

A Study of

Small-Volume Red Meat Processing in Virginia

Prepared by:

Virginia Foundation for Agriculture, Innovation & Rural Sustainability

P.O. BOX 27552
RICHMOND VA 23261
804-290-1158
VAFAIRS.COM

VAFAIRS

Introduction

The Virginia Foundation for Agriculture, Innovation, and Rural Sustainability provides this study examining the Virginia and federal requirements for establishing a generic, small-volume red meat processing facility. The goal of this manual is to present the available information regarding the typical operation and establishment of a slaughter and processing facility, and a high-level look at associated economic costs and revenues for sample operations.

The information in this document comes from a literature and database search as well as the knowledge of the consultants' work in agriculture in multiple states in the region on numerous red meat projects in the past. The general literature consulted is included as resources throughout the document for further exploration. This manual delves into several topics relevant to the general operations of a meat slaughter and processing facility, including an overview of the national and Virginia red meat industries, as well as typical business operations for a facility.

Document Definitions:

USDA: United States Department of Agriculture

FSIS: Federal Safety Inspection Service

VDACS: Virginia Department of Agriculture and Consumer Services

Federally Inspected Plants: These facilitates have been inspected by the FSIS and products carry a federal inspection label. The inspection verifies that the animals were handled and slaughtered humanely, and that the meat is fit for human consumption. The facility and equipment are also inspected to ensure sanitary conditions are maintained.

State Plants: These facilities have been inspected by the state department of agriculture, or VDACS by a trained Meat & Poultry Inspector. Products from these establishments are labeled with an inspection legend. Products inspected under the State Inspection can be sold anywhere within Virginia but cannot be sold across state lines.

Custom Exempt Operator: A custom exempt operator is a slaughter and processing facility that processes livestock belonging to someone else for the exclusive use of that household, not for resale. This facility does **not** have a state or federal inspector on duty and the meat from these facilities are **not** considered state or federally inspected meats. These facilities are regularly inspected for overall sanitation, but the animals are not inspected for disease and soundness.

Talmadge-Aiken Plants: The USDA and select states have a cooperative agreement that allows state employees to conduct federal inspections, allowing those products to carry federal inspection labels and allowing products to be sold across state lines. The name for these type of inspected plants comes from the Talmadge-Aiken Act of 1962.

Mobile Slaughter Units (MSU): A mobile slaughter unit (MSU) is a self-contained slaughter and processing facility that can travel from site to site.

Table of Contents

Introduction 1
Document Definitions: 1
Executive Summary 6
Slaughter and Processing Facility Challenges 10
Challenges for Farmers Using a Facility 14
Strategies to Overcome Challenges 15
National Red Meat Industry 18
Table 1: National Red Meat Inventory by Total Head, 2000-2019 18
Table 2: Red Meat Production and Disappearance Forecast 19
Figure 1: Averages of U.S. Meat Consumption in Pounds Per Capita 20
Figure 2: Average Meat Consumption Per Capital by Product, in Pounds 20
Figure 3: National Red Meat Slaughter, Commercial Production, 2000-2019 21
Table 3: Top 10 Meat Processors (Ranked by 2019 Sales) 21
Figures 4 and 5: Slaughter Facility Density per County for Cattle Farms and Hog Farms 22
National Beef Industry 23
Table 6: United States Beef Industry Summary Data 24
Table 7: U.S. Cattle Inspected Slaughter 2004-2019 25
Figure 6: Steer, Heifers, and Beef Cow Inspected Slaughter Trends 26
Figure 7: Weekly Cow Slaughter 2014-18, 2019, Sept. 2020 26
Table 8: Cattle and Beef Prices and Production, Sept. 2020 27
National Sheep Industry 28
Figure 8: Percentage Growth/Decline of Sheep Industry in U.S. 28
Figure 9: National Sheep and Lamb Slaughter in Heads, 2000-2019 29
Table 9: Lamb Pricing and Production, Sept. 2020 29
National Goat Industry 30
Figure 10: Number of Goats per Type in U.S. 30
National Pork Industry 31
Figure 11: National Hog and Pig Slaughtered in Heads, 2000-2019 31
Table 10: Hog and Pork Pricing and Production, Sept. 2020 32
Impacts of COVID-19 33
Figure 12: COVID-19 Impact on Weekly Cattle and Hog Slaughter 34
Figure 13: Beef and Pork Live-to-Cutout Spreads 35
Figure 14: Beef Wholesale, Retail, and Farm-Gate Prices 35

Figure 15: Daily Percent Change in Grocery Store Foot Traffic 37
Virginia Red Meat Industries 39
Table 11: Red Meat Inventory in Virginia, 2000-2019 39
Figure 16: Red Meat Slaughter Commercial Production in Pounds, Virginia 2000-2019 40
Virginia Beef Cattle Industry 41
Table 12: Virginia Beef Cow Industry 2002-2017 41
Figures 17 and 18: Number of Beef Cattle and Beef Cattle Farms in Virginia 42
Virginia Swine Industry 42
Figures 19 and 20: Virginia Hog and Pigs Farms with Sales, Number of Hog Sold 43
The Virginia Sheep and Lamb Industry 43
Figures 21 and 22: Number of Sheep and Lambs; and Farms with Sheep and Lambs 43
The Virginia Meat Goat Industry 44
Figures 23 and 24: Meat Goat Inventory and Meat Goat Farms 44
Virginia Meat Processing 45
Figure 25: Virginia Inspected Processing Facilities, March 2020 45
Table 13: TA Slaughter and Processing Facilities in Virginia 45
Figure 26: Inspection Permit Requirements 47
Ownership Business Models 49
Legal Ownership Models 49
Figure 27: Types of Corporations 50
Table 14: Legal Structure Advantages and Disadvantages 52
Tax Structure 53
Slaughter and Processing Business types 55
Service Models 55
Figure 27: “Very Local” Processing Arrangement 56
Figure 28: “Local-Independent” Processing Arrangement 56
Figure 29: “Regional-Aggregated” Processing Arrangement 57
Table 15: Start Up Costs for Mobile Slaughter Unit 58
Table 16: Mobile Slaughter Units in Operation 60
Slaughter and Processing Facility Needs 62
Single Species vs. Multi-Species 62
Plant Scale Overview 62
Food Safety and Regulations 63
Transportation and Logistics 64

Location and Site Specifications....65
Table 17: Standard Requirements for Site Development....65
Figure 30: Sample Slaughter and Processing Plant Layout....66
General Slaughter and Processing Procedure Overview....68
Figure 31: Livestock Slaughter Flow Chart....69
Figure 32: Slaughter of Bovines and Small Ruminants....70
Figure 33: Cuts of Beef....72
Figure 34: Goat Meat Cuts....72
Figure 35: Hog Processing and Cuts....73
Equipment....75
Table 18: Typical Slaughter and Processing Equipment List....75
Human Resources....77
Figure 36: Processing Facility General Labor Hierarchy....77
Food Safety And Quality Control....81
Sanitation Standard Operating Procedures (SSOP)....81
Good Manufacturing Practices....81
Hazard Analysis Critical Control Point (HACCP)....82
Inspection....82
Worker Safety....82
Processing and Slaughter Operation Comparisons....84
Table 19: Meat Processing Facility Studies....85
Figure 37: Construction Analytics Building Cost Index....89
Table 20: Employment Cost Index Example 2006....90
Table 21: Employment Cost Index Example 2020....91
Figure 38: Producer Price Index-Machinery and Equipment....91
Figure 39: Consumer Price Index Annual Inflation....92
Facility Comparison Summary....92
Table 22: Facility Summary....93
Table 23: Multispecies Equivalency- Live Weight....93
Table 24: Facility Cost Comparison Overview....94
Cost Per Head Evaluation....94
Figure 40: Cost per Head Comparison- Small Facility....94
Figure 41: Cost per Head Comparison- Medium Facility....95
Job Creation and Labor Costs....96

Table 25: Jobs Figures 97
Figure 42: Average Total Labor Cost by Species 98
Table 26: Labor Costs as a Percentage of Yearly Revenue 98
Figure 43: Average Labor as a Percentage of Revenue 99
Figure 44: Labor and Facility Cost Comparison 99
Equipment Costs 100
Table 27: Equipment Costs 100
Figure 45: Equipment and Facility Cost Comparison 101
Figure 46: Labor and Equipment Cost Comparison 101
Head Comparisons 102
Table 28: Head Numbers 102
Facility Averages 103
Table 29: Facility Size and Expenses 103
Budget and Financial Model Examples 104
Beef-Only Financial Model 105
Table 30: Beef Only Pro Forma Operating Statement 105
Figure 47: Beef-Only Annual Costs 107
Multispecies Financial Model 108
Table 31: Multispecies Pro Forma Operating Statement 108
Multispecies Annual Costs 110
Figure 48: Multispecies Annual Costs 111
Facility and Equipment Financing 111
Table 32: Project Finance for Beef Only Equipment 112
Table 33: Project Finance for Beef Only Facility 112
Table 34: Project Finance for Multispecies Processing Equipment 113
Table 35: Project Finance for Multispecies Facility 114
Beef-Only and Multispecies Conclusions 114
Resources 116
General Meat Processing Resources 116
Profitability and Financial Planning Resources 117
Facility Design Resources 117
Inspection, Regulation, and Food Safety Resources 118
COVID-19 Resources 119
Potential Funding Sources 119

EXECUTIVE SUMMARY

The recent supply chain issues that were revealed in spring of 2020 with the nation's response to the COVID-19 outbreak have increased demand for local meats. In many instances, a bottleneck for access to these products have been the ability for producers to access inspected local slaughter and meat processing. In response to this need for processing services, farmers may seek cooperative efforts to implement small volume, red meat processing facilities in rural areas.

This document is intended to provide guidance and information for those seeking to implement a red meat processing facility. The following is an overview of key highlights for each portion of the document, followed by a discussion of the challenges often faced by a slaughter and processing facility.

