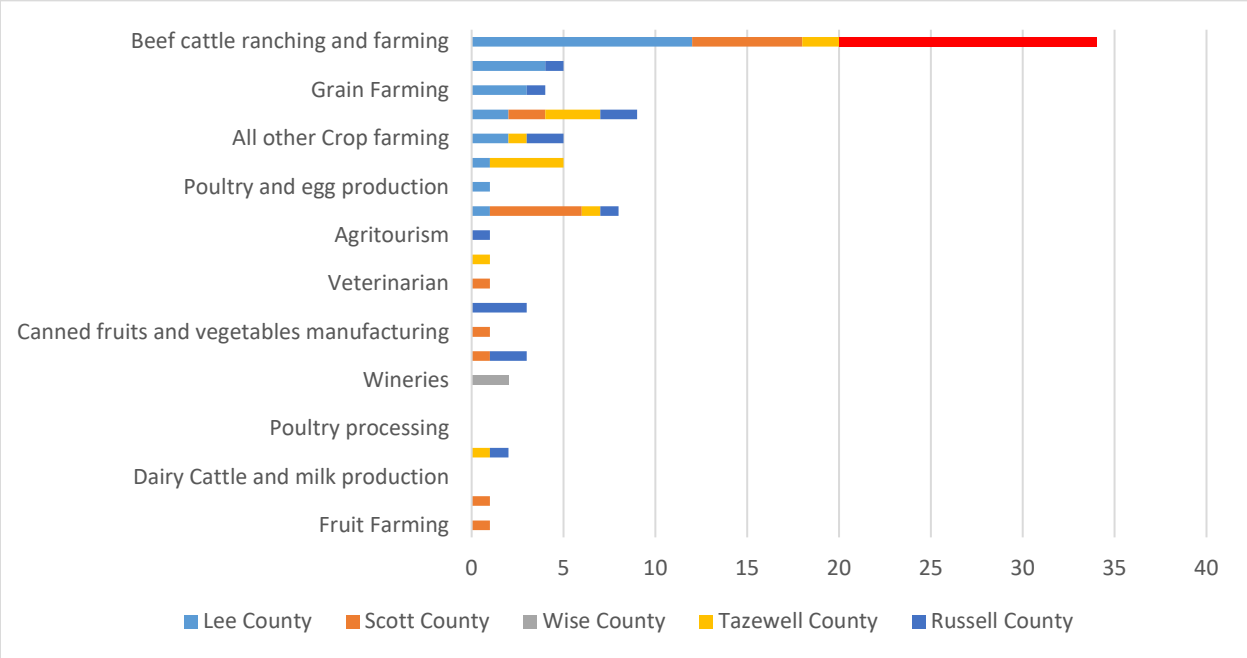


Figure 5. Distribution of the producers' markets.

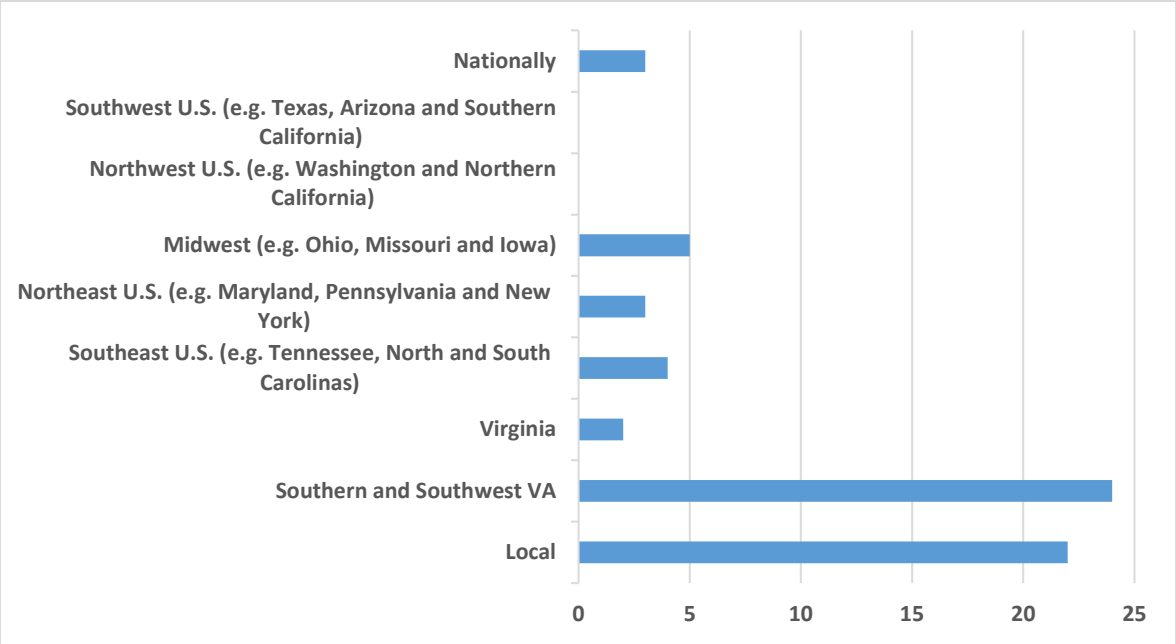
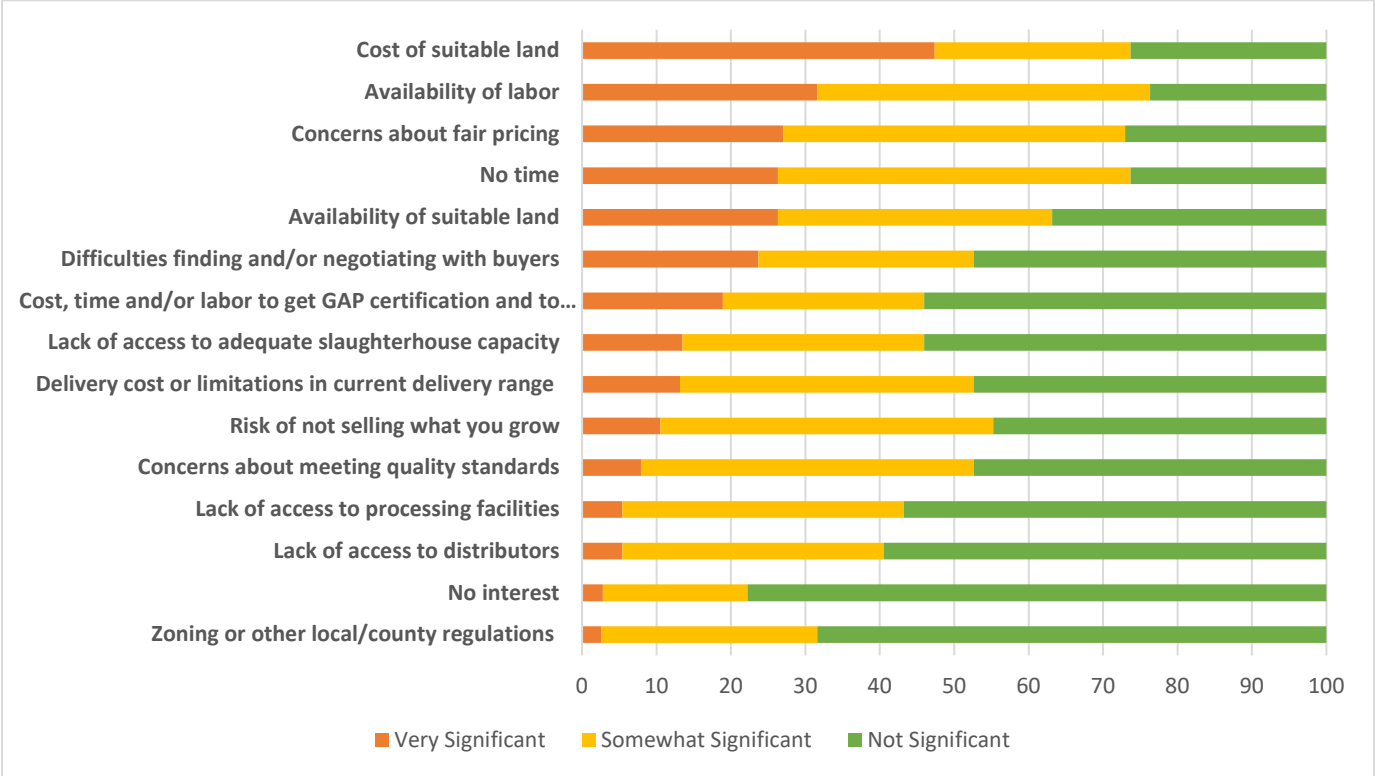


Figure 6. Significance of the following barriers for entering or increasing participation in additional markets.



Others wrote in that the following were very significant:

- Access to organic soil amendments on pastures and labor/equipment to harvest pastures

- Lack of local consumers
- Non-scaled regulations hampering small farms and direct sales
- Access to organic feed
- Regulations/Paperwork
- Income of Clients

The survey demonstrates that cost of suitable land, availability of labor, concerns about fair pricing, lack of time, and availability of suitable land were the most significant barriers to entering or increasing participation in additional markets. The least significant barriers for expansion into new markets was no interest and zoning/regulations. Some of the producers' largest hesitations with entering or expanding sales into non-direct-to consumer channels include high costs, inconsistent supply chains, lack of production, lack of funding, uncertainties about the profitability of expansion, the amount of time it will take, access to suitable land, labor constraints, and market fluctuations.

Agritourism

About 45% of respondents do not participate in agritourism and have no plans to do so. About 40% of respondents do not have agritourism but may offer it in the future, and about 16% do participate in agritourism. Those who participate listed the following activities:

- School group/Ag group Farm visits
- Farm Market
- Corn Maze: pumpkin sales, haunted tours, parties
- Retail Shop
- Farm Tours/Classes
- Mentor

Precision Agriculture

About 68% of survey respondents do not use precision agriculture in their production, of the 32% who do, they use the following types of precision agriculture:

- Health monitoring
- GPS guidance
- Fence monitoring system
- Identification
- Video monitoring of calving
- Disease/parasite monitoring

Other responses: Solution in search of a problem, doesn't seem cost effective but interested in seeing if it could apply to small operations, would like to explore other uses, not interested.

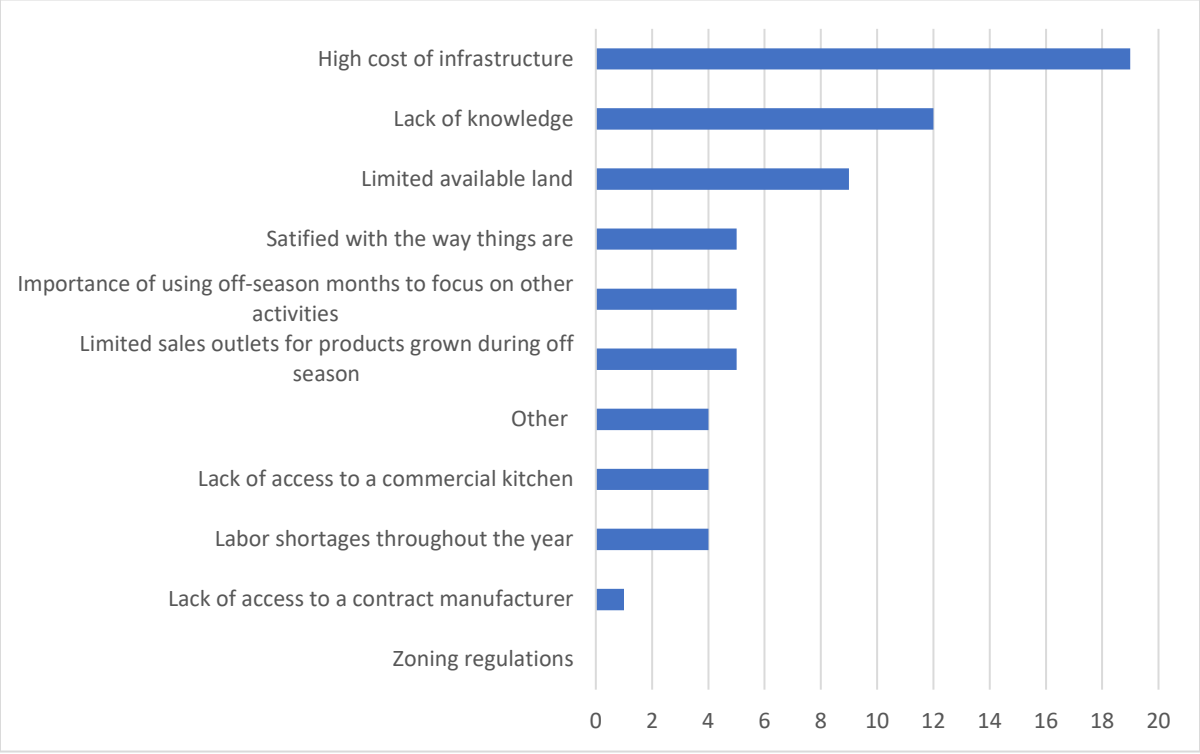
Extension strategies

The top three techniques currently in use among the respondents include use of background beef cattle for a value-added price, selling to both local and non-local markets and many noted they do not employ techniques to extend their sales season. Some barriers for utilizing or expanding extension strategies include the high cost of infrastructure, lack of knowledge, and limited available land.