Industry Background and Statistics

The red meat industries nationally and in Virginia have fluctuated over the years, especially in light of the impact that the COVID-19 pandemic has had on the slaughter industry. Data on these industries shows that the total inventory of red meat livestock species (beef cattle, hogs, goats, and lamb/sheep) have decreased since 2000 across all categories except for hogs. Total inventory of beef cattle in the United States decreased by 5.6%, inventory of sheep and lambs decreased by 25.6%, and inventory of meat goats decreased by almost 35%. The inventory of hogs, however, has increased by over 29%.

Production of red meat in Virginia have similarly decreased, except for sheep and lamb. The inventory of beef cattle in the commonwealth has decreased by 3%, while hogs and meat goats have also decreased by 20% and 26% respectively. The inventory of sheep and lambs, however, has increased by over 29% during the time-period between 2000 and 2019. The numbers of sheep and lamb increase is not nearly enough to make up the decline in beef and hogs, resulting in a decline in overall in red meat production in Virginia.

Red meat slaughter is up nationally, but down for Virginia. Nationally, the red meat slaughter has been on the rise over the past almost 20 years. By 2019, total red meat slaughter has reached 55 billion pounds, an increase of 19% over slaughter numbers in 2000. However, in Virginia, red meat slaughter has decreased significantly since 2000, dropping by almost 26% by 2019. Most of the slaughter and processing facilities located in Virginia are along Interstate 81, with most clustered in Northern Virginia.

Impacts on cattle and hog slaughter from the COVID-19 pandemic have mostly recovered, while prices have not. The number of cattle and hogs processed nationally experienced a large drop during March and April 2020 as many facilities adjusted to new guidelines to comply with new worker and safety requirements in response to the pandemic. Since then, slaughter numbers have started to align to previous years more closely.

Slaughter and Processing Facility Considerations

Handling and selling food products, such as processed meat, has significant legal liabilities and risks. Remaining compliant with regulations becomes even harder when operating a mobile slaughter unit, which will be limited based on the area and permits obtained. New and changing

safety and regulatory requirements in response to COVID-19 create additional hurdles. New processing and slaughter facilities must already comply with multiple regulations regarding food safety when handling meat products. In light of the COVID-19 pandemic, the CDC and FSIS have provided additional guidelines and regulations on worker and food safety that a facility will need to address. Local and state mandates may also affect the normal operations of a facility.

Additionally, unexpected changes in operations or lack of supply can cause sustainability issues for start-up operations. A new facility should always have a plan in place before starting operations, including a plan in case of drops in red meat production and inventory. Facility management should be prepared to address lack of cash flow during slow months as revenues will be lower, but expenses will still be incurred.

More considerations about the challenges faced by facilities can be found in the following section Slaughter and Processing Facility Challenges.

Facility Budget Examples and Comparisons

To provide an analysis of the financial requirements for a facility, the consultants conducted a comparison of different facility types based on feasibility studies and case studies on various proposed facilities. The comparison looks at seven studies on small-scale facilities and four studies on medium-sized facilities. The comparison discusses the number of jobs created for each facility, the expected yearly revenue, capital investment needed, and the amount of head processed for both beef and other species.

From the comparison of studies, the average number of jobs created for a small-scale facility is 7 jobs. These facilities processed, on average, about 1,554 head of beef cattle and 1,463 head of other species, such as hogs, goats, and sheep/lamb. The studies examined also indicated that the average yearly revenue for a small facility is just over $674,000 and requires a total capital investment of $1,334,778.

As expected, the average medium-sized facility from the studies examined is able to process more livestock and has higher yearly revenue, as well as creates more jobs. The average number of jobs created by a medium-sized facility is 19 jobs. These facilities also process, on average, 6,700 head of beef and 4,160 head of other red meat species. The yearly revenue for the average medium-sized facility is $2,741,413 and requires a total capital investment over almost $2,200,100.

The consultants conducted a financial model of six budget examples for a facility processing only beef, as well as a facility processing multiple species. From this analysis, the consultants found that beef and multispecies processing operations can be successful if certain conditions are met. Operations with only 1,000 head per year, both beef-only and multispecies, may struggle initially, with multispecies being in a more precarious position from the outset. Entrants into the market that may want to pursue one of these smaller operations should carefully consider the financial situation and producer situation in their region prior to pursuing this size facility.

As the amount of head processed yearly increases, the financial issues begin to diminish, leaving room for growth and reinvestment. Facilities processing 2,500 head yearly reach roughly

breakeven or slightly over breakeven from year one. Capital costs do increase for these operations compared to the 1,000 head but the increase in revenue makes up for these increased costs. Those facilities wishing to process 5,000 can expect mild financial success if conditions are right from year one, with room to grow significantly as the operation gets underway.

There are several hurdles that must be considered for these operations to succeed. Securing enough supply will be the most crucial. Without proper supply, it will not matter what the financial goals or how many head the facility can process. Additionally, these operations are initially capitally intensive, which may prove problematic. Even with low interest rates in today's economic environment, the overall cost for a small facility and equipment will be more than $1.5 million. Finally, while these facilities are quite expensive from a capital sense and are an upfront cost, the biggest yearly expense is labor. Labor in general can use up to 50% or more of sales in many cases but is an essential expense for the operation to function.

Resources

The information in this document comes from a literature and database search as well as the knowledge of the consultants work in agriculture in multiple states in the region on numerous red meat slaughter projects in the past. The sources used are cited throughout the document.

To provide further literature and materials on slaughter and processing information, a dedicated section with resources and case studies is included. This section provides a link to each source, as well as a short description of the type of information provided.

Slaughter and Processing Facility Challenges

Slaughter and Processing Facility Challenges

Starting and operating a slaughter and processing facility brings multiple challenges that are both common among starting any business, as well as unique to the specific industry. Any new venture must determine key feasibility points, either formally or informally, to decide on whether to proceed with a business idea. Such areas include whether the venture will be feasible considering economic, technical, financial, market, and management environments and conditions. These general categories entail numerous components that all must work together for a project to be feasible.

Multiple reports and feasibility studies discuss the challenges faced by slaughterhouses and processing facilities. Many of these challenges are the same across reports, as they are common across facilities typically without regard to size or specific model. These challenges have been synthesized here, but links to each study can be found in the Resources section of this document.

Access to capital and securing sufficient start-up capital

Depending on the level of construction needed to build and open a functional facility, any venture would require significant capital outlay. Having the necessary funds during the startup phase is crucial for any project or business. Owners for a new facility must determine all their startup costs and the sources of that funding before initiating the project. Sources of startup capital can include new business loans, funding from investors/ donors (if the facility is a nonprofit), owner equity, and federal or local grants.

Not only should owners identify the sources of funding, but also have then secured before investing in a building or equipment as many of these, such as grants or loans, depend on approval that could take months to receive. Often a figure of 50 percent equity along with 50 percent in loan funding is used as a good general rule of thumb for financing new ventures. Potential funding sources for working capital for a processing facility are provided in the appendix.

While startup funding is vital to the beginning stages of the facility, management will also need to determine how operations will be financial sustained in the future. Grant and loan funding can continue to assist in some capacity, but the facility should aim to self-sufficient to sustain operations long term. The capital invested would have a long-term return since processing facilities generally operate on slim profit margins per pound of processed product and depend more on volume and throughput for operating capital. Particularly in start-up operations, the venture would be vulnerable to a lack of inputs and need for services, due to existing players and a lack of beef cow inputs.

Facility Scale

From a survey of multiple studies conducted to determine the feasibility of a small-scale slaughter facility, it appears that most facilities of this scale require approximately 400-1,100 head of cattle processed in order to cover cost. This range is due to the variation in circumstances that are unique to each venture, including difference in existing infrastructure, market pricing, and other key factors.

Furthermore, it seems that the smaller a processing facility is, the more difficult it is for them to cover costs by finding a market for the entire carcass. Often, certain cuts or portions of meat have a ready market, but the disposal of the rest of the carcass can often prove problematic due to low volumes for small producers. These costs can mount to be prohibitive.

Labor and Management

Finding skilled management that is committed to the project or business is vital for new businesses. The facility owners should strive to find the management team for the business during the start-up phase to ensure that the team is capable and competent for the business. Facility owners should fully detail the expectations and duties of the management team and conduct a robust hiring process to find the most qualified candidates.

Along with finding skilled managers, facility owners will also need to ensure that they are providing adequate compensation to the managers for the expected level of work. Labor represents a large expense for facilities but is a necessary cost to maintain a skilled workforce. Underpaying or understaffing the management team could lead to early turnover and an unstable business.

Along with skilled management as discussed above, finding a skilled and committed labor force is another potential challenge. Some areas may have a larger pool of skilled laborers than others, especially if the facility is in the general area of other processors. Additionally, if the facility is processing multiple species, it will become harder to find laborers skilled in all areas, and additional training may be needed, further adding to labor costs.

Even if the facility can find skilled labor or provide training to laborers, keeping employees at the facility and reducing turnover is another issue. The cost to retain skilled labor is another factor to consider when planning for a facility; if the facility cannot afford to keep skilled labor, then it will not be able to retain skilled labor. Additionally, if the facility only uses seasonal labor, it becomes more difficult to guarantee that those trained employees will return for the next season.

Facility Site

The site or facility that is ultimately chosen for any venture such as this should take into consideration the locations accessibility, both in terms of moving and holding product for slaughter, as well as the ease of moving finished product to end customers.

The community surrounding a potential slaughter facility can often be an obstacle as well, the "Not In My Back Yard" attitude can provide significant community friction, particularly when a venture is attempting to get zoning and other local permits and permissions.

The location chosen for the venture would also have to consider zoning restrictions that may interfere or affect the day to day operations of the facility. The fact that slaughter takes place individually, while delivery of a load of cattle for slaughter would take place in masse means that facilities would need to encompass at least some sort of short-term holding area for groups of cattle intended for slaughter, as well as facilities to handle the resulting waste.

Water and wastewater are major inputs and outputs of slaughter and processing. Almost every step in the slaughter of live animals will involve water. From previously conducted estimates, many facilities utilize about 500 gallons of water for each animal slaughtered and processed. It is generally recommended that the facility have access to city or public water instead of a well. Public utilities generally requires that the water be treated for removal of fats and monitored for other waste products.

Because of the large amounts of waste and effluent products that are produced by any slaughter operation, there are numerous and varied regulations regarding wastewater and sewer treatment and disposal. Those interested in establishing such a venture should work closely with city and county officials to determine the costs of such infrastructure in order to accurately assess the ability of a site to serve as the location of a slaughter and processing plant.

The facility itself will need to implement an infrastructure specific to the clean and safe handling of live animals near food products being produced. Proper drainage and segmentation of the entire slaughter and processing process should be planned with the help of engineers and consultants as well as close cooperation with local and state level officials in order to assure the best chance of success.

The facility will need to be of sufficient size to operate efficiently at the level of production that is chosen to minimize cost and maximize the chance for profitability. Slaughter costs can vary by breed, largely due to the differing amounts of labor required to harvest each breed as well as highly variable carcass yields.

The potential owners of the facility will need to work with design experts to create a site-specific design that contains elements such as delivery, holding, killing areas, cooler and freezer storage, dry storage, employee facilities such as locker and shower rooms, break rooms, loading docks, and administrative offices.

In most cases, it is the functional issues rather than the specific layout of the facility that determines most of the costs of construction of a processing facility. Other costs like site preparation and permitting can account for a surprisingly large part of the cost. The option of refurbishing an existing facility for slaughter and processing may serve to reduce the capital cost of a facility and reduce the time necessary to begin operations.

Risks and Regulatory Obstacles

Any potential facility dealing with the slaughter and processing of live animals for human consumption will face significant risks and regulatory hurdles. Though it may be difficult to quantify a specific dollar value for these risks, specific risks must be considered by those interested in a possible venture to determine their own level of risk tolerance.

Because the slaughter and processing industry is hugely dependent on small margins and large volumes in order to achieve viability, the significant cost of capitalization for a new venture, particularly if the build out of a brand-new facility is involved can make profitability a long-term endeavor rather than short-term.

Dealing with food will produce significant legal liability risks, and insurance costs to cover the liability associated with raw meat handling can be prohibitive in certain situations. Many agencies require testing for multiple types of pathogens and contaminants in order to comply with regulations. Testing carries with it significant cost, both in the performance as well as the infrastructure that may be required in order to comply with regulations. Well known regulatory acts, agencies, and requirements include:

- Federal Meat Inspection Act
- Poultry Product Inspection Act (PPIA)
- United States Department of Agriculture
- Federal State Inspection Service
- Occupational Safety Health Administration
- Environmental Protection Agency

In addition to standard processing and slaughter regulations, should the venture decide to seek specific labels for their products such as "organic," "natural," or "humanely handled," these designations often carry with them their own legal and regulatory ramifications, and should be thoroughly investigated as part of the costs of any potential slaughter and processing operation.

Marketing

Promoting awareness of a venture such as a slaughter and processing facility would need enough funding, especially during the first years of operation, in order to capture the available demand for processing services. Failure to sufficiently market to producers in the area could result in a lack of cash flow for the facility, and ultimately, cessation of business.

Whether or not the facility considers building their own brand, or simply focusing on custom processing services for local producers, the venture will need to work to establish relationships in the region to secure steady processing inputs.

In any business, relationship marketing will need to be the core of promotion for a potential processing facility. Maintaining positive relations with producers supplying cattle for processing as well as purchasers of the processed end-product can increase revenue for the venture.

The cost of sufficient marketing tools and the ability of management and personnel to implement those tools in a meaningful way will be key to driving awareness of the facility. By gaining a reputation for consistency of product and reliability of operation, new customers can be encouraged to utilize the services offered by the facility.

Pricing

While it is generally assumed that locally produced and marketed products can capture a price premium when sold, these assumptions are subject to the variableness of consumer markets, and may change with little or no notice, thus jeopardizing a new venture with higher costs.

Continuity (over Seasonality)

Seasonality should be investigated, as this is a frequent cause of negative cash-flows for any business related to agricultural production. A potential venture must consider both the seasonality of demand, as well as the seasonality of supply of beef cows for slaughter and processing. Because of the lack of local level statistics regarding the number of beef cows

available for inputs for a local processing facility, a producer survey would need to be conducted in order to assess the input support that would be available for such a venture.

The potential owners would need to consider both the seasonality of demand for their services, as well as the seasonality of supply of cattle inputs. Birth and slaughter cycles are established by producers to allocate resources and provide the most efficient return. Any venture would need to ascertain this seasonality and its impacts on the venture, particularly regarding the negative cash flows that may result during offseason operation.

While it is hoped that the presence of a facility nearby would stimulate local producers to raise more beef cattle for local slaughter, it is not known if this would be the case. The venture would depend on a general increase in beef cow production intended for local slaughter in order to remain viable in the long term.

Any facility would have to address the concerns over their ability to provide year-round animal input for slaughter and processing, as well as supply any variances in seasonal demand for beef products.

Challenges for Farmers Using a Facility

In addition to the challenges faced by the processing facility, farmers also face challenges in producing and providing their livestock to the facility. These challenges include:

Distance of the farmers from the processing facility. Many farmers are not able to drive long distances to bring their livestock to a processing facility, not only is there a cost associated with the transportation, but also a time commitment that takes the farmer away from the business toward driving round trip. To many, the ability to access a processing facility that is close by that has the capacity to process all their animals is a major barrier for farmers.

Wait times at the facility and overall capacity. When a farmer can access and transport their livestock to a facility, many times the processor does not have the capacity to process all the animals needed and the farmer must find an additional facility to process the livestock. Additionally, if a facility has high demand for their services, the wait times to process livestock may increase, causing the farmer to be unable to process their animals in a timely manner to meat orders.

High costs of processing. The high costs associated with processing animals is another barrier and challenge that farmers must weigh when deciding where to process their animals. To reach some of the niche markets, like certified organic, farmers may also have to pay higher processing fees at a certified facility.

Lack of control over product and packaging. Using a third-party processing facility removes some of the control farmers have over the end-product, including the type and quality of packaging used. Some facilities may not be able to provide further processing and cut-up services, which means the farmer must conduct that themselves if they want to provide specific cuts to the market. Additionally, facilities typically only provide basic packaging with minimal

labeling. For direct-to-consumer markets, farmers may need to repackage or place different labeling on the product before it is sold.

Strategies to Overcome Challenges

The following are multiple potential strategies for overcoming challenges for slaughter and processing facilities and farmers supplying those facilities. These strategies are adapted from multiple studies. Links to all sources are provided in the Resource section.

Plan, Plan, Plan

Planning and research are the most important step before ever investing in a facility or beginning construction. This process may take time, but it will be worth it to the long-term success and sustainably of the project. Planning can include building a network of expertise within the industry and engaging with experts early; developing a feasibility study to analyze different aspects of the project; and developing a more in-depth business plan that outlines specific operations and projections.

One of the main reasons that a facility may fail or meet unexpected challenges including the ones listed above is due to insufficient planning from the beginning. Planning includes determining how the facility will operate during a startup phase and scale up to larger capacities as needed. Knowing the number of animals that will need to run through the facility, as well as costs, labor needs, and funding sources will help, but owners should also have a contingency plan if projections are not met.

While the initial planning is an important step, this planning process will need to continue as the business grows. By conducting the business planning and operations review process annually or at least regularly, then facility owners and management can determine if current operations and procedures are meeting client needs, as well as still profitable for the company.

Differentiate the Business

A slaughter and processing facility has different options for the overall business and service model, so finding a way to diversify the business and differentiate themselves in the market can help with long-term success. Strategies include:

- Obtain product certifications, such as organic, all natural, and animal welfare. Becoming a certified plant for one or all of these product categories can help expand the customer base for the facility, as well as increase the value of services and products.
- Develop and implement an on-site retail store. By offering an on-site retail store, the facility can either sell products under a facility-owned brand name, or under brands for other customers. This sales outlet could provide higher prices for products, as well as another market service for producers using the facility.
- Find creatives uses for non-prime cuts of meat. Finding a market or product use for less desirable cuts or offal can help reduce waste and provide additional income.
- Establish brand identity at the start of the venture. An established brand that moves into meat processing may have better success at finding market and customers for their products.
- Diversify customer outlets. This strategy will pertain more to facilities that are selling cuts versus facilities that are simply providing processing services and not maintaining ownership

of the meat. Knowing the markets providing products that would satisfy multiple markets will help a facility maintain sales if one market fails.

Know and Track Business Financials

During the planning process as discussed above, potential facility owners should conduct a full financial feasibility assessment, as well as financial projections under a business plan. These financials will help with not only securing funding in the start-up phase, but also provide a guide for how the business is expected to perform financially over the next few years.

During actual operations, facility management will need to continue to monitor all financials and compare actual expenses and revenue to projections. This process is extremely useful to understanding how the company is performing, where improvements may be needed, and where to focus time and efforts in the future.

Industry Background and Statistics

NATIONAL RED MEAT INDUSTRY

The red meat industry in the United States consists mainly of beef, pork, mutton/lamb, and goat meat. Beef and pork remain popular choices for many households in terms of red meat. Over the years, the production and consumption, or disappearance, of red meat has fluctuated.

The table below provides information on the national inventory of red meat livestock from the USDA National Agricultural Statistics Service (NASS).[1] As shown below, the inventory for beef cattle has decreased since 2000 by over 5 percent, while the inventory of hogs has increased by almost 30 percent. Inventory of sheep and lambs have also decreased by almost 27%. The data for meat goats is only available from NASS starting in 2008. Between 2008 and 2019, the inventory of meat goats has also decreased by almost 35 percent.