Table 2. Techniques used to extend sales season.

Current techniques	
Background beef cattle to get value-added price	16
None	10
Sell to both local and non-local market	7
On-farm refrigerator or freezer	2
On-farm preservation	2
Preservation in a certified commercial kitchen (value-added goods like jams and salsa)	2
High Tunnels	2
Work with a manufacturer to produce value-added good	1
Other	1
Early perennial crop	1
Storage crops in root cellar	0

Figure 7. Barriers that may be preventing the producers from utilizing or expanding their extension strategies.



Other barriers included:

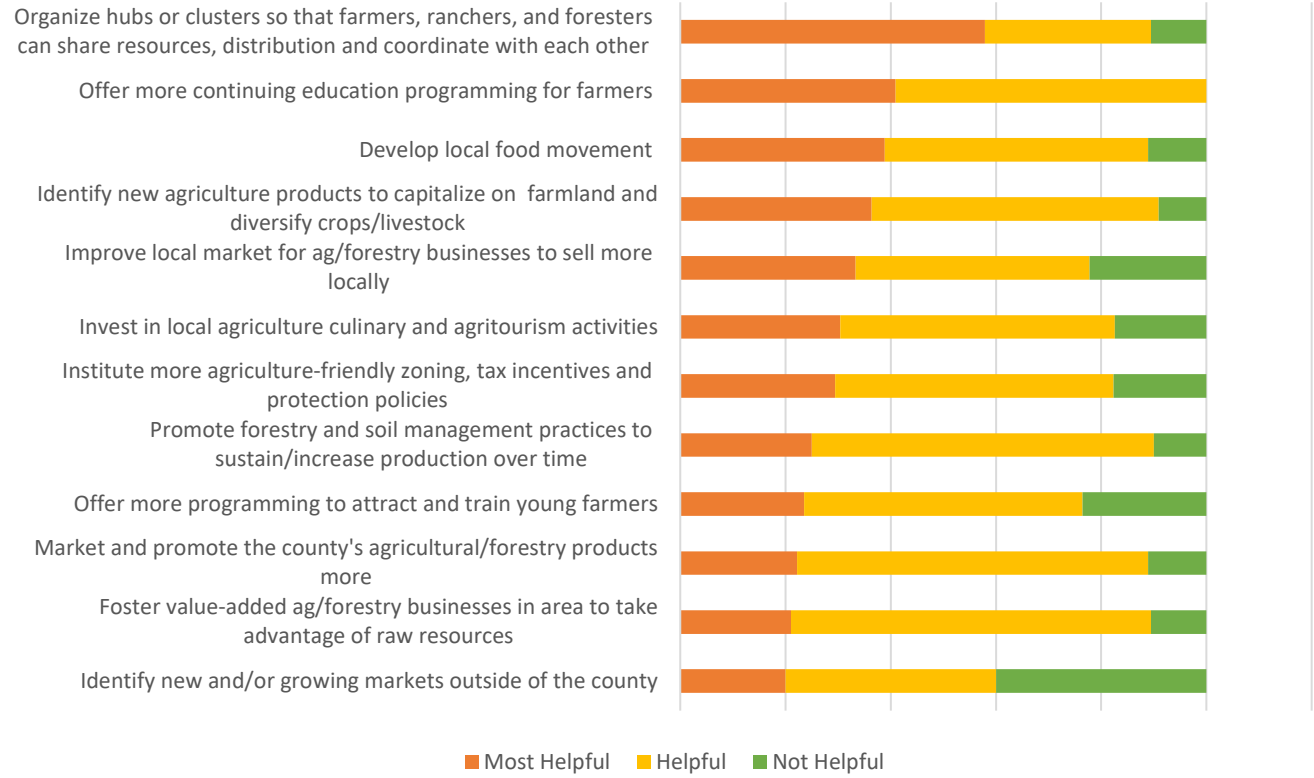
- Mostly man power and cash flow
- Primary job leaves little time but for basic cattle operations
- Money to build indoor riding area

- Pollinators are in trouble generally due to a wide range of factors

Opportunities that would help agriculture and/or forestry business

There is variation in responses over what opportunities/strategies the business owners believe will best serve the VCEDA region. Most agree that it would be most helpful to organize hubs or clusters so producers can share resources, distribution and coordinate with each other. All respondents believe that offering more continuing education programming for farmers is helpful. The least helpful opportunity according to the survey respondents is identifying new and/or growing markets outside of the county.

Figure 8. Opportunities to agriculture and/or forestry businesses in the VCEDA region ranked by helpfulness.



There is not much variation among respondents based on county, most agree that organizing hubs or clusters of farmers would be the most helpful. Respondents from Russell County noted that offering more continuing education programming for farmers would me most helpful in comparison with the respondents from other counties. Producers also believe that improving the local market for agriculture/forestry to sell more locally and identify new agriculture products to capitalize on farmland would be most helpful.

Figure 9. Opportunities that would be most helpful to agriculture and/or forestry businesses in the VCEDA region organized by county.

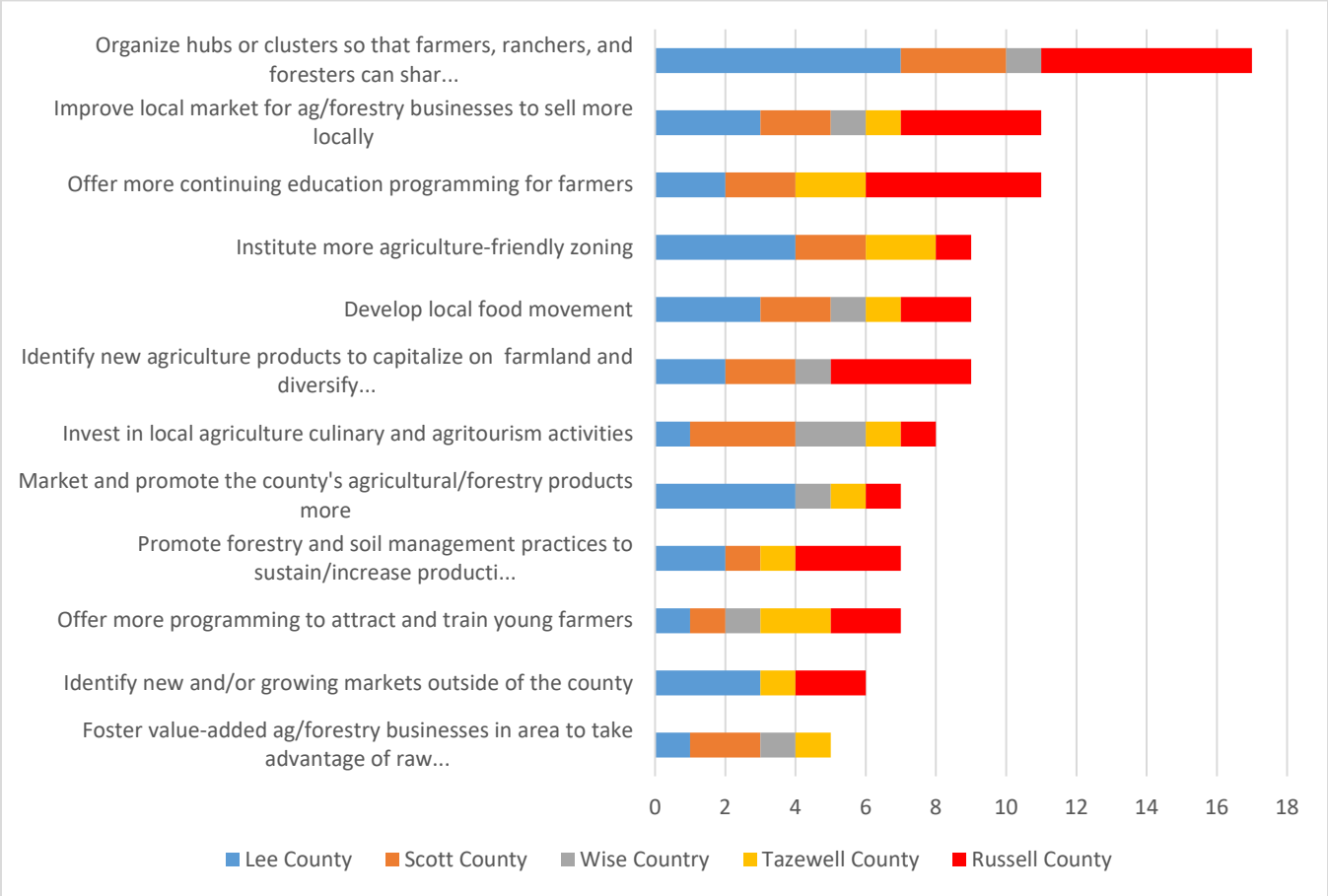
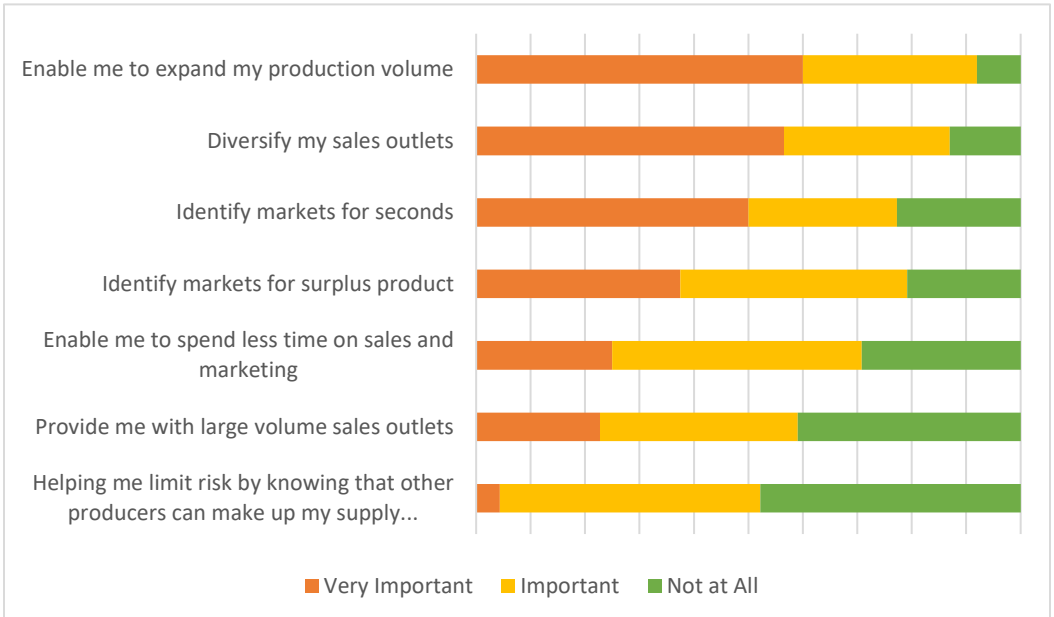


Figure 10. Level of importance regarding the following support service items



Most producers believe that enabling them to expand their production volume is most important followed by diversifying their sales and identifying markets for seconds. They believe that helping them limit risk by knowing that other producers can make up my supply is not important.

The following table (Table 3) shows the products that the survey respondents would like to try in the coming five years that they are not currently producing.

Table 3. Product opportunities, interested in producing in the coming five years.

Expansion of cattle production	Agritourism	Animal products	Crops	Other
Feeder calves VQA Cattle Bulls Grass fed Beef Freezer Beef	Farm to table dinners Corn Maze Apple Orchard Cherry Orchard	Sheep Duck Eggs Chicken Eggs Lamb	Mushrooms Berry Crops Hemp Mum flowers for fall Spring-ready plants Bamboo Medicinal Products (Ginseng, Cohosh, Perennial herb crops-lavender)	Herb manufacturing facility On-site commercial kitchen Retail greenhouse sales Ag Drone Business

Recommendations

The recommendations from the producers are listed below, multiple producers agree that education and technical assistance are helpful and more classes from the local extension agency would be helpful. There is variation in responses with respect to taxation, subsidies, and competition along with the strategies for ways to improve. The responses have been summarized and are listed below:

What specific recommendations do you have to improve the local agriculture/forestry business climate in the region?

- Market a Southern Appalachian product using 2 canneries in Russell County now that they are USDA certified.
- Grow apple trees and make our own apple butter.
- Change the land taxing for mine land, such that long term leasing of land could be a win/win for owner and leasee.
- Seed money to help start new value added products, with local retail sales locations.
- Create a quality brand of coalfield agricultural products (Napa wine or Washington apples).
- Deregulate and pull farm welfare programs to enable young farmers and entrepreneurs innovate with new avenues of agriculture.