Table 1: National Red Meat Inventory by Total Head, 2000-2019

Year	Beef Cattle Inventory	Hogs Inventory	Sheep and Lambs	Meat Goats
2019	31,690,700	74,661,200	5,230,000	2,055,000
2018	31,466,200	72,054,900	5,265,000	2,075,000
2017	31,170,700	70,916,000	5,270,000	2,080,000
2016	30,163,800	68,274,000	5,295,000	2,080,000
2015	29,332,100	67,299,000	5,270,000	2,125,000
2014	28,956,400	61,344,000	5,235,000	2,100,000
2013	29,631,300	65,072,000	5,360,000	2,114,000
2012	30,281,900	64,777,000	5,375,000	2,194,000
2011	30,912,600	63,759,000	5,470,000	2,278,000
2010	31,439,900	63,618,000	5,620,000	2,389,000
2009	31,793,800	65,519,000	5,747,000	2,500,000
2008	32,434,500	66,718,000	5,950,000	3,160,000
2007	32,644,200	61,896,000	6,120,000	
2006	32,702,500	60,340,000	6,200,000	
2005	32,674,400	59,711,000	6,135,000	
2004	32,531,300	59,529,000	6,065,000	
2003	32,983,300	58,193,000	6,321,000	
2002	33,133,700	59,256,000	6,623,000	
2001	33,398,200	57,546,000	6,908,000	
2000	33,575,000	57,775,000	7,036,000	

According to the USDA's Economic Research Service (ERS), production of red meat, including beef, pork, lamb, and mutton, is expected to have increased by 10 percent since 2016 based on projections for 2020. This increase is expected to continue into the next year with annual production estimated to increase by another 1.4 percent over the previous year. The table below highlights the data from USDA ERS's August 2020 red meat forecast for 2019 through 2021.

[1] USDA NASS (2020). National Beef, Hog, Sheep, and Goat Quick Stats. Retrieved from https://quickstats.nass.usda.gov/

Table 2: Red Meat Production and Disappearance Forecast

	2019					2020					2021		
	I	II	III	IV	Annual	I	II	III	IV	Annual	I	II	Annual
Production, million lb													
Beef	6,414	6,817	6,923	7,001	27,155	6,929	6,054	**7,060**	**6,985**	**27,028**	**6,805**	**7,050**	**27,620**
Pork	6,838	6,615	6,706	7,478	27,638	7,426	6,311	**7,170**	**7,450**	**28,357**	**7,110**	**6,990**	**28,565**
Lamb/ mutton	37	40	36	36	149	35	36	**35**	**36**	**142**	**34**	**40**	**145**
Total	**13,289**	**13,472**	**13,665**	**14,515**	**54,942**	**14,390**	**12,401**	**14,265**	**14,471**	**55,527**	**13,949**	**14,080**	**56,330**
Per capita disappearance, retail lb													
Beef	14	14.8	14.5	14.8	58.1	14.7	13.6	**14.9**	**14.7**	**57.9**	**14.5**	**15.1**	**58.1**
Pork	13.1	12.5	12.9	13.9	52.4	13.2	11.6	**13.2**	**13.4**	**51.2**	**12.3**	**12.7**	**50.8**
Lamb/ mutton	0.3	0.3	0.2	0.3	1.1	0.4	0.3	**0.2**	**0.3**	**1.1**	**0.3**	**0.3**	**1.1**
Total	**27.4**	**27.6**	**27.6**	**29**	**111.6**	**28.3**	**25.5**	**28.3**	**28.4**	**110.2**	**27.1**	**28.1**	**110**

Red meats, such as beef and pork are staple food products for many households in the United States. Overall, the consumption of meat in the United States is increasing, even if only slightly. In 1950, total consumption of meats, poultry, and fish was at 101 pounds per person.[2] Total per capita meat consumption in 2016 has doubled that, reaching to over 223 pounds.[3] Along with total consumption, the availability of retail meats has also increased over the past 66 years, growing from just over 149 pounds to over 193 pounds per person.[4] The implications surrounding the trends of meat consumption are significant, especially for farmers or livestock workers. The trend additionally reveals that meat consumption is steadily increasing, and it implies that there will continue to be a demand for meat products for consumption.

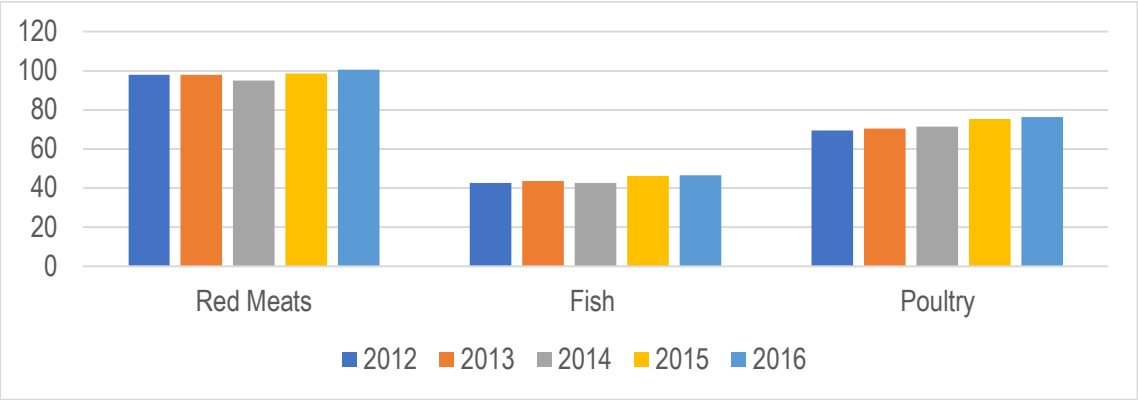
The consumption of specific meats has fluctuated slightly over the years with more Americans consuming red meat (beef, pork, veal, and lamb) over poultry or fish. However, the per capita consumption of both poultry and fish has been increasing at a more rapid pace than red meat in recent years. Between 2012 and 2016, the consumption of red meat increased by about 2.5 pounds per person, while the per capita consumption of fish increased by four pounds and poultry increased by seven pounds in the same timeframe. This information is provided from the most recent 2019 Agricultural Statistics Annual from USDA's National Statistics Service (NASS). The following figure highlights the per capita meat consumption for each of these categories from 2012 to 2016.

[2] USDA (1960). Consumption and Family Living: Table 786. Food Consumption. *Agricultural Statistics.* https://downloads.usda.library.cornell.edu/usda-esmis/files/j3860694x/df65vb73h/n583xx84h/Agstat-04-23-1960.pdf

[3] USDA (2019). Consumption and Family Living: Table 13-6- Consumption. *Agricultural Statistics*. https://www.nass.usda.gov/Publications/Ag_Statistics/2019/chapter13.pdf

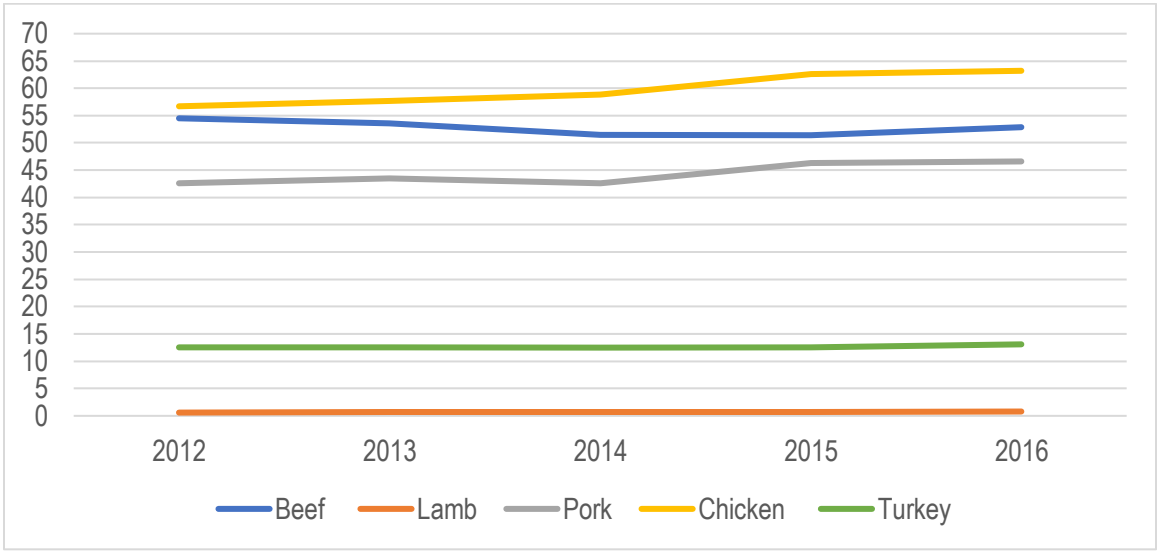
[4]Kantor, L. and Blazejczyk

Figure 1: Averages of U.S. Meat Consumption in Pounds Per Capita[5]



The data above is further examined in the figure below, which shows the specific per capita consumption of the products in each category. As shown, the most consumed meat product between 2012 and 2016 was chicken, followed by beef, then pork. During this timeframe, the consumption of pork and chicken have both increased, while beef has experienced an overall decrease. Consumption of lamb and turkey have remained relatively the same.

Figure 2: Average Meat Consumption Per Capital by Product, in Pounds



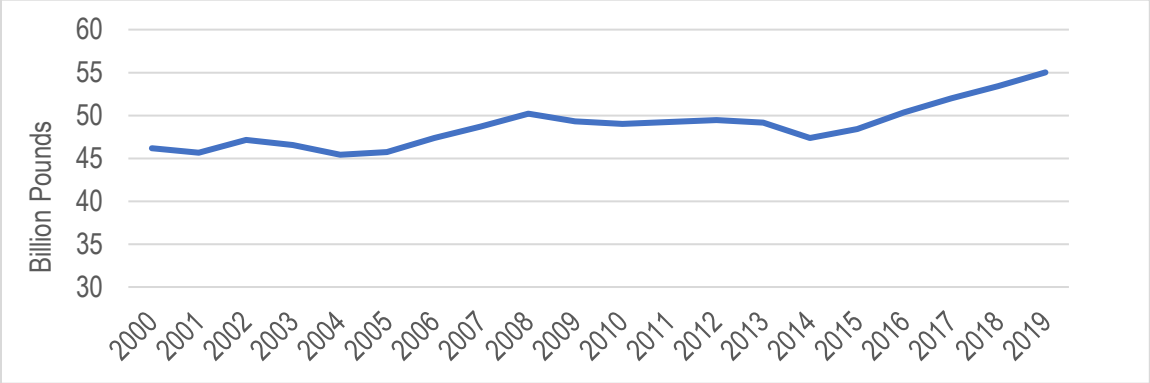
National Red Meat Slaughter and Processing

Total red meat slaughter in the US has been on the rise in recent years. The figure below is based on NASS statistics on commercial production of red meat for slaughter measured in billion pounds. As shown, red meat slaughter reached its lowest point between 2000 and 2019 around 2004 when it decreased to about 45.4 billion pounds. However, since then, the numbers have

[5] (2019). Consumption and Family Living. *2019 Agricultural Statistics Annual.* USDA https://www.nass.usda.gov/Publications/Ag_Statistics/2019/index.php

shown a positive trend, with a slight dip in 2014, but reaching its highest point so far in 2019 at 55 billion pounds. This represents and overall increase of over 19% since 2000.

Figure 3: National Red Meat Slaughter, Commercial Production, 2000-2019[6]



Meat sales and processing in the United States is largely centered on a few major companies, including Tyson Foods, which had over $40 billion in net sales for 2019, followed by JBS USA Holdings with $35.8 billion in the same year. The table below highlights the top ten largest meat companies in the US.

Table 3: Top 10 Meat Processors (Ranked by 2019 Sales)

Rank	Company and Location	2019 Net Sales (Billion $)	Number of Plants
1	Tyson Foods Inc – Springdale, AR	$40	110
2	JBS USA Holdings Inc.—Greeley, CO	$35.8	60
3	Cargill Meat Solutions—Wichita, KS	$20	36
4	Sysco Corp.—Houston, TX	$17.2	17
5	Smithfield Foods, Inc - Smithfield, VA	$15.4	59
6	Hormel Foods Corp.—Austin, MN	$9.5	32
7	National Beef Packing- Kansas City, MO	$7.5	7
8	Perdue Farms Inc.- Salisbury, MD	$6.7	14
9	OSI Group, L.L.C.—Aurora, IL.	$6.1	58
10	ConAgra Foods, Inc—Omaha, NE	$6	32

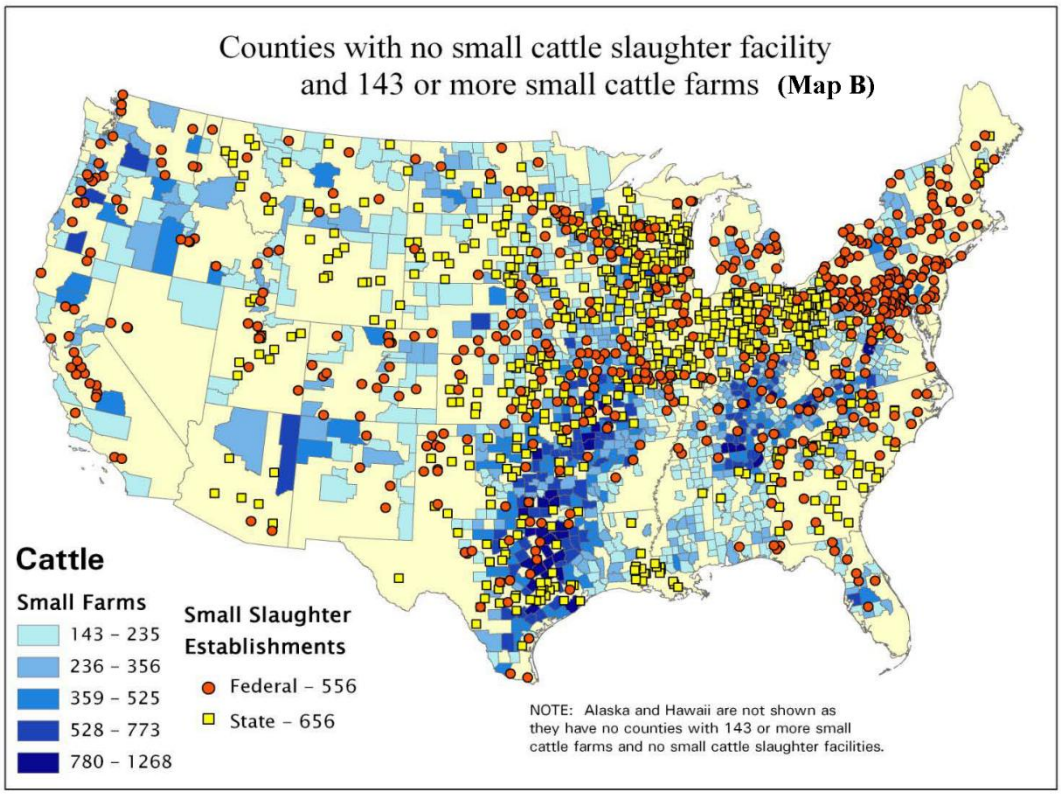
Source: https://www.provisioneronline.com/2019-top-100-meat-and-poultry-processors

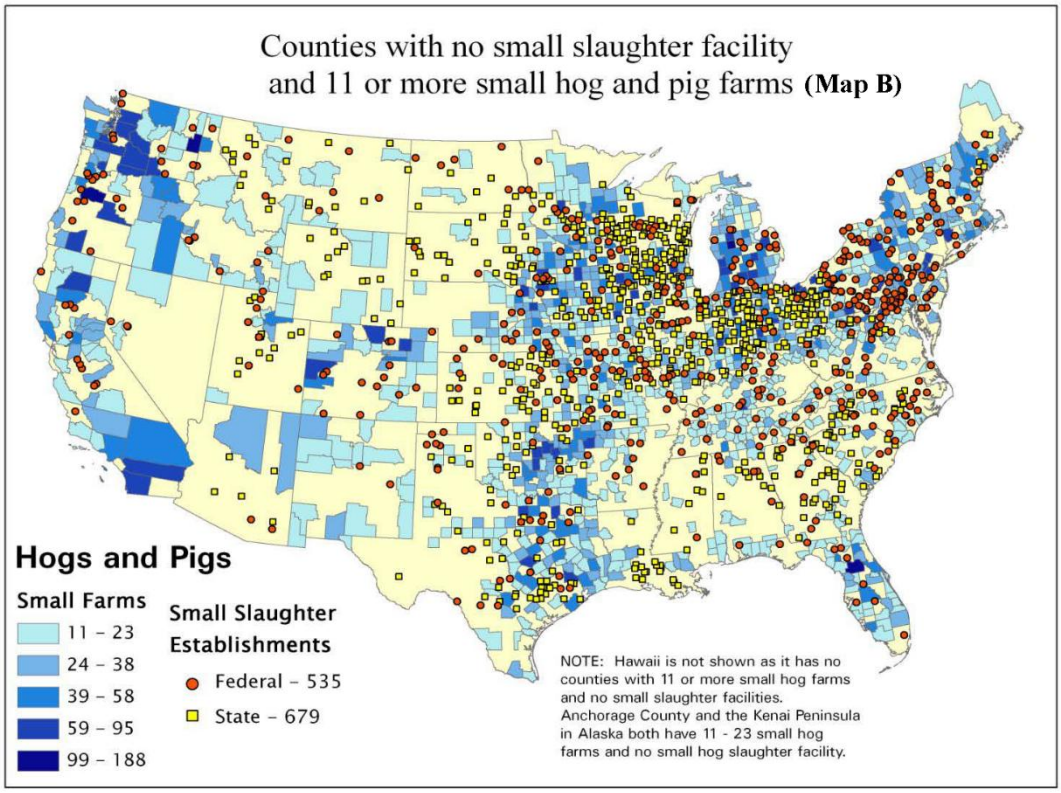
The largest meat brands and companies in the United States has remained relatively the same over the years, with some switching positions within the top ten between years. Tyson Foods and JBS USA Holdings have remained in the top two positions for the past few years, with sales continuing to grow. However, 2020 may look very different for many of these companies in the wake of the COVID-19 pandemic. Smithfield Foods was reported to have lost $72 million in their second quarter for the year due to costs associated with the pandemic, such as expanding employee benefits and added safety measures and equipment.

[6] USDA National Agricultural Services (2020). Quick Stats: Red Meat Slaughter Commercial Production. https://quickstats.nass.usda.gov/results/B22EF5DF-7149-3239-9B0A-6652E44D47B8

While there are major processing companies with processing plants across the nation, there are also many areas with small farms that do not have immediate access to a slaughter or processing plant. As part of the USDA's Know Your Farmer, Know Your Food Initiative, the FSIS released maps with data showing the per county density of small livestock producers and the locations of federally- and state- inspected slaughter facilities. The two maps below show the locations of slaughter facilities across the United States (from 2010). The shaded areas represent counties where the number of producers is equal to, or greater than the median number of cattle or hogs for that county, and do not have a processing facility.

Figures 4 and 5: Slaughter Facility Density per County for Cattle Farms and Hog Farms







National Beef Industry

The beef industry within the United States has shown overall positive trends over the past almost twenty years. Beef production has reached its highest point in 2019 during this time and the retail equivalent is also at an all-time high for the past twenty years. Beef consumption, or disappearance, has also shown a positive trend over the past years, although consumption did peak in 2002. Beef exports are also showing an overall positive trend, although exports are down slightly in 2019 over the previous year.[7]

The following table provides a summary of the beef industry for the United Stated between 2000 and 2019. This summary information includes commercial beef production, the retail equivalent of that production, total beef disappearance and the retail equivalent, and beef exports.