- There needs to be some way to get all of the cattle in our region sold as a whole to the bigger feed lots so that maybe we could get better pricing.
- Regulation of grading through an agency or firm for cattle sold at market
- Develop markets or ways to add value example VQA cattle sales.
- Educate citizens on importance of agriculture
- Plant stands of Basswood, Tulip Poplar, and Sourwood to provide a nectar source at the same time prior to being harvested on a rotation basis across the growing season it would likely be helpful to pollinators within the county.
- More experienced beekeepers are needed within Tazewell County to ensure pollinators will be here in spite of the environmental damage being done.
- Use chain saw crews to manage the vegetation along roads and right of ways, it would likely improve survival rates of pollinators.

Or do you have any other thoughts regarding what local governments, businesses or support agencies can do?

- Recognition for being an important part of the local economy, farms don't get much attention because they don't hire many full time employees.
- Tazewell County claims the title of tourism. They need to market farms and farm markets.
- Competition with giant food suppliers is cost prohibitive, difficult to produce good, sustainable products
- A campaign to teach are citizens in Southwest Virginia about how good quality food impacts human health- if chefs were put into schools and hospitals creating meals from local produce and meats. This would also create instant markets for all our produce and an incentive for more farmers.
- Subsidization for small farms just as large farms get.
- Working more directly to improve specific farmers markets. Small-scale farmers are suffering from poorly attended local farmers markets. Helping to promote markets and build incentives for purchasing there is a great way to help farmers, as well as providing incentives for local restaurants to purchase produce locally.
- The NRCS continues to provide very important technical assistance and cost share for conservation projects on our farms. That agency is important to our growth and success.
- The classes are informative.
- Continue to support land use taxation.
- Develop markets for more value added and further processed products locally.
- Provide more educational programming to help enhance our knowledge of our product and how to better market it.
- Expand grant opportunities to everyone. It always appears that only a select, few people hear about good opportunities to move their productions forward. Need to get the word out to EVERYONE.
- Local Extension Agency needs to provide more educational opportunities.
- Need to do more for the little guys and less for the ones with the bigger operations.

Appendix 2: Niche Products to Pursue, and Associated Opportunities, Funding, And Challenges

Product	Opportunities/current assets	Current Funding Resources (non-VCEDA)	Challenges and barriers	Market/Consumer Trends
Aquaculture	• Growing market for fish • Cam 18 (greenhouses and hydroponics) • VSU aquaculture program		• Water needs • Education • Funding	• 5% growth in consumption (1996 - 2015) • VA market value: $1.46 million (2015) • U.S. market value: $423 million (2015)
Agritourism	• Pick your own • Packaged trail tours and farm to table • Connection with outdoor recreation and motorcycle tourism		• Public perception, visitors vs. active farms • Education	• Number of wineries increased by 73% (2009 – 2016) • VA grape market value: 16.3 million (55% growth 2008 - 2015) • 102 % growth in berry consumption (1996 – 2015)
Branded products/value added	• "Rooted in Appalachia" brand (ASD)		• Facility, agreement on brand, marketing	• Demand for locally identifiable, authentic products, specialty cheese
Livestock (grassfed and heritage breeds)	• Take culled cattle that don't meet criteria for higher value markets (VQA and others) and finish them • Sheep/goats – suitable for current land, and multi-species grazing systems • Fencing businesses (including installation)	• Some fencing material funding available through Tobacco Commission	• Education • Markets • Funding for infrastructure	• VA market value $614 million (2015) • U.S. Beef market value $71 billion (2015) • U.S. goat meat imports (kgs) increased by 634% (1996-2017) • Value of goat imports $107 million (2017)
Poultry (chickens and turkey)	• Attracting contract poultry • Poultry litter useful for reclaimed mine land		• Processing	• VA poultry market 1.1 billion (26% increase 2008 -2015) • Broilers and Turkeys ranked 1st and 4th most valuable Virginia Ag export

Product	Opportunities/current assets	Current Funding Resources (non-VCEDA)	Challenges and barriers	Market/Consumer Trends
Craft beverage	• Create beer with distinct regional flavors	• Tobacco Commission Grant expanded to SWVA	• Startup costs • Marketing	• 72% growth in employment (2009-2016) • 42 to 175 VA brewing establishments (2009-2016)
Greenhouses/ high tunnels/hoop houses (small and industrial scale)	• Suitable mine land • Industrial sites	• NRCS High tunnel funding	Startup costs	Fresh/Frozen produce consumption increasing (berries/dark leafy greens/bell peppers/other greenhouse crops)
Industrial hemp	• Regional openness		Markets, only for research now	
Organic fruits and vegetables	• Open to learning and adopting among some producers		• Cost of certification/certifier • Education • Marketing and Transportation cost	• Increasing consumer demand for organics
*Chickpeas			Found by VSU and Sabra not to be economically viable in Virginia	
*Surface energy production			Lack of markets, other similar projects have failed in Southern Virginia region	
Bees and honey	• VCEDA/SWVA Honey Bees initiative	• VDACS Cost share (limited funds)	Education	• VA honey market value: $1.175 million (91% increase 2008 - 2015)
Farm equipment repairs,	• Coal mine equipment manufacturers could develop farm equipment			• Farms are getting larger, but small niche farming operations are increasing

Product	Opportunities/current assets	Current Funding Resources (non-VCEDA)	Challenges and barriers	Market/Consumer Trends
retrofitting, rentals				

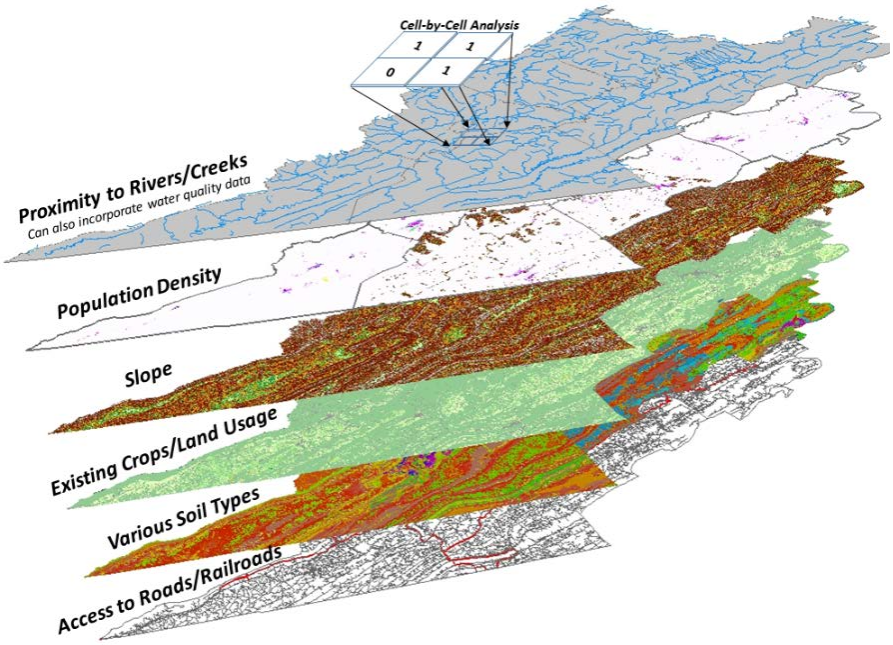
Appendix 3: Expanded GIS Mapping for Industrial sites and mine land

Introduction

In the age of big data and increased computational capabilities, geographic information systems (GIS) have transformed the way in which new land development is planned or preexisting sites are chosen. GIS data is becoming more readily available online to the public to implement into suitability models which can cut out the traditional trial-and-error approach and most importantly cut down the time it takes to choose a site by eliminating ones that do not fit the requirements and statistically scoring and ranking the ones that do. These scores can then be sorted to narrow the focus of site selection down to a few rather than an overwhelming many.

For agricultural GIS analysis, many important variables may be considered when choosing an appropriate land site or facility. Hydrography data can be used to make create a layer like in figure 1 below showing the geographic locations of rivers, streams, and creeks. This layer can also include oxygen level and other characteristics such as pH to improve the model if necessary. Roads and rail roads may be used to show accessibility (for workers and commerce) to specific sites. Distance data can be derived from road and railroad data to show the distance to transportation infrastructure in a given area by overlaying the industrial sites to 30 by 30 meter cells. For example, after running the Euclidean distance tool, cells located where a major road exists will have a value of zero because it is zero meters away from an existing major road. However, cells that are geographically furthest away from the feature will have the largest values and are least favorable. Population density data may be used to choose a site which is closer or further away from densely populated areas. For instance, confined animal feeding operations must typically meet zoning setbacks and therefore sparsely populated rural areas are preferred. Slope is important, in that flat land is preferred as it reduces the amount of grading needed for site preparation. Slope orientation, can be used for agricultural purposes by estimating sunlight availability that changes seasonally. All of these characteristics ultimately save the developer money by reducing shipping costs, land grading, piping from a water source, etc. These variables or layers can be seen in the graphic below.

Figure 1: Data Layers Used in Site Analysis



Site Analyses

There are twenty industrial property sites and 123,440 acres of reclaimed mine sites in the VCEDA area used for the analyses. The industrial sites vary in size and water, electric, sewage capacity. A preliminary analysis was conducted to determine if general agricultural industry requirements were met for both existing industrial sites and reclaimed mine sites. The analysis looked at qualities for slope, aspect, proximity to population, water, roads, etc. Industrial sites that do not meet the specific site requirements pertaining to water and electrical capacity would be excluded in the future when determining the best site locations. The vacant reclaimed mine sites were analyzed solely on the general site requirements of slope, access to population, proximity to water, roads, and railroads. The model is outlined below, but illustrates potential sites for VCEDA to consider when developing agricultural industries.

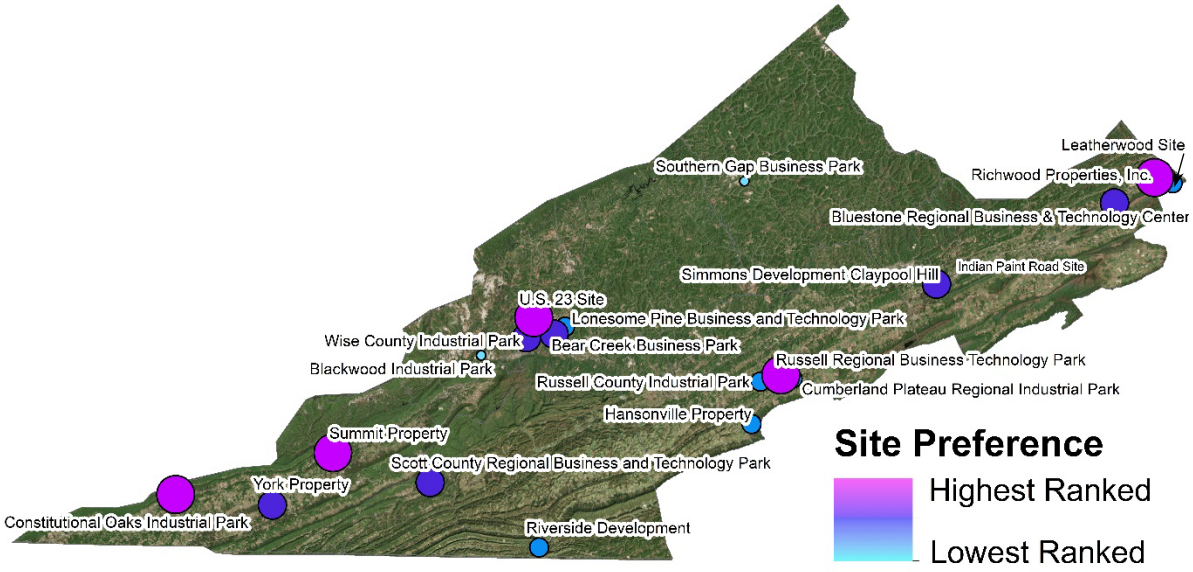
The geographic model took all the layers shown in figure X and normalized them to the same scale. For example, the road distance layer was rescaled so that the furthest distance was reclassified to zero and the shortest distance was rescaled to 100. When a site is added, the closer a site is to roads the higher value it would receive after adding or subtracting all of the rescaled data layers. Different weights were used based on importance to general agricultural industrial needs. Slope[39] was multiplied by 0.25,

[39] Derived from Virginia Department of Mines Minerals & Energy

distance to creeks and rivers[40] by 0.2, streams by 0.15, population density[41] by 0.15, distance to roads[42] by 0.15, and distance to railroads[43] by 0.1. These could easily be changed based on the specific agricultural industry that VCEDA is seeking to develop. For instance industries like meat processing may require for more sparsely populated areas, and could be subtracted rather than added, to favor low population density areas.

Figure 2 below shows the combined layers using the weights mentioned. The industrial sites in the VCEDA region were ranked by preference where the larger purple dots show sites which are most preferred and the smaller blue sites are least preferred based on the combination of the layers shown in figure 2. Figure 3 shows the reclaimed mine sites which were clipped from the model output from figure 1 and were then ranked based on those with the highest overall score.

Figure 2: Most Preferred Industrial Sites based on Model Output



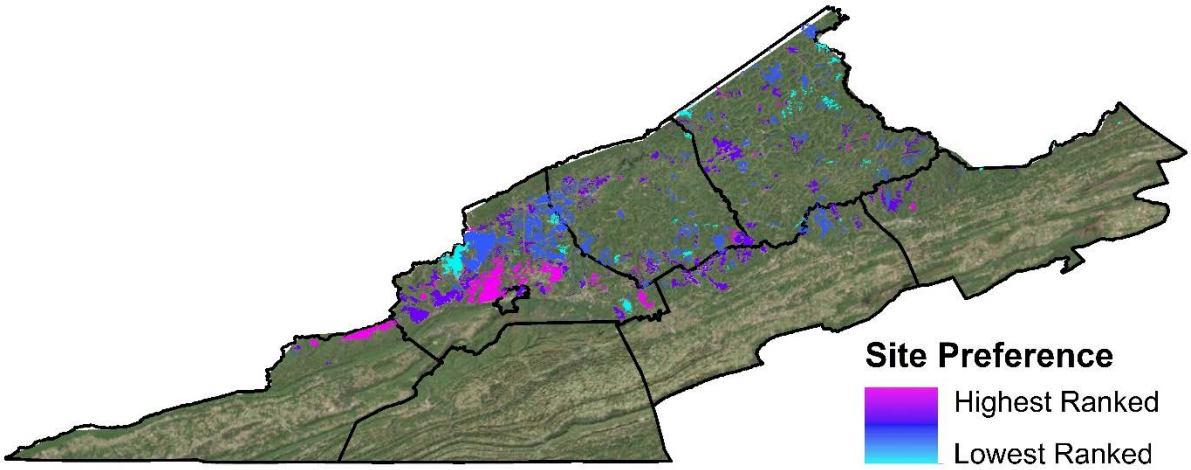
[40] Derived from U.S. Geological Survey (USGS), EROS Data Center. National Hydrography Dataset (NHD) 1:24,000

[41] Derived from U.S. Department of Commerce, Bureau of the Census. TIGER 2017 Block Population Estimates

[42] Derived from U.S. Department of Commerce, U.S. Census Bureau, Geography Division. TIGER 2015 Roads

[43] Derived from U.S. Department of Commerce, U.S. Census Bureau, Geography Division. TIGER 2015 US Railroads

Figure 3: Most Preferred Reclaimed Mine Sites based on Model Output



Specific Ag-Related Industry Site Requirements:
Water capacity required for an industry is generally defined as the amount of total water available at a specific flow rate. This is determined by the engineered specifications of the pipe and the pump being used at each site.

Greenhouses
Greenhouses need approximately 0.3 gallons/sq. ft.[44] to compare to available water capacity for each site. The largest continuous parcel was converted to square feet and then multiplied by 0.3 to estimate the amount of water in gallons needed per day for that property. Once the water need was estimated, the figure was compared to each industrial sites' water capacity, to determine if the current water lines could meet the demand for a greenhouse. Slope orientation was also considered as it may improve or hinder a sites total amount of annual sunlight, thus altering the site's greenhouse seasonality. For instance, southern facing slopes may be more suitable for year-round production whereas eastern/western are limited to the winter months. The following table shows the top three sites with the highest value from the combined model layers for year-round and winter production.

Rank	Year Round	Winter
1	Summit Property	Russell Regional Business Technology Park
2	Russell County Industrial Park	Wise County Industrial Park
3	Simmons Development Claypool Hill	Scott County Regional Business and Technology Park

Aquaculture & Aquaponics:

[44] https://ag.umass.edu/greenhouse-floriculture/greenhouse-best-management-practices-bmp-manual/water-supply-sources

Aquaculture and aquaponics facilities typically require water flow rates between 25 - 40 gallons per minute (for every surface acre of pond) or about 0.1g/sf.[45] Other preferred water characteristics suggested are pH to be between 6.5 and 9.0[46], alkalinity between 75 and 250 mg/l, water hardness between 75 and 250 mg/l, and soil (if constructing a pond) greater than > 20% of clay.[47]

Food & Beverage Manufacturing: Meat Processing/Breweries/etc.

Breweries are an example of a food and beverage manufacturing facility. They typically require a water supply of 60 psi at 25-30 gallons per minute or about 0.1g/sf. Size (not including parking) varies based on the number of barrels used; a 3 to 5 barrel system requires approximately 300 to 500 sq. ft. and a 7 to 15 barrel system approximately 555 to 1200 sq. ft. As for electricity sites need at a minimum around 200 amps of electrical capacity to house a brewery.[48]

Limitations

One limitation in doing a soil analysis of reclaimed mine sites is that the soil data is based on data surveyed for the site prior to the reclaimed mine. This is also the case for elevation data therefore an accurate slope assessment is difficult. Both water and soil testing is needed at each reclaimed mine site to determine the viability of developing the site for agricultural production.

VCEDA has available space to develop for agriculture industries, our preliminary analysis highlights the most suitable sites for these industries. A detailed analysis of water and electrical capacity was not attempted for this study.

[45] http://aqua.ucdavis.edu/Calculations/Flow_Rate.htm

[46] http://articles.extension.org/pages/58707/water-quality-in-aquaculture

[47] http://www2.ca.uky.edu/wkrec/AquacultureSiteSelection.htm

[48] https://specificmechanical.com/brewing-systems/brewery-building-requirements/

Appendix 4: Expanded SWOT assessment

Strengths

- Products
    - Most important according to VCEDA stakeholders:
        - Grazing animals/livestock
        - Cattle (beef cattle, cow calf, feeder)
        - Goats and sheep
        - Forest products (wood chips, hard and soft wood, timber, forest botanicals)
        - Forage and hay
        - Produce
        - Wine and craft beer
    - Most important agricultural products in terms of economic value (from the 2012 Agriculture Census)
        - Cattle – More than $72.2 million in sale, 2012
        - Hay (other forage/feed) $8.88 million in sales, 2012
        - Tobacco $1.95 million in sales, 2012
        - Corn (feed) $1.37 million in sales, 2012
        - Vegetables $860 thousand in sales, 2012
- Aggregation points
    - Coalfield Ag Center helps save about $5-10k annually vs. loading in Abingdon
    - Duffield Appalachian Harvest Center
    - Tri-cities livestock center
    - Other cattle load points (Kevin Slump Cattle)
- Beef Cattle
    - VQA program
    - Other feeder-cattle collection points
    - Suitable land and increasing interest in education for higher prices
- Business attraction
    - Low cost of living
    - Low labor costs
    - Available sites
- Education
    - Virginia Cooperative Extension programming and personnel, 4H in schools
    - SWCC implementing agricultural classes, interest from Mountain Empire
    - LMU Vet School
    - Desire to learn about new methods
- Land
    - Available land, suitable for livestock

    - Mine land suitable for greenhouses, aquaculture
- Labor
    - Available workforce
    - Transition from mining-type jobs to agricultural jobs
    - Entrepreneurial spirit

Challenges, barriers, threats, and weaknesses

- Education
    - Limited use of best management practices for forest landowners about sustainable practices and when/how to cut
    - Limited business planning assistance (VT used to have someone, but doesn't any longer. Some for-profit businesses have other motivations in advising producers – need unbiased source of assistance in creating business plans for agriculture)
    - Strong VCE programming and agents, but limited reach because of funding/personnel shortages
    - Availability of FFA teachers
    - Limited technical assistance for transferring production to alternative systems
    - Public perception of agriculture
    - Limited vocational ag education or FFA programs in high schools
    - Limited understanding of resources for producers outside of immediate area
- Access to land
    - Cost of land
    - Difficulty in land transfer (or older farmers leasing land to younger/new farmers)
- Aging farmers
    - Many landowners/farmers keeping land as "retirement" plan, but new farmers unable to pay expected prices
    - Land management to control invasive species
- Funding
    - Cost of land
    - Grants
        - Difficulty in finding matching dollars for existing grants
        - Difficulty in filling out grant applications
    - Producers who want to scale up or diversify face challenges because they lack the capital and startup money and many banks won't lend
    - Mindset that farming is not profitable
    - Funding for certifications
    - Funding for improvements (like fencing if you don't have an active stream)
    - Farmers need more help accessing funding and understanding what funding applies to them and how to apply for that funding

    - Long return on investment for higher value forest products and orchards (what do people do in the meantime?)
- Agricultural marketing
    - Closest VDACS person is in Wytheville
    - Perception that SWVA stops at Abingdon, businesses and consumers don't know about agricultural products grown west of Abingdon
    - Producers (non-beef) need help accessing markets, aggregating goods, etc.
    - Limited sales potential for locally-produced vegetables because of price
- Business attraction challenges
    - Water supply
    - Capacity of water treatment plants
    - Raw ingredients come from too far away
    - Chicken processors prefer to be in Shenandoah (but, they have a challenge with what to do with chicken litter there, which we would not have in SWVA if there was a plan to spread it on reclaimed mine land)
- Collaboration/aggregation
    - Some aggregation points, many require government funding
    - Some examples of collaboration – collaboration won't work in all communities
    - Some outsider/vs. insider mentality making it difficult for new farmers to become part of the community
    - Aggregation doesn't work for highly perishable produce
- Disease
    - Lack of animal welfare knowledge and some basic livestock management practices in some places
    - Invasive species – education and research both lacking
- Regulation
    - Limited number of certifiers/inspectors
- Labor
    - Work ethic
    - Knowledge
- Markets
    - Access and distance to markets
    - Lack of awareness of local markets
    - Limited cooperative marketing systems
    - Limited awareness of marketing opportunities
    - Limited time for direct marketing
    - Many produce stands don't have local produce (or a mandate for local produce), so South Carolina and Georgia products being sold at Virginia farm stands
    - Distance from urban markets, wealthier consumers
    - Limited reach of Appalachian Harvest, and perception

  - Niche products – find markets, but don't flood the market and bottom out the price
  - Local farmers markets – limited farmers willing to sell, and consumers willing to pay higher prices

Opportunities

- Reclaimed mine land
  - Aquaculture
  - Greenhouses
  - Poultry houses – chicken litter byproduct (demonstrated in Pennsylvania to be successful combined with waste paper mill sludge and composted poultry manure, then growing switch grass for biofuels – problem is limited market for biofuels, but there are facilities to do it in built by the Tobacco Commission)
- Improved pastureland
  - Brush control
  - Research on invasive species
  - Implementation of fertilization techniques for forage (could VCEDA pay for VCE programming/research into forage and fescue in SWVA? Doing some work there this fall in Southside)
- Attract multi-faceted industry with many input needs
- Attract outside capital (look at Grow Appalachia as an example)
- Cattle
  - Expand online sales
  - Increase participation in VQA program (need education and cooperation first)
  - Cooperative aggregation and selling
- Other livestock
  - Revive hare sheep association and explore additional buyer
  - Explore funding for USDA certified processing plant
  - Funding/education for using quality breeding stock
- Cooperatives
  - Land
  - Shared equipment (only applicable in certain communities for certain products)
- Marketing
  - Hire Agricultural marketing director to:
    - Increase profile of SWVA-grown agricultural products
    - Help current producers find markets
    - Help build business plans
    - Form cooperatives (together with VCE)
  - Distribution centers
- Education

    - Expand VCE programming to be implemented by SWCC
        - Master Cattleman's (feeder for VQA)
        - Beginning Farmer and Rancher
        - Others
    - Other community college programs
        - 2 year ag tech program partnered with VT
        - Viticulture program
        - Two year poultry science
        - 2 year aquaculture
        - Basics of agriculture and landscape management
        - Food inspector certification programs
    - Best practices for forage and feed
    - Sustainable land management practices to increase fertility and profitability
    - Greenhouses at local schools and school farms
    - Assist LMU in outreach for livestock owners (when to call a vet training, how to birth a calf, etc.)
    - Assist in Lee County Vocational education redesign (other counties may have the same)
- Funding
    - Funding for transitioning to organics, or other diversification efforts
    - Funding for certifications (GAAP, food processing)

<u>Potential Opportunities for Agriculture Sector:</u>

- Consumption changes suggest that consumers are switching away from canned and frozen produce towards fresh vegetables.
    - Potential for greenhouses or growth of production in berries/dark leafy greens
- Switching away from beef and fluid milk production
    - Large growth in yogurt and cheese consumption suggests farmers should look into expanding these operations.
        - A majority of dairy products imported are from Italy and France for cheese
- Chicken is growing and has been consistently growing, potential to utilize land for chicken houses
    - Both demand for broilers and eggs is growing
- Lexington and Louisville, Kentucky have seen an increase in the employment in food processing and manufacturing (2.93% and 1.19% growth from 1998-2015 for each economic area

respectively[49]), with a particular focus in specialty food and frozen food. Part of this is the amount of distilleries in the area but the majority of the form the expansion of frozen food processing. Knoxville, has seen an increase in this industry cluster (4.18% growth[50]). Nashville, TN is a large employer in this industry with 11,055 employed in this industry in 2015[51].