[7] USDA Economic Research Service (July 2020). Cattle & Beef Statistics and Information. https://www.ers.usda.gov/topics/animal-products/cattle-beef/statistics-information.aspx

Table 6: United States Beef Industry Summary Data[8]

Year	Commercial Beef Production (Billion Lbs.)	Retail Equivalent Value of Beef Produced ($'s)	Total Beef Disappearance (Billion Lbs.)	Retail Equivalent of Disappearance (Billion Lbs.)	Beef Exports (Billion Lbs.)
2019	27.2	111.2	27.3	19.1	3
2018	26.9	106.7	26.8	18.8	3.2
2017	26.2	104.8	26.5	18.6	2.9
2016	25.2	103.3	25.7	18	2.6
2015	23.7	104.9	24.8	17.4	2.3
2014	24.3	96.9	24.7	17.3	2.6
2013	25.7	88.2	25.5	17.9	2.6
2012	25.9	84.7	25.8	18.1	2.5
2011	26.2	79.3	25.5	17.9	2.8
2010	26.3	75.8	26.4	18.5	2.3
2009	26	73	26.8	18.8	1.9
2008	26.6	75.9	27.3	19.1	2
2007	26.4	74.4	28.1	19.7	1.4
2006	26.2	71.2	28.1	19.7	1.1
2005	24.7	70.8	27.8	19.5	0.7
2004	24.5	70.3	27.8	19.4	0.5
2003	26.2	62.6	27	18.9	2.5
2002	27.1	59.5	27.9	19.5	2.4
2001	26.1	56.9	27	18.9	2.3
2000	26.8	52.5	27.3	19.1	2.5

As shown, from 2000 to 2019, total commercial beef production in the United States saw a slight increase of almost 1.5%, moving from 26.8 billion pounds annually to 27.2 billion pounds annually. The retail equivalent value of the beef produced has significantly increased by over 112% percent since 2000. Production has been near to the domestic disappearance for the last 20 years.

Total beef disappearance or the amount used in domestic markets, including fresh and processed meat sold through grocery stores and used in restaurants has not changed much. In 2019 is the same as it was in 2000 but reached a low point in 2014 at 24.7 billion pounds. Since then the total disappearance has increased by over 10%. Finally, beef exports have increased by 20% over the past 20 years, reaching 3 billion pounds in 2019. This is up about a half a billion pounds on a carcass weight basis.

National Beef Slaughter and Processing

Historically, cattle slaughtered at federally inspected facilities has experienced a slight decrease over the past almost 20 years, moving from over 35.6 million head of cattle processed to about

[8] (July 2020). Cattle and Beef: Statistics and Information. United States Department of Agriculture. https://www.ers.usda.gov/topics/animal-products/cattle-beef/statistics-information/

33 million head. The table below show the number of head of cattle slaughtered at inspected facilities over the past 19 years in the US.

Table 7: U.S. Cattle Inspected Slaughter 2004-2019[9]

Year	Total Cattle	Steers	Heifers	Beef cows
	(1,000 Head)			
Jan-Jul 2020	18,365.1	9,064.2	5,325.6	1,858.8
2019	33,069.4	16,297.8	9,818.8	3,189.9
2018	32,518.8	16,636.6	9,166.6	3,024.0
2017	31,704.3	16,770.5	8,611.1	2,784.1
2016	30,114.5	16,494.5	7,698.3	2,542.6
2015	28,296.4	15,331.4	7,351.4	2,236.3
2014	29,682.2	15,377.6	8,376.5	2,564.6
2013	31,947.0	16,003.4	9,131.6	3,130.2
2012	32,125.4	16,159.5	9,269.1	3,344.1
2011	33,554.8	16,538.5	9,725.7	3,797.6
2010	33,701.9	16,596.3	10,046.9	3,629.9
2009	32,765.3	16,311.8	9,743.0	3,325.0
2008	33,804.9	16,948.9	10,090.9	3,569.2
2007	33,720.7	17,285.2	10,207.0	3,177.9
2006	33,145.0	17,478.3	9,819.5	2,982.6
2005	31,831.4	16,796.9	9,761.2	2,522.9
2004	32,155.7	16192.1	10344.6	2706.3
2003	34906.5	17177	11078.2	3163
2002	35120.2	17522.2	11342	3051.1
2001	34770.7	17097	11379	3092.3
2000	35631.4	17757.8	11834.5	2795.9

As shown in the table, total cattle slaughter reached its highest point during this time period during 2000, when over 35.6 million head were slaughtered at inspected facilities. By 2014, this total had dropped to under 29.7 million head, and again decreased the next year to 28.3 million. Since then, total cattle slaughter has continued to rise each year.

The following figure provides a further visual of the trends for meat slaughter in the United States, showing the total inspected slaughter for steers, heifers, and beef cows. The figure further depicts the overall increase in slaughter in the US, with low points occurring in 2015.

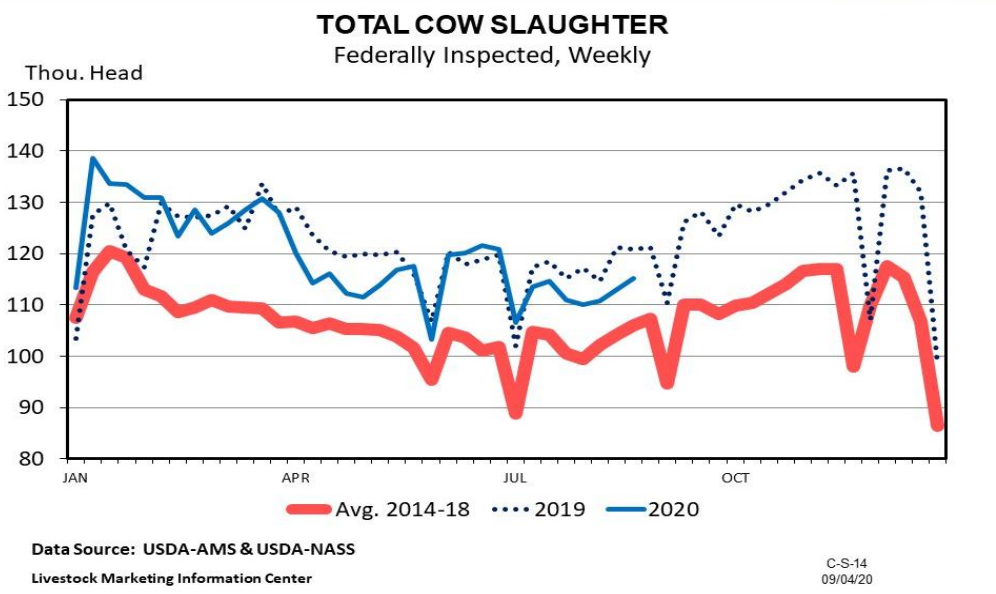
[9] (2020). Cattle and Beef: Statistics and Information. United States Department of Agriculture.

Figure 6: Steer, Heifers, and Beef Cow Inspected Slaughter Trends



The Livestock Marketing Information Center (LMIC) aggregates information on livestock production, slaughter, and sales across multiple sources. The following figures are provided from the LMIC and showcase the trends in cattle slaughter and production. Figure 7 compares the average weekly cow slaughter across the year for 2014-2018, as well as 2019 and up to September 2020. As shown in the figure, cow slaughter in 2020 has mostly followed a similar trend to previous years, even in the wake of the COVID-19 pandemic. The amount of head slaughtered did peak above 2019 slaughter numbers early in the year, but experienced a steep drop heading into April. However, total slaughter numbers begin to align with 2019 trends during the summer.

Figure 7: Weekly Cow Slaughter 2014-18, 2019, Sept. 2020



The following table shows current changes in weekly cattle slaughter, including average weight and prices. The "current" category presented below represents the week ending with September 5, 2020 and compares data to the previous week, as well as the previous year. As shown below, the amount of cattle slaughtered has increased by almost 11 percent between Sept. 2019 and Sept. 2020 and total beef production increased by 13 percent. Prices of beef, however, have decreased over the previous year, with only live fed steer and rib cuts experiencing a slight price increase during that time.

Table 8: Cattle and Beef Prices and Production, Sept. 2020

		Unit	Current	Week Ago		Year Ago	
				Number	% Change	Number	% Change
	Production						
	FI Slaughter	Thou Head	633	654	-3.2%	571	10.8%
C	Avg. Live Weight	Lbs	1365	1364	0.1%	1350	1.1%
A	Avg. Dressed Weight	Lbs	835	835	0.0%	818	2.1%
T	Beef Production	Million Lbs	527.3	544.6	-3.2%	466.3	13.1%
T	**Prices - $/cwt**						
L	Live Fed Steer		103.18	105.09	-1.8%	101.73	1.4%
E	Dressed Steer	Weighted Avg	163.11	166.53	-2.1%	165.83	-1.6%
	Georgia Feeder Steer	600-700 Lbs	124.76	128.36	-2.8%	126.19	-1.1%
&	Beef Cutout	600-900 Choice	227.39	229.91	-1.1%	229.51	-0.9%
	Rib	Choice	373.69	376.94	-0.9%	364.97	2.4%
B	Round	Choice	179.09	181.51	-1.3%	189.99	-5.7%
E	Chuck	Choice	179.14	180.01	-0.5%	183.44	-2.3%
E	Trimmings, 50%	Fresh	43.10	45.04	-4.3%	87.20	-50.6%
F	Trimmings, 90%	Fresh	225.28	226.01	-0.3%	224.81	0.2%
	Hide/Offal	Live Steer	7.88	7.82	0.8%	9.18	-14.2%
					Week Ending		09/05/20

Source: Various USDA Agricultural Marketing Service Reports.
https://www.lmic.info/spreadsheet/prices-and-production

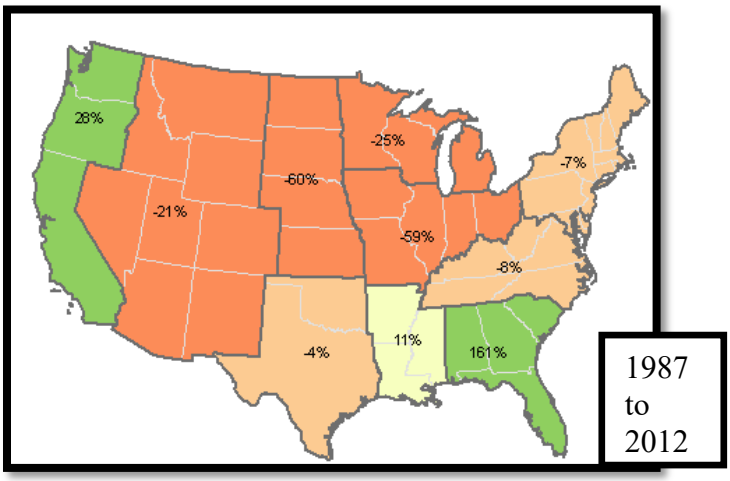
National Sheep Industry



The primary focus on the cultivation of sheep livestock in the United States is for their meat (lamb or mutton) and wool. However, over the past 40 years, the sheep industry has seen a decline in the demand for wool, causing the industry to shift more to meat production.