- VCEDA may have potential to provide inputs to these food processing center. Need to better understand the demand of the companies in this area.

Potential Industrial/Commercial Agriculture Opportunities:

Consumption trends represent future spending and demand for agricultural products. VCEDA has the opportunity to benefit from the regions natural resources in the area including land, water, and forestry. Part of this opportunity is shifting or diversifying towards agriculture practices aligned with consumption patterns. Though the region may not have the natural resource base to competitively produce certain crops (citrus or almonds) or use specific agriculture production technique (field crops), there are several alternative agriculture production and processing operations to expand current production, add value to the regions agriculture products, and take advantage of unique assets within the region.

Several agriculture products and productions facilities that have potential for VCEDA are; Commercial Greenhouses, Chicken Houses, Aquaculture production facilities, and frozen fruit/vegetable/meat packaging facilities. Smaller Greenhouses, chicken houses, and aquaculture operations can be carried out on individual farms given farms natural resources. However, VCEDA farmers and economic developers may seek to invest in larger production facilities in order to expand opportunities for producers. Each facility has specific site requirements that require investments in order to establish a facility. Moreover, food processing facilities have particular food safety guidelines to consider in order to obtain certification or qualify to sell food products. Below are general site characteristics for the specific opportunities.

General Site Requirements for Greenhouses:

- Land requirements: minimum 2 acres of land
- Water needs to be clean and general estimates for water requirements are .3-.4 gallons/day/sq ft of growing space.
- Topography: Slight slope south facing (optimal sunlight) or 1%-2% slope land will reduce grading costs. Best practice state that greenhouse should be placed on a 6'' to 12'' above grade on a gravel base. In addition slight slope allows for run-off of rainwater.
- Orientation is key and depends on production schedule (year round vs. seasonal)

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[49] Source: U.S. Cluster Mapping. Retrieved from http://www.clustermapping.us/cluster/food_processing_and_manufacturing#related-clusters

[50] Source: U.S. Cluster Mapping. Retrieved from http://www.clustermapping.us/cluster/food_processing_and_manufacturing#related-clusters

[51] Source: U.S. Cluster Mapping. Retrieved from http://www.clustermapping.us/cluster/food_processing_and_manufacturing#related-clusters

- Utilities requirement for heating and cooling system. Design is key in this aspects as cooling or heating costs can be reduced by taking advantage of natural ventilation
- Protection or barriers from high-wind that could damage structure

Greenhouse Construction Resources:

- University of Massachusetts Amherst (2016). Greenhouse Best Management Practices (BMP) Manual. Retrieved from https://ag.umass.edu/greenhouse-floriculture/greenhouse-best-management-practices-bmp-manual

General Site Requirements for Chicken houses (Broiler and Egg Production):

Egg Production

- About 1.5 square feet of floor space per a bird.

General Site Requirement of Aquaculture:

- Abundant source of quality water that can be either surface or underground water sources. Water needs to be tested before site

Reclaimed Coal Mines:

A unique asset to the VCEDA region is the presence of reclaimed coal mines. There are several constant characteristics of coal mines that present opportunities for agriculture operations. These include:

- Cleared of forest allowing for operations dependent on optimal sunlight (i.e. greenhouse)
- Sites are leveled or have slight slopes, which lowers costs associated with grading
- Sites have access to roads and infrastructure associated with transporting coal (quality is important; accessible for workers vs wholesalers' trucks)
- Sites tend to be far away from housing and other businesses, therefore set-backs are a nonissue (water resources, residential areas, other agriculture)
- Again mines are away from other agriculture activities, reduces the chances of agriculture runoff
- Located in elevated areas which reduces the risks of flooding
- Often located near water (generally streams), which is a key input for agriculture operations (i.e. greenhouse or aquaculture)

Reclaimed coal mines do have potential drawbacks for agriculture operations or business opportunities including:

- Regulations specific to reclaimed mines may not allow for agriculture facilities or industrial sites
- Little to no topsoil, meaning investments in replenishing topsoil or having operations in raised beds from soil from other places.
- Leftover pollution and contaminants from the mining operations, including in soil and water resources
- Though there is a presence of roads how accessible are the roads (are roads accessible by passenger cars?)
- Many agriculture operations require heating and cooling system along with pumps and may require access to utilities (there is potential for solar panels)

Taking advantage of reclaimed coal operations for agriculture operations, will take considerable coordination across multiple stakeholders. There is research and resources that have evaluated site characteristics of several coals fields in the region. An ARC-funded study conducted site evaluations of 14 reclaimed coal operations in the region (*'Healing Our Land, Growing Our Future')* that outline potential agriculture operations that can be utilized in the region.

Appendix 5: Domestic Consumption Trends and Imports

Consumptions trends illustrate potential opportunities for farmers in the VCEDA region to both expand current production, diversify by planting a different variety of produce or livestock, or new farmers to decide what to plant. Trend data can help educate farmers on current food markets and where they are heading. As food preferences changes on a national level, spending habits and markets adapt. The brief data summary below, can help the region as a whole assess opportunities for collaboration and help producers make decisions, and further marketing information should be collected by stakeholders in the region.

Looking at domestic consumption trends over the past two decades, there exist several shifts in demand for agricultural products that has potential implication for farmers in the VCEDA region. U.S. consumers are consuming less red meats (pork and beef), fluid milk, processed produce (fruits and vegetables) and some dairy products (for example processed cheese). [52] Consumption has increased for chicken meat and eggs, some fresh vegetables and fruits, and for several specialty dairy products (cheese and yogurt). Moreover, these increases in demand have spurred growth in imports for all agriculture commodities previously mentioned.

Within fresh vegetable consumption there has been an increase demand for the dark leafy greens (+77%)[53], with increases in spinach (+57%), broccoli (+46%), romaine lettuce (+88%), and kale (+37%) consumption (Figure 1). [54] In addition, there has been an increase in demand for sweet potatoes, bell peppers (+59%), dry peas (+832%), garlic (+27%), squash, asparagus (+82%) and legumes (broadly defined).[55] In general, consumers are demanding less canned, frozen, dried vegetables, but consuming more vegetable chips. This increase in fresh vegetable demand has been met with increases in imports from other countries, for all vegetables (+182% increase in millions of lbs. of imported vegetable products).[56]

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[52] We use food availability as a proxy for consumption. Food availability is the supply of that particular commodity in any given year. This figure includes imports (+), exports (-), and non-food uses (-).

[53] Percent increases and decreases with be in the parenthesis followed by a + or – sign, depending other whether there was a growth or decline consumption.

[54] All growth figures are growth from 1995 – 2015 of per capita lbs. food availability, unless otherwise noted. Source: U.S. USDA, ERS (2017). Food Availability (Per Capita) Data System. Retrieved from https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/

[55] *Ibid*

[56] *Ibid*

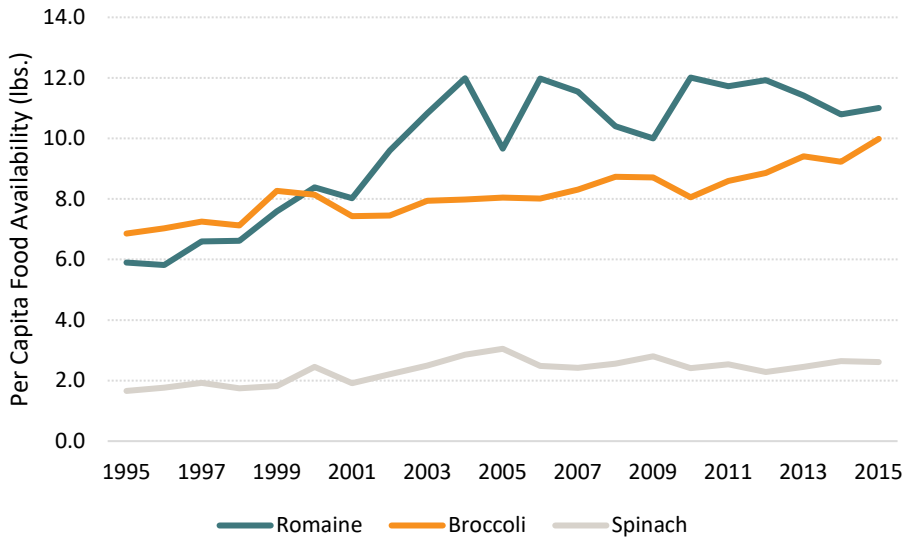


Figure 1. Per Capita Food Availability of Romaine, Broccoli, and Spinach, 1995 – 2015

Fruit products there have experienced a decline (-8%) in per capita consumption since 1995. However, demand for frozen (+20%) and fresh fruit (-9%) has increased. Of the fruits that may have potential for growth in the VCEDA region, demand for apples has (+1%) and berries have experienced increases in consumption. Raspberries (+250%), strawberries (+80%), and blueberries (+188%) have all experienced growth in per capita food availability (Figure 2). All fruits mentioned have seen increase in imports over the same time period.

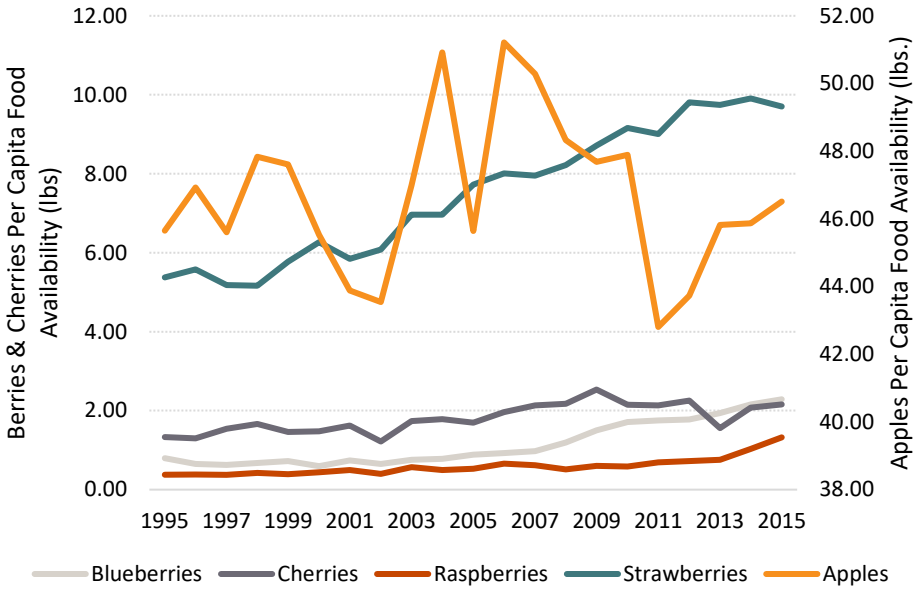


Figure 2. Per Capita Food Availability of Various Berries, Cherries, and Apples, 1995 - 2015

USDA does not collect disaggregated data on organic consumption, but information on organic trade have shown an increase in exports of U.S. organic spinach, carrots, celery, onion, and strawberries.

Livestock products has seen shifts in consumption patterns. There has been an increase in demand for chicken products, both chicken meat (+30%) and eggs (+4% for eggs and +27% for processed eggs; Figure 3). Both beef (-19%) and dairy products (broadly defined) have experience a decline in consumption. Fluid milk has experienced a decline (+28%) in consumption, though per capita food availability of 1 percent milk has increased (+12%) over this time period. Cheese (+12%), yogurt (+139%), and sour cream (+42%) have all experienced growth in per capita food availability. The most popular cheese consumed domestically are American (+21%), Cheddar (+12%), than Mozzarella (+42%), and each experienced an increase in consumption form 1995 – 2015 (Figure 4). Pork has also experience a small decline in per capita food availability since 1995 (-4%).

Figure 3. Per Capita Food Availability of Meats 1995 – 2015

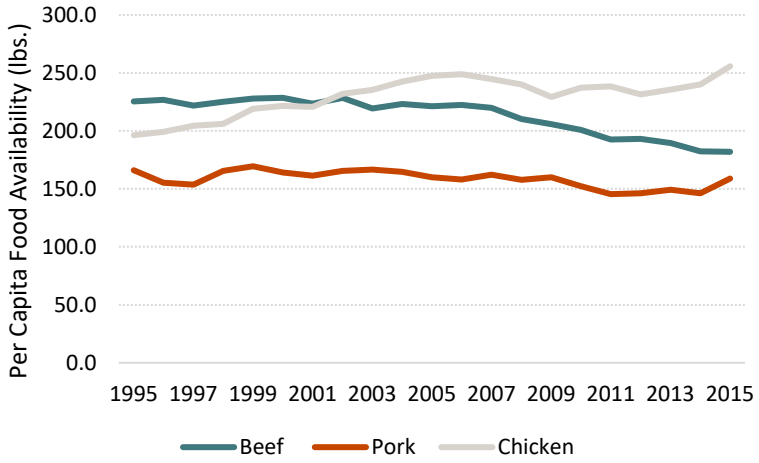
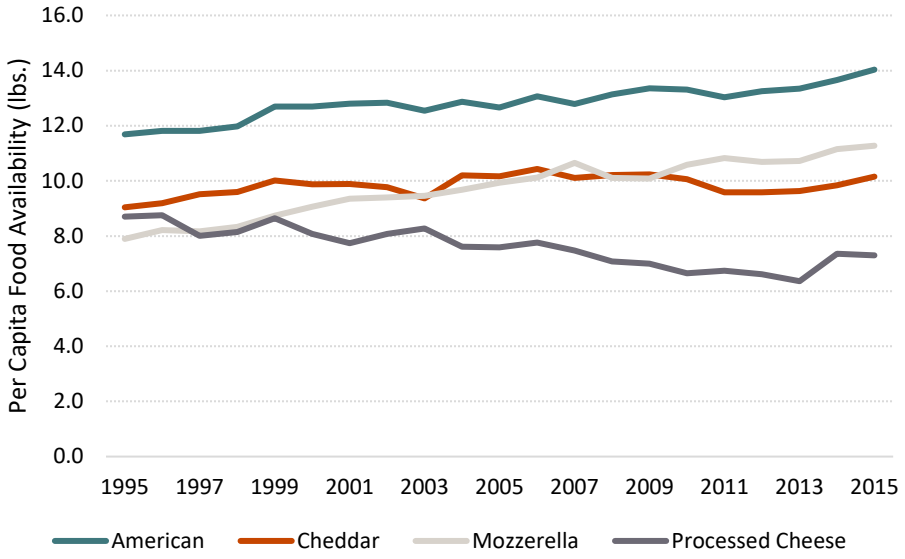


Figure 4. Per Capita Food Availability of Various Cheeses, 1995 – 2015



Appendix 6: Case Studies on Meat Processing Facilities in Virginia

In the process of conducting this strategic plan, the opportunity of bringing a large-meat processing facility was again and again discussed by community members. In order to outline the potential barriers and provide examples approaches in creating a meat processing facility, OED researched other meat processors in Virginia. Table 1 lists the location, size capital costs (private), capacity (how many animals can be processed per a day), public funds, and number of employees for three separate meat processors throughout Virginia.

Table 15: Location, Capital Cost, Additional Public Funds, and Number of Employees of Various Meat Processors in Virginia[57],[58],[59]

	Seven Hills	Allegany Meats	Landcrafted Food Co.
Location	Lynchburg, VA	Monterey, VA	Independence, VA
Size	40,000 sq. ft.	3,000 sq. ft.	7,000 sq. ft.
Capacity	75 – 100 Cattle a day	7 Cattle a day	Unknown
Capital Funds	$3 million	$1.8 million	$2.1 million
State or Local Funds	-$250,000 from AFID -$250,000 matching grant from Lynchburg EDA	- $50,000 from AFID - $45,000 Tobacco Region Opportunity Fund	-$480,000 loan from USDA-Rural Development
Number of Employees	22	11	8

<u>Seven Hills Food:</u>

[57] Sources: News Advance, Work It, Lynchburg (2014). *Seven Hills Food will reopen meat processing plant in Lynchburg*. Available at http://www.newsadvance.com/work_it_lynchburg/news/seven-hills-food-will-reopen-meat-processing-plant-in-lynchburg/article_177709e6-86e7-11e4-88be-4b4ed964c78a.html. Virginia Community Capital (VCC; 2017). *Strengthening Local Food Systems in Lynchburg, VA*. Available at http://www.vacommunitycapital.org/news/2017/08/29/strengthening-local-food-systems-lynchburg-va/

[58] Allegany Meats (2012). *Ag Center to Trade as Alleghany Meats*. Available at http://alleghanymeats.com/2012/03/30/ag-center-to-trade-as-alleghany-meats/. Allegany Meats (2016). *Ag Center Board Reflects on Changes, Challenges*. Available at http://alleghanymeats.com/2016/04/09/ag-center-board-reflects-on-changes-challenges/.

[59] Sources: WJHL (2017). *Grayson County, VA farmers open new meat manufacturing facility*. Available at http://wjhl.com/2017/07/18/grayson-county-farmers-open-new-meat-manufacturing-facility/. Landcraft Food Company (2017). *Introducing Landcrafted Food*. Available at http://landcraftedfood.com/introducing-landcrafted-food/

The largest of the meat processing facility researched and was started by an entrepreneur that had several butcher shops located throughout Central Virginia. Seven Hill Foods purchased a closed meat processing facility in downtown Lynchburg and invested a reported $3 million in capital funds to revitalize the facility. In addition to these capital funds, the business venture received funds from Agriculture and Forestry Industries Development (AFID) and a matching grand from Lynchburg EDA. The facility wholesales it processed meat, to restaurants and grocery stores throughout Central Virginia and as far as Washington D.C. The company has a mission of serving local producers and consumers, and works with both large and small producers throughout the region. Initially the company reported to process 12,000 beef and hogs over a 3 year period, and has expanded from a reported 15 to 22 employees. Seven Hills Food company can be an example for the VCEDA and could potentially serve current producers finishing their meat in the region.

Website: www.sevenhillsfood.com

Alleghany Meats:

This facility is the smallest of the facilities researched, however is located in a region with similar geography and isolation from large markets. The facility is a partnership from producers and stakeholders from four neighboring counties including Bath (VA), highland (VA), Pocahontas (WV), and Pendleton (WV). Capital funds were pulled together from over a reported 90 individuals who owned shares in the facility, and additional funding was received through the USDA Rural Development grant (the USDA grant required partnership with the Highland Telephone Cooperative). A feasibility study was conducted in process of establishing the facility. Initially the facility was manage by a five-member board and has had marketing help from a local non-profit call the Highland Center. The facility is USDA certified and also has the ability for producers pay for a humanely treaded animal certification. Initially the meat process started out serving local producers that would bring their livestock to get process for either home consumption or for direct sales, however recently the facility opened up a retail store that sell to the wider community. Operating a small facility has come with many hurdles, including repaying the loan from USDA, in order to pay the annual payments of $64,000 the facility sold additional shares to the public.[60] Allegany Meats may be smaller than the hopes expressed by regional community members, however their approached in management, marketing, and funding serve as a potential example for the VCEDA region.

Website: www.alleghanymeats.com

Landcrafted Food Company:

Landcrafted Food Company is a snack meat company that recently completed the construction of a USDA certified meat processing facility. The construction and company is supported by a

[60] Alleghany Meats (2016). *Ag Center Board Reflects on Changes, Challenges*. Available at http://alleghanymeats.com/2016/04/09/ag-center-board-reflects-on-changes-challenges/

grass-fed beef company, the River Ridge Land and Cattle Company, located in Grayson County. The company wholesales grass-fed beef snacks local, nationally, and capable of selling internationally. Capital funds for the facility were a reported $2.1 million, with funding received from AFID and the Tobacco Region Opportunity Fund. Currently, Landcrafted Food Company employs 11 full-time individuals. Landcrafted Food Company can serve as a regional resource for how to develop and fund a meat processor.

Website: www.landcraftedfood.com

Appendix 7: Economic Impact BQA Feeder Program and Expansion of the Program

As outlined in the report, VCEDA could expand resources to increase participation in the Virginia BQA feeder program to both benefit current livestock owners and promote economic growth in the region. To illustrate the current and potential future economic impacts of the program, OED conducted an economic impact assessment using IMPLAN.

A key question to ask when conducting an economic impact analysis is whether the money would be in the regional economy in the absence of the activity (BQA program). Calves that are BQA certified received a premium at market compared to non-BQA certified calves, showing this money is due to the program. Moreover, feeder cattle in VCEDA are generally purchases by operations in the Midwest. Thus, the premiums received are from outside regional sources and go directly to the farmers. There are direct economic impacts from the extra cash received per calf, and in turn, this money has indirect and induced effects as farmers use this increase in incomes to reinvest in farming operations (for example hiring an additional worker or buying more calves) and make other purchases in the regional economy.

In order to calculate both the potential annual economic impact of the current program and projected impacts from expansion of the program the inventory of feeder cattle in the region is needed. Table 1 lists the inventory of cattle and calves, beef, cows, and milks cows for all the counties in the region. The last column of Table 1, is an estimated number of feeder cattle in the region which is constructed by subtracting the number of beef and milk cows from the column with all cattle & calves in the region. At the beginning of 2017 there were 78,800 feeder cattle throughout VCEDA.

Table 16: January 1, 2017 Inventory of Cattle and Calves, Beefs Cows, Milk Cows, and an Estimated Inventory of Feeder Cattle for the VCEDA Counties[61]

	All Cattle & Calves	Beef Cows	Milk Cows	Feeder Estimate
Buchanan	600	400	_	200
Dickenson	1,400	(D)	_	(D)
Lee	26,500	12,800	100	13,600
Russell	52,000	21,000	200	30,800
Scott	26,500	13,800	200	12,500
Tazewell	34,500	12,100	700	21,700

[61] United States Department of Agriculture, National Agricultural Statistics Service (USDA-NASS; 2017). *Cattle County Estimates – January 1, 2017*. Available at https://www.nass.usda.gov/Statistics_by_State/Virginia/Publications/County_Estimates/Cattle17_VA.pdf. Note: (D) signifies that data was not available

Wise	2,400	(D)	(D)	(D)
Total	**143,900**	**60,100**	**1,200**	**78,800**

In 2015, the average state-wide premium that BQA certified feeder cattle received was $82 per head. This price fluctuates depending on the market and has been reported to reach as high at $100 per head. Therefore, OED used three different scenarios for the current impact of the regional BQA program and the projected impacts of expanding the program; i) low premium of $60; ii) medium premium of $82; and iii) high premium of $100 per head.

Table 17: Estimated Annual Economic Impact of the Current BQA Program and Project Impacts of Expanding of the Program[62]

	Current Program			Expanded Program		
	$60	$82	$100	$60	$82	$100
Direct Effect	$236,400	$323,080	$394,000	$472,800	$646,160	$788,000
Indirect & Induced Effect	$133,864	$182,948	$223,107	$267,728	$365,895	$446,214
Total Economic Impact	**$370,264**	**$506,028**	**$617,107**	**$740,528**	**$1,012,056**	**$1,234,214**

Currently the BQA program has an annual economic impact between $370,264 - $617,107, or an average annual impact of **$497,800** to VCEDA regional economy. One of the strategies suggested in the report is to expand BQA programming throughout the region, and if the program was to double the amount of calves under BQA certification, it would bring on average **$995,599** to the region.

As outlined in the report, VCEDA could expand resources to increase participation in the Virginia BQA feeder program to both benefit current livestock owners and promote economic growth in the region. To illustrate the current and potential future economic impacts of the program, OED conducted an economic impact assessment using IMPLAN.

A key question to ask when conducting an economic impact analysis is whether the money would be in the regional economy in the absence of the activity (BQA program). Calves that are BQA certified received a premium at market compared to non-BQA certified calves, showing this money is due to the program. Moreover, feeder cattle in VCEDA are generally purchases by operations in the Midwest. Thus, the premiums received are from outside regional sources and go directly to the farmers. There are direct economic impacts from the extra cash received per calf, and in turn, this money has indirect and induced effects as farmers use this increase in incomes to reinvest in farming operations (for example hiring an additional worker or buying more calves) and make other purchases in the regional economy.

[62] It was assumed that 5% of feeder cattle estimated in the in Table 1 are currently under BQA certification. This rate was roughly the state wide rate in 2015.

In order to calculate both the potential annual economic impact of the current program and projected impacts from expansion of the program the inventory of feeder cattle in the region is needed. Table 1 lists the inventory of cattle and calves, beef, cows, and milks cows for all the counties in the region. The last column of Table 1, is an estimated number of feeder cattle in the region which is constructed by subtracting the number of beef and milk cows from the column with all cattle & calves in the region. At the beginning of 2017 there were 78,800 feeder cattle throughout VCEDA.

Table 18: January 1, 2017 Inventory of Cattle and Calves, Beefs Cows, Milk Cows, and an Estimated Inventory of Feeder Cattle for the VCEDA Counties[63]

	All Cattle & Calves	Beef Cows	Milk Cows	Feeder Estimate
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Lee	26,500	12,800	100	13,600
Russell	52,000	21,000	200	30,800
Scott	26,500	13,800	200	12,500
Tazewell	34,500	12,100	700	21,700
Wise	2,400	(D)	(D)	(D)
Total	**143,900**	**60,100**	**1,200**	**78,800**

In 2015, the average state-wide premium that BQA certified feeder cattle received was $82 per head. This price fluctuates depending on the market and has been reported to reach as high at $100 per head. Therefore, OED used three different scenarios for the current impact of the regional BQA program and the projected impacts of expanding the program; i) low premium of $60; ii) medium premium of $82; and iii) high premium of $100 per head.