As shown in the figure below, the sheep industry experienced increased production in some regions of the United States, with states on the West Coast increasing sheep production by 28% and states within the Southeast growing by 161%.

Figure 8: Percentage Growth/Decline of Sheep Industry in U.S.



Despite this decline throughout parts of the United States, the sheep industry still plays an important economic role in many states. A new interest is growing hair sheep, specifically because they do not require shearing, have a high parasite tolerance and low heat stress. In addition to their ability to yield lamb and mutton, they can also be used for excellent leather. North Eastern States also have potential for this industry growth, because of their global consumers being Middle Eastern, Caribbean, and African.[10]

The Census of Agriculture reports some information about sheep and lambs, however it does not provide specifics on how much of the sheep produced and in inventory are used for consumption. According to the 2017 Census of Agriculture, there were over 101,000 farms in the US that had sheep in inventory as of Dec. 31, 2017. These total farms had almost 5.4 million sheep and lambs in inventory.

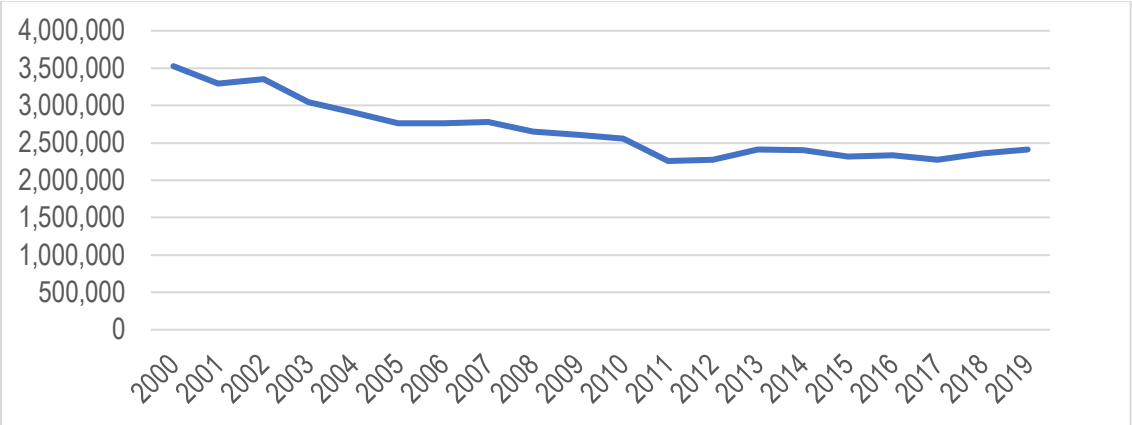
National Sheep Slaughter and Processing

Over the past twenty years, the slaughter and processing of sheep and lambs has decreased in the United States. According to NASS, the total number of sheep and lamb slaughtered has decreased by over 31%. In 2000, the United States slaughtered over 3.5 million head of sheep and lamb; by 2011, total slaughter numbers had reached a low point of about 2.2 million head.

[10] (May 2012). Sheep, Lamb & Mutton. United States Department of Agriculture www.ers.usda.gov

Since 2011, these numbers have increase, but only slightly, to reach over 2.4 million sheep and lamb slaughtered. The following figure provides a visual representation of the trends for sheep and lamb slaughter between 2000 and 2019.

Figure 9: National Sheep and Lamb Slaughter in Heads, 2000-2019



In the past two years, sheep slaughter and the prices for lamb have generally increased. According to the Livestock Marketing Information Center, total slaughter of lamb between September 2019 and September 2020 has increased by 3.5 percent, an increase of about a thousand head. Overall lamb production has also increased by almost 5 percent during the same period, reaching about 2.2 million pounds in September 2020. As shown in the table below, the prices of most lamb cuts have also increased, with the price of trimmed loins increasing in price by almost 19 percent.

Table 9: Lamb Pricing and Production, Sept. 2020

		Unit	Current	Week Ago		Year Ago	
				Number	% Change	Number	% Change
	Production						
	FI Slaughter	Thou Head	34	32	6.3%	33	3.5%
	Avg. Live Weight	Lbs	129	128	0.8%	128	0.8%
L	Avg. Dressed Weight	Lbs	65	64	1.6%	64	1.6%
A	Lamb Production	Million Lbs	2.2	2.0	10.0%	2.1	4.8%
M	**Prices - $/cwt**						
B	National Weekly Formula	Carcass Avg.	NQ	NQ	NA	296.57	NA
	San Angelo Feeder	60-90 Lbs	162.77	174.99	-7.0%	174.00	-6.5%
	Lamb Cutout *		361.04	357.06	1.1%	346.87	4.1%
	Double Leg	18-26 Lbs	395.04	387.35	2.0%	371.33	6.4%
	Trimmed 4" Loin	5-9 Lbs	640.71	625.92	2.4%	539.47	18.8%
	Hotel Rack	5-7 Lbs	812.61	801.88	1.3%	923.52	-12.0%
					Week Ending		09/05/20
	* As of 2002, Based on Average Carcass Weight 2 Weeks Prior						

Source: Various USDA Agricultural Marketing Service Reports.
https://www.lmic.info/spreadsheet/prices-and-production

National Goat Industry

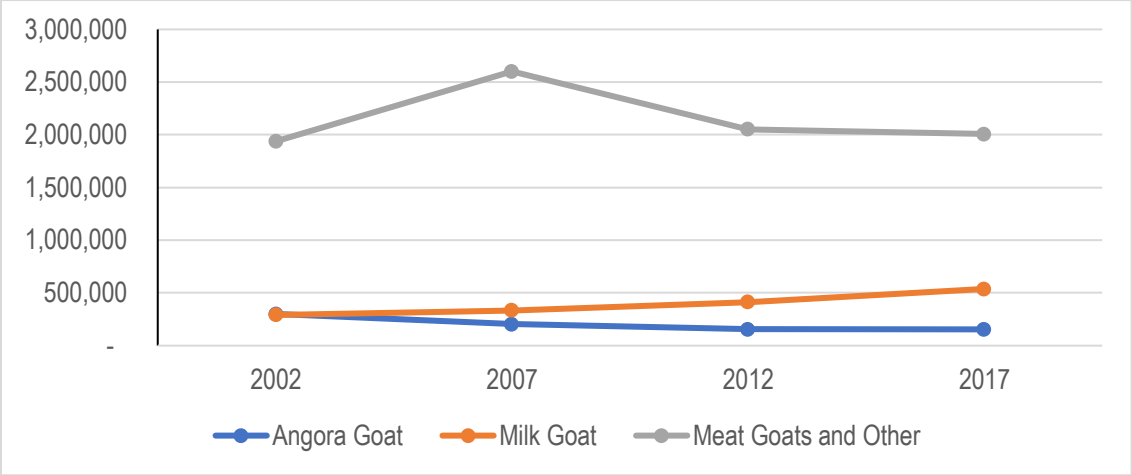
Traditionally, the main supply of U.S. meat goats is produced in the American Southwest and then transported for slaughter. Roughly 30% of all federally inspected goat slaughter takes place in New Jersey.[11] In 2003 it is estimated that 647,000 goats were slaughtered in 352 federally inspected facilities. Pennsylvania and New York are the next most important markets for selling/exporting goats.[12]



This Photo by Unknown Author is licensed under CC BY

The main breeds of goat meat include the Boer goat, the Kiko goat, the Spanish goat, and the Angora goat. It is possible to crossbreed these goats. Boer goats typically have higher yields, while Kiko goats are the easiest to raise because of their hardiness. Spanish goats are still bred in the United States because they have been established in the country for the longest time.

Figure 10: Number of Goats per Type in U.S.[13]



The figure above highlights the inventory of goats in the United States for different goat types and operations. The largest category of goats is those raised for meat consumption. According to the 2002 Census of Agriculture, the United States had about 1.9 million meat goats; by 2007, this figure increased by over 34%, but has since dropped by almost 23%, reaching just over 2 million in the 2017 census.

[11] Iowa State University Extension. (November, 2003). "Co-Location Of Industries With Livestock Slaughter Facilities."
[12](2014). Sheep and Goats. Cornell University and USDA. http://usda.mannlib.cornell.edu/reports/nassr/livestock/pls-bban/lsan0304.txt
[13] (August 2011). Overview of the United States Sheep and Goat Industry. National Agricultural Statistics Server (NASS), Agricultural Statistics Board, and the United States Department of Agriculture. USDA. http://usda01.library.cornell.edu/usda/current/ShpGtInd/ShpGtInd-08-09-2011.pdf



National Pork Industry

Based on the United States Census of Agriculture, in 2007, it was reported that there were around 75,000 farming operations that specialized in hogs and pigs. Since then, the total number of farms has decreased to just over 66,400. In 2017, these farms held over 72.3 million hogs and pigs, representing an increase from 2007 of almost 4.6 million over the ten years. This indicates that while there are fewer pig and hog farms, the average farm size is increasing to produce more animals.