Table 19: Estimated Annual Economic Impact of the Current BQA Program and Project Impacts of Expanding of the Program[64]

	Current Program			Expanded Program		
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Direct Effect	$236,400	$323,080	$394,000	$472,800	$646,160	$788,000
Indirect & Induced Effect	$133,864	$182,948	$223,107	$267,728	$365,895	$446,214
Total Economic Impact	**$370,264**	**$506,028**	**$617,107**	**$740,528**	**$1,012,056**	**$1,234,214**

[63] United States Department of Agriculture, National Agricultural Statistics Service (USDA-NASS; 2017). *Cattle County Estimates – January 1, 2017*. Available at https://www.nass.usda.gov/Statistics_by_State/Virginia/Publications/County_Estimates/Cattle17_VA.pdf. Note: (D) signifies that data was not available

[64] It was assumed that 5% of feeder cattle estimated in the in Table 1 are currently under BQA certification. This rate was roughly the state wide rate in 2015.

Currently the BQA program has an annual economic impact between $370,264 - $617,107, or an average annual impact of **$497,800** to VCEDA regional economy. One of the strategies suggested in the report is to expand BQA programming throughout the region, and if the program was to double the amount of calves under BQA certification, it would bring on average **$995,599** to the region.

Appendix 8: Resource Guide

The following resource guide provides information on funding agencies, examples of organizations, and potential educational material for the strategies presented in the strategic plan. Resources were categorized according to the strategy they apply to, however there is a general agriculture section that has additional sources that can serve the agriculture sector in VCEDA.

Resources for enhancing support for agricultural development and marketing

Brickyard Educational Farm's Incubator Program
http://brickyardeducationalfarm.org/program-overview
This program provides technical assistance to farmers in access to land and costly equipment, and marketing. The incubator would supply beginning farmers with land, shared equipment and business strategy advice.

Community Food Projects (CFP) Competitive Grants Program
https://nifa.usda.gov/funding-opportunity/community-food-projects-cfp-competitive-grantsprogram
The CFP Competitive Grants Program funds community-based food and agriculture projects in the U.S. These projects are designed to help agricultural producers and low-income consumers in order to enhance neighborhoods' food and agriculture needs. These projects include infrastructure improvement and development, planning or innovative marketing activities.

Grants for Non-Profit organizations
https://www.farmaid.org/our-work/grant-guidelines/
These grants are awarded to qualifying nonprofit organizations that serve family farmers in growing the good food movement, helping farmers thrive, and/or taking action to change the system.

The Highland Center
http://thehighlandcenter.org/center-for-rural-entrepreneurship-partnership/
The Highland Center is a non-profit organization that provides various technical and marketing assistance for farmers. They have a Faces of Farmers program, they collaborate with the Alleghany Meats, and have a Highland Farmers' Market. The Highland Center also provides business incubation and community economic development programs.

Non-Recourse Marketing Assistance Loan Programs
https://www.fsa.usda.gov/programs-and-services/price-support/commodity-loans/non-recourseloans/index
The USDA's Farm Service Agency provides loan that allows producer to market crops when they choose. These loans help farmer and rancher with their cash flow needs while market prices are low.

Small Farmer Outreach, VSU Cooperative Extension
http://www.vsu.edu/pages/3167.asp
This project assist producers and ranchers to own, maintain and operate farms and ranches independently. The program provides assistance activities in production management, financial management, marketing and other areas in order to help farmers and ranchers to increase farm profitability.

USDA Transportation & Marketing Program

https://www.ams.usda.gov/about-ams/programs-offices/transportation-marketing-program
The USDA Transportation and Marketing Program provides support to local and regional food systems to connect consumers with local produce. Their programs assist through grants to help small- and mid-sized producer with marketing opportunities specifically with research, technical assistance, and grants.

VDACS marketing assistance
http://www.vdacs.virginia.gov/marketing-sales-and-market-development.shtml
The Office of Sales and Market Development assists Virginia's agricultural producers and processors market their products throughout the United States and Eastern Canada.

Virginia Beginning Farmer & Rancher Coalition Program (VBFRCP)
http://www.vabeginningfarmer.alce.vt.edu/
The program helps Beginning farmer and rancher through training, education, and technical assistance in topics such as production and management strategies, marketing strategies, legal strategies and productivity and competitiveness and sustainability of agricultural business.

Virginia Grown
http://www.vdacs.virginia.gov/vagrown/index.shtml
Virginia grown is a marketing program promoting fresh, local products to consumers. It offers point-of-sale materials, consumer publications and promotion throughout the year.

Virginia's Agricultural Commodity Boards
http://www.vdacs.virginia.gov/boards-virginias-agricultural-commodity-boards.shtml
Virginia's agricultural commodity boards enhance the sale of Virginia's farm commodities by conducting market development, promotional, educational and research programs.

Resources for promoting agricultural and financial education

American farmland Trust
https://www.farmland.org/
This organization provides technical assistance to farmers through education, advocacy, and networking.

Arcadia's Center for Food and Sustainable Agriculture
http://arcadiafood.org/
This program helps military veterans to participate in a hands-on agriculture training program. The program provides support and technical assistance in farm and nutrition education, food access and distribution, sourcing, and sustainable growing practices.

Collaborative Regional Alliance for Farmer Training (CRAFT)
http://chesapeakecraft.wordpress.com/
Chesapeake CRAFT improve practical new farmer training and networking in the region. It facilitates learning opportunities for farm apprentices, interns, and workers that emphasize successful ecological approaches to agriculture.

Farm Credit University
http://www.fcuniversity.com/home.aspx
This is a training program for farmers and ranchers combining online and traditional training resource.

Farmland Information Center (FIC)
http://www.farmlandinfo.org/
The FIC is a learning center for people working to save farm and ranch land that provide educational resources to help educate key audiences and answer requests for information.

Future Harvest - CASA (Chesapeake Alliance for Sustainable Agriculture)
www.futureharvestcasa.org
Future Harvest - CASA (Chesapeake Alliance for Sustainable Agriculture), is a non-profit, educational network of farmers, landowners, consumers and agricultural professionals. This group helps farmers find ways to use environmentally sustainable farming methods.

The Allegheny Mountain Institute
http://www.alleghenymountaininstitute.org/
The institute provides training in hands-on experience on a diversified farm and study food system issues.

The Beginning Farmer and Rancher Development Program
https://nifa.usda.gov/program/beginning-farmer-and-rancher-development-program-bfrdp
The National Institute of Food and Agriculture (NIFA) provides grants to organizations of the cooperative extension system that help beginning farmers and ranchers. NIFA's grants focuses on education, mentoring and technical assistance services.

The Sustainable Agriculture Research and Education (SARE)
http://www.southernsare.org/Grants
The SARE grants provide resources for researchers, farmers, educators and communities. There are various different grants categorized in research and education grants, large systems research grants, graduate student grants, professional development grants, On-Farm research grants, producer grants, sustainable community innovation grants, and the young Scholar Enhancement Grant. Also, SARE provides training programs, educational assistance and other professional development programs.

Resources for diversifying & differentiating

Beehive Grant Fund
http://www.vdacs.virginia.gov/plant-industry-services-beehive-grant-program.shtml
The Beehive Grant Fund provides resources to establish new beehives in the Commonwealth.

Emergency Assistance for Livestock, Honey Bees, and Farm-raised Fish (ELAP)
https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/emergency-assistfor-livestock-honey-bees-fish/index
Provides Emergency relief to producers of livestock, honey bees, and farm-raised fish. Covers losses from disaster such as adverse weather or other conditions covered by any other disaster program.

Farm Storage Facility Loan Program (FSFL)
https://www.fsa.usda.gov/programs-and-services/price-support/facility-loans/farm-storage/index
The USDA's Farm Service Agency provides low-interest financing so producers can build or upgrade facilities to store commodities such as grains, oilseeds, peanuts, pulse crops, hay, honey, fruits and vegetables to mention some.

Farmers Market Promotion Program
https://www.ams.usda.gov/services/grants/fmpp
The purpose of the Farmers Market Promotion Program (FMPP) provides technical assistance to farmers and ranchers in the development, improvement, and expansion of domestic farmers markets.

Local Food Promotion Program
https://www.ams.usda.gov/services/grants/lfpp
The Local Food Promotion Program (LFPP) offers planning and implementation grants. These grants support the development and expansion of local and regional food business enterprises to increase domestic consumption.

Microloans Program
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/microloans/index
The USDA's Farm Service Agency provides small operating loans. These loans is designed to serve small and beginning farmers, non-traditional, and specialty crops.

Rural Micro-entrepreneur Assistance Program
https://www.rd.usda.gov/programs-services/rural-microentrepreneur-assistance-program
The USDA's rural development programs provides microloans and technical assistance for microenterprise startups.

Specialty Crop Block Grant Program
http://www.vdacs.virginia.gov/sales-specialty-crop-competitive-grant-program.shtml
Specialty Crop Block Grant Program is designed to enhance the competitiveness of specialty crops such as fruits and vegetables, tree nuts, dried fruits, and horticulture and nursery crops to mention some. Grants are awarded to agricultural associations, industry and producer groups, community-based organizations and academia.

Value-Added Producer Grants
https://www.rd.usda.gov/programs-services/value-added-producer-grants
The USDA's rural development programs provides grants and funds that can be used for planning activities or for working capital expenses. These resources must be related to producing and marketing a value-added agricultural product.

Virginia Finest
http://www.vdacs.virginia.gov/vafinest.com/index.shtml
This trademark program enhances the economic opportunities and success of Virginia's specialty food and beverage companies. Participants accepted into the program may include the Virginia's Finest logo on their packaging.

Virginia Organic Certification Cost Share Program
http://www.vdacs.virginia.gov/sales-certified-organic.shtml
The Virginia Department of Agriculture (VDACS) support farmers interested the organic certification process. The program help producers by reducing the certification cost.

Virginia Tobacco Region Revitalization Commission
https://www.revitalizeva.org/

The commission funds strategic investments in projects that will diversify the long-term Agribusiness economy of Virginia's tobacco region. The funds are broken down into seven categories: research and development, special projects, tobacco region opportunity fund, Southwest and Southside economic development, agribusiness, and education. These funds can be used for smaller-scale projects such as fencing on agricultural properties.

Resources to expand meat processing

Animal Welfare Institute (AWI)
https://awionline.org/awi-quarterly/2014-winter/awi-grants-support-better-care-animals-farm
AWI audits, certifies, and supports farmers raising their animals according to the highest welfare standards, outdoors on pasture. Farm that are part of AWI certification program may be eligible for the Good Husbandry Grant program. This grant program fund farmers to improve animal's welfare through genetics or outdoor access among other criteria.

Livestock Indemnity Program (LIP)
https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/livestockindemnity/index
LIP provides benefits to livestock producers for livestock deaths in excess of normal mortality caused by adverse weather.

The Standard Reinsurance Agreement (SRA) and the Livestock Price Reinsurance Agreement (LPRA)
http://www.rma.usda.gov/pubs/ra/
The Federal Crop Insurance Corporation (FCIC) provides reinsurance and subsidies on eligible crop insurance contracts sold by the insurance company. Crop Insurance Providers in Virginia can be found at https://www3.rma.usda.gov/tools/agents/companies/2017/virginiaCI.cfm and Livestock Price Insurance Providers in Virginia can be found at
https://www3.rma.usda.gov/tools/agents/companies/2017/virginiaLPI.cfm

Virginia Tobacco Region Revitalization Commission
https://www.revitalizeva.org/grant-loan-program/grant-programs/agribusiness-grant-program/
The Agribusiness Grant Program through the Virginia Tobacco Region Revitalization Commission fund projects like commercial agriculture product processing facilities and community food processing facilities.

Resources for developing and supporting cooperatives

Virginia Tobacco Region Revitalization Commission
https://www.revitalizeva.org/grant-loan-program/grant-programs/agribusiness-grant-program/
The Agribusiness Grant Program through the Virginia Tobacco Region Revitalization Commission fund projects like wholesale and retail cooperative marketing.

United States Department of Agriculture Rural Development: Interagency Working Group on Cooperative Development
https://www.rd.usda.gov/about-rd/initiatives/interagency-working-group-cooperative-development
The interagency working groups bring together national and local cooperative agencies and works to promote cooperative programs and interests.

Creating Co-op Fever: A Rural Developer's Guide to Forming Cooperatives
http://www.uwcc.wisc.edu/info/sr54.pdf
The USDA developed a guide to forming cooperatives called Creating 'Co-op Fever'. The guide covers development, successful practices, information on the mechanics of cooperative development and organizational philosophy of cooperatives.

United States Department of Agriculture Rural Development: Co-ops 101
https://www.rd.usda.gov/files/cir55.pdf
This report was developed by the USDA Rural Development office and offers basic information on cooperatives, the use of cooperatives, and how to organize a cooperative.

Resources for reimagining reclaimed mine land, existing industrial sites

The Governor's Agriculture and Forestry Industries Development (AFID): Facility Grants
http://www.vdacs.virginia.gov/agriculture-afid-facility-grants.shtml
An AFID facility grant seeks to support or benefit a specific company. It is expected the grant will help to attract new or expand existing agriculture and forestry companies.

The Governor's Agriculture and Forestry Industries Development (AFID): Planning Grants
http://www.vdacs.virginia.gov/agriculture-afid-planning-grants.shtml
An AFID planning grant is designed to help localities to develop a strategy for agriculture and forestry. The grants may be used on develop a strategic plan, feasibility studies, and policies that promotes agritourist and local food systems.

General Agriculture Support

AgBiz Masters
http://www.agbizmasters.com/
AgBiz Masters provides hands-on business and financial management training to young and beginning farmers.

Alternative Farming Systems Information Center
https://www.nal.usda.gov/afsic
This system specializes in identifying resources about sustainable food systems and practices in support of USDA's effort to ensure a sustainable future for agriculture and farmers worldwide.

Appalachian Sustainable Development
http://asdevelop.org/farmers/
This non-profit organization provides technical assistance to farmers from land assessment to farm business and marketing plans.

Beginning Farmers and Ranchers
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/beginning-farmers-andranchers-loans/index
The USDA's Farm Service Agency provides loans provide credit opportunities to eligible family farm and ranch operators and owners who have been in business less than 10 years.

Black Belt Justice Center (BBJC)
http://blackbeltjustice.org/index.html
The BBJC provides legal services, research and policy, and community education and engagement activities.

BMP Tax Credit Programs
http://www.dcr.virginia.gov/soil-and-water/costshar3
This program helps agricultural producers with a conservation plan to take a credit against state income tax and implement agriculture best management practices.

Business & Industry Loan Guarantees
https://www.rd.usda.gov/programs-services/business-industry-loan-guarantees
The USDA's rural development programs provide guaranteeing of loans for private existing rural businesses that allow private lenders to extend more credit than they would typically be able to.

Conservation Reserve Enhancement Program (CREP)
http://www.dcr.virginia.gov/soil-and-water/crep
The program provides financial incentives, cost-share and rental payments to farmers who improve Virginia's water quality and wildlife habitat through agriculture best management practices.

Conservation Stewardship Program (CSP)
https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/
This program provides financial and technical assistance to owners of land in agricultural production in order to increase their business productivity and protect the value of their land while promoting the best conservation practices.

Direct Farm Ownership Loans
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-ownership-loans/index
The USDA's Farm Service Agency provides direct loan in order to purchase or enlarge a farm or ranch, construct a new or improve existing farm or ranch buildings, and for soil and water conservation and protection purposes.

Direct Operating Loans
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-operating-loans/index
The USDA's Farm Service Agency provides loans for farmers in order to purchase items such as livestock, farm equipment, farm chemicals, insurance, and family living expenses. In addition, it may be used for small improvements or repairs to buildings and general farm operating expenses.

Emergency Loans
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/emergency-farmloans/index
The USDA's Farm Service Agency provides loans to help farmers and ranchers recover from production and physical losses. The USDA consider emergency loans due to drought, flooding, other natural disasters or quarantine.

Environmental Compliance Assistance Fund (ECAF)
http://www.deq.virginia.gov/Portals/0/DEQ/Air/SmallBusinessAssistance/AutoBody/Appendix13.pdf
ECAF provides existing Virginia businesses with financing for to implement voluntary agriculture best management practices.

Environmental Quality Incentives Program (EQIP)
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelprdb1044009
This program serves owners of land in agricultural production who are interested in implementing conservation practices in order to improve natural resources on agricultural land.

Farm and Ranch Land Protection Program (FRPP)
http://dof.virginia.gov/land/easement/dev-rights-purchase.htm
FRPP provides financial and technical assistance to help conserve agricultural lands helping farmers to purchase agricultural land or wetland reserve easement.

Farm Credit http://www.farmcreditofvirginias.com/home.aspx;
https://www.fcsamerica.com/products/youngbeginning
http://www.farmcreditnetwork.com/about/overview
Farm Credit offers a variety of rural loans, leases, financial services, business planning assistance and risk management products to farmers, ranchers and rural businesses.

Farm Labor Housing Direct Loans & Grants
https://www.rd.usda.gov/programs-services/farm-labor-housing-direct-loans-grants
The USDA's rural development programs provide loans and grants for the construction, improvement, repair and purchase of housing or buying and improve land for domestic farm laborers.

Farmer Veteran Coalition (FVC)
http://www.farmvetco.org/
FVC is a national nonprofit organization that assists military veterans interested on careers in agriculture.

Farmland Preservation
http://www.vdacs.virginia.gov/conservation-and-environmental-farmland-preservation-tools.shtml
Purchase of development rights (PDR) programs are designed to compensate landowners who voluntarily place an agricultural conservation easement on their property.

Farm-to-consumer Legal Defense Fund
http://www.farmtoconsumer.org/
The Fund helps farmers and consumers providing technical assistance through legal counseling, lobbying, and litigation.

Guaranteed Loans
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/guaranteed-farmloans/index
The USDA's Farm Service Agency provides guarantee loan to family farm operators and owners who do not qualify for standard commercial loans. Financial institutions receive additional loan business and servicing fees in order to give farmers credit at reasonable terms for operating expenses or business expansion.

International Trade Initiative
http://www.virginiasbdc.org/programs/passport-to-global-markets/

The Virginia SBDC offers training seminars to help companies mitigate risks, identify and prioritize markets, grow your international sales, and finance your exports.

Lost Adjustment Standards Handbooks (LASH)
https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/loss-adjustmentstandards-handbooks/index
This program assist farmer in case of crop loses when there is a crop insurance provision. Every state specify which crops are covered.

Minority and Women Farmers and Ranchers
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/minority-and-womenfarmers-and-ranchers/index
The USDA's Farm Service Agency provides loans support minority and women farmers to buy and operate a farm or ranch.

Multi-Family Housing Rental Assistance
https://www.rd.usda.gov/programs-services/multi-family-housing-rental-assistance
The USDA's rural development programs provides payments to Farm Labor Housing projects on behalf of low-income tenants unable to pay their full rent.

National Young Farmer Coalition
http://www.youngfarmers.org/
This non-profit organization provides technical assistance to young farmers.

Natural Capital Investment Fund
http://www.conservationfund.org/what-we-do/natural-capital-investment-fund
NCIF supports locally owned enterprises in Central Appalachia. NCIF provides financing services for sustainable agriculture needs in order to grow and expand.

Nature Conservancy
http://www.nature.org
The Nature Conservancy helps farmers and ranchers access federal and state conservation programs, and advise on how to monitor and manage environmental impacts of various types.

Noninsured Disaster Assistance Program (NAP)
https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/noninsured-cropdisaster-assistance/index
This program provides financial assistance to producers of non-insurable crops to protect against natural disasters.

Rural Business Development Grants
https://www.rd.usda.gov/programs-services/rural-business-development-grants
The USDA's rural development programs provides grants to public entities and private nonprofit corporations to facilitate the development of small enterprises in rural areas.

Rural Business Investment Program (RBIP)
https://www.rd.usda.gov/programs-services/rural-business-investment-program

The USDA's rural development programs provide licenses to newly formed venture capital organizations to help meet the equity capital investment needs in rural communities.

Rural Cooperative Development Grant Program
https://www.rd.usda.gov/programs-services/rural-cooperative-development-grant-program
The USDA's rural development programs provides grants to non-profit organizations for establishing and operating centers for cooperative development. These grants focuses on the development of new cooperatives and improving operations of existing cooperatives.

Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Loans & Grants
https://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energysystems-energy-efficiency
The USDA's rural development programs provides guaranteed loan financing and grant funding to agricultural producers and rural small businesses for renewable energy systems. This program seek agriculture producers can decrease energy costs and develop energy efficiency improvements in their operation.

Rural Energy Savings Program
https://www.rd.usda.gov/programs-services/rural-energy-savings-program
The USDA's rural development programs provides small businesses with loans to implement durable cost-effective energy efficiency measures.

SBA Small Business Loans
https://www.sba.gov/loans-grants/see-what-sba-offers/sba-loan-programs
These loans helps agricultural businesses in order to starting, acquiring and expanding. There are several types of loans including microloan programs, Disaster Loans, Real Estate & equipment Loan and Small Business loans.

Small Business Innovation Research Program (SBIR)
https://nifa.usda.gov/program/small-business-innovation-research-program-sbir
The SBIR are grants awarded to small businesses to support advanced concepts research in agriculture that could lead to significant public benefit.

Socially-Disadvantaged Groups Grant
https://www.rd.usda.gov/programs-services/socially-disadvantaged-groups-grant
The USDA's rural development programs provides technical assistance to socially disadvantaged groups through cooperatives. Grant funds must be used for feasibility studies, business plans, strategic planning and leadership training to socially disadvantaged groups in rural areas.

Start2Farm.gov
http://www.Start2Farm.gov
Start2Farm.gov is an online database connecting beginning farmers and ranchers with available programs and resources created by USDA's National Agricultural Library, in partnership with the American Farm Bureau Federation.

Sustainable Agriculture technical assistance for farmer and ranchers
https://attra.ncat.org/index.php

This website presents resources such as a list of internships and apprenticeship, educational publication and technical assistance for farmers and rancher.

The Farm Bureau® Rural Entrepreneurship Challenge
http://www.strongruralamerica.com/challenge/
The Farm Bureau® Rural Entrepreneurship Challenge is the first national business competition focused exclusively on rural entrepreneurs working on food and agriculture businesses.

The Small Farm Dream Course
http://www.pecva.org/small-farm-dream
This program offer education training on starting an agricultural operation and landowners opportunities to increase farmland accessibility.

The Virginia Agricultural Best Management Practices Cost-share Program (VACS)
http://www.dcr.virginia.gov/laws-and-regulations/lr8b
The Program's goal is to improve water quality in the state's streams, rivers, and the Chesapeake Bay. Financial and technical assistance are offered as incentives to carry out construction or implementation of agriculture best management practices.

The Virginia Farm Business Development (VFBD)
http://www.vdacs.virginia.gov/agriculture-virginia-farm-business-development-program%20.shtml
The Virginia Farm Business Development (VFBD) Program is a reimbursement grant designed to help farms and small agribusinesses engage in business planning, market research, succession planning, and other related activities.

Transition Incentives Program (TIP)
https://www.fsa.usda.gov/programs-and-services/conservation-programs/transitionincentives/index
The Transition Incentives Program (TIP) provides economic incentives to expiring Conservation Reserve Program (CRP) land owners, on the condition they sell or rent this land to a beginning farmer or rancher. The TIP provides an opportunity for beginning and socially disadvantaged farmers and ranchers to purchase their own land or rent land.

Tree Assistance Program (TAP)
https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/tree-assistanceprogram/index
The Tree Assistance Program provides financial assistance to qualifying orchardists and nursery tree growers.

Tricycle Gardens
http://tricyclegardens.org/
Tricycle Gardens is a non-profit organization that offer a training program that provide experiential and technical training in the field of urban agriculture.

VA Farm Link
https://farmlink.va-vdacs.com/
Virginia Farm Link is a program designed to help farmers and landowners providing individuals seeking farming opportunities with a method to demonstrate their farming commitment and retiring landowner that want their land to continue in agriculture operation.

Virginia Farm to Table Plan
http://virginiafarmtotable.org/virginia-farm-to-table-plan/
This initiative informs and integrates assessment, education, development of programs and infrastructure, policy and funding recommendations to address key issues facing farmers, food entrepreneurs, and communities.

Virginia Foundation for Agriculture, Innovation and Rural Sustainability
https://www.vafairs.com/
VA FAIRS is a not-for-profit foundation that provides technical assistance to Virginia's based rural agricultural enterprises. Assistance is provided in strategic planning, grant assistance, feasibility studies, business plan creation, and cooperative assistance.

Virginia small business financing authority (VSBFA)
http://www.vabankers.org/VSBFA
The VSBFA provides direct loans to business and banks including agribusiness. They provide microloans and finance equipment that will have quantifiably less impact on the environment or the business is seeking to implement voluntary agricultural best management practices.

Virginia Tobacco Region Opportunity Fund (TROF)
http://www.tic.virginia.gov/tobregionoppfund.shtml
The TROF grant program provide performance-based monetary grants to localities in Virginia's tobacco producing region. The TROF grant focus on assisting the creation of new business or existing business expansion.

Whole Farm Revenue Protection (WFRP)
http://www.rma.usda.gov/policies/wfrp.html
This program provides risk management safety net for all commodities on the farm under one insurance policy. This insurance plan includes farms with crops and livestock organic commodities.

Youth Loans
https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/youth-loans/index
The USDA's Farm Service Agency provides loans for young people who are participants of agricultural youth organization to finance educational, income-producing, and agriculture-related projects.