According to the USDA, hog operations are often broken into several different categories. Of these operations, there are three primary hog operations:

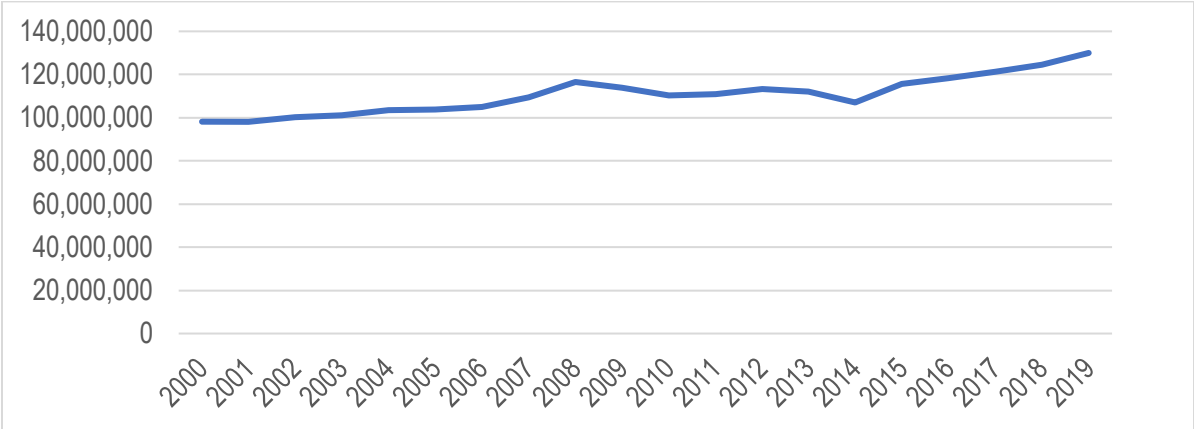
1. Farrow-to-finish operations raise hogs from birth to slaughter weight, which is about 240-270 pounds.
2. Feeder pig farmers raise pigs from birth to about 10-60 pounds; then, they generally sell them for finishing.
3. Feeder pig finishers buy feeder pigs, growing them to slaughter weight.[14]

According to the United States Census of Agriculture, the value of hogs and pigs appears to be increasing. In 2007, hog and pig total sales were roughly around $18.1 billion, but by 2017, this value had increased by over 45% to reach over $26.2 billion in sales.

National Hog and Pig Slaughter and Processing

The industry for hog and pig slaughter has been on the rise over the past almost twenty years. Since 2000, the number of hogs slaughtered in the US has increased by over 32%. The total amount of hogs slaughtered in 2019 was almost 130 million head, while only 98.1 million were slaughtered in 2000. This trend is reflected in the figure below.

Figure 11: National Hog and Pig Slaughtered in Heads, 2000-2019



[14] (June 2012). Hogs and Pork. United States Department of Agriculture www.ers.usda.gov/topics/animal-products/hogs-pork.aspx#.UtAJ_vTrznE

As presented in the table below, the Livestock Marketing Information Center has reported the change in slaughter and pork production between September 2019 and the week ending of September 5, 2020. During this time, total slaughter increased by 12 percent, reaching about 2.48 million head. Total production also increased by over 12 percent, growing from 466 million pounds, to over 524 million pounds in one year. The prices for pork cuts have also experienced an increase during this time with ham increasing by over 15 percent in price, pork belly increasing by over 10 percent, and trimmings by over 26 percent. However, pork loins did experience a slight decrease in price by 3.7 percent.

Table 10: Hog and Pork Pricing and Production, Sept. 2020

		Unit	Current	Week Ago		Year Ago	
				Number	% Change	Number	% Change
	Production						
H	FI Slaughter	Thou Head	2484	2657	-6.5%	2217	12.0%
O	Avg. Live Weight	Lbs	283	283	0.0%	282	0.4%
G	Avg. Dressed Weight	Lbs	211	211	0.0%	210	0.5%
S	Pork Production	Million Lbs	524.1	560.0	-6.4%	466.5	12.3%
	Prices - $/cwt						
A	Natl. Negotiated Purchase	Weighted Avg	44.26	42.45	4.3%	53.81	-17.7%
N	Natl. Base Carcass	Weighted Avg	57.45	56.75	1.2%	65.62	-12.4%
D	Natl. Net Carcass	Weighted Avg	59.84	59.08	1.3%	67.84	-11.8%
	Natl. Early Wean Feeder	10-12 Lbs.	25.86	24.99	3.5%	33.07	-21.8%
P	Natl. Pork Cutout	205 Lbs.	76.28	73.09	4.4%	73.01	4.5%
O	Ham	53-54% Lean	67.46	57.30	17.7%	58.50	15.3%
R	Loin	53-54% Lean	68.93	71.51	-3.6%	71.60	-3.7%
K	Belly	53-54% Lean	119.68	110.57	8.2%	108.48	10.3%
	Trimmings, 72%	Fresh Combo	79.55	80.07	-0.6%	62.94	26.4%
	By-product Value	Live Hog	4.03	3.79	6.3%	3.56	13.2%
					Week Ending		09/05/20

Source: Various USDA Agricultural Marketing Service Reports.
https://www.lmic.info/spreadsheet/prices-and-production

Impacts of COVID-19

Slaughter and processing entities are no strangers to the typical risks associated with running a meat or food processing business. Preparing for the potential impacts of unforeseen or unavoidable natural and economic events such as disease outbreaks or natural disasters should also be considered in any operations, including meat processing.

On March 1, 2020, the President of the United States declared a national emergency in response to the outbreak of COVID-19. The spread of COVID-19 around the world and across the United States has had significant impacts on the state of country's food systems. In response to the pandemic, many businesses either temporarily ceased operations or altered their business to conform to health concerns and governmental restrictions. A meat processing facility, as an essential part of the food supply, would have to overcome multiple challenges to typical operational practices and market conditions to adjust to any new restrictions and regulations.

There are both risks and opportunities for processors and other food system businesses within the changes happening to the food system and supply chain. Local foods are increasingly being sought to supplement the traditional supply chain, both for food entering the consumer market as well as food being used for emergency relief. As the crisis continues to unfold, it is uncertain what new shifts will come about, which of the changes will remain in place in a post-pandemic economy, or what the long-term impacts on the food system will be.

The full impact of the COVID-19 pandemic is not yet known and data on the current impacts change frequently as new guidelines and requirements are continually released. The following information is adapted from a May 7, 2020 report[15] on the impacts of the pandemic on processing facilities at that point.

Processing Facility Impacts

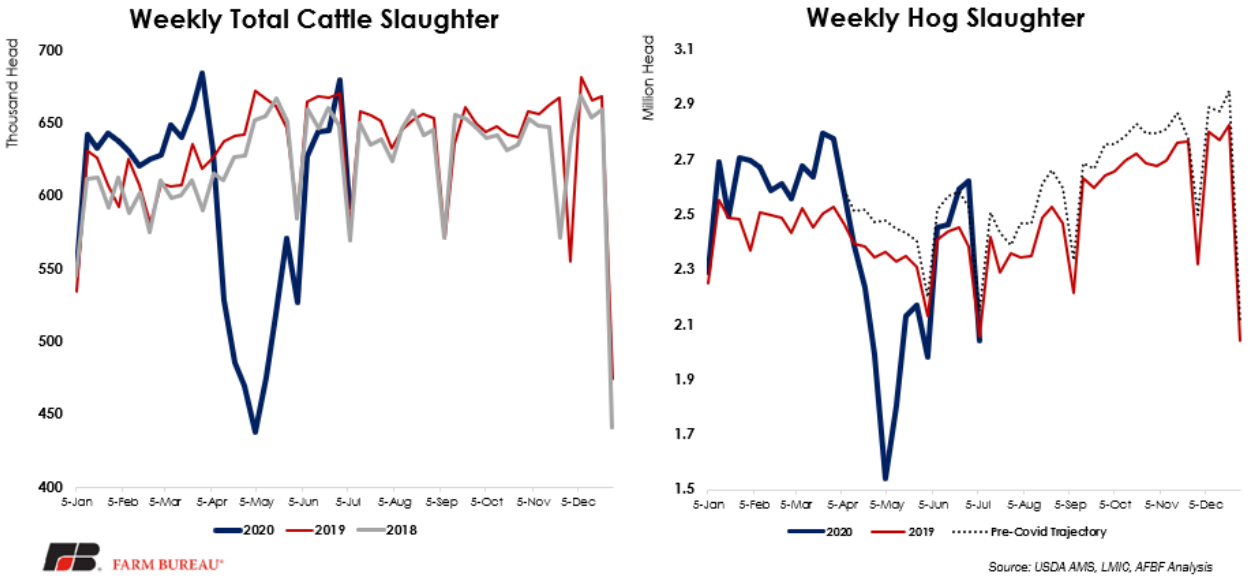
During the wake of the COVID-19 pandemic, meat processing facilities were designated as critical infrastructure since these facilities heavily influence the supply of meat in local and national food systems. This designation allowed facilities to stay open, when possible, to continue operations under guidelines from the Center for Disease Control. While these facilities were allowed to stay open under revised operating procedures, many still struggled to maintain operations due to labor shortages and worker safety measures slowing efficiencies.

During March and April 2020, multiple livestock processing plants closed their doors due to issues from the COVID-19 pandemic. Some closed only temporarily to make adjustments to fit CDC guidelines, while others for longer periods of time as they could not keep the skilled labor to continue operations. During this time the country's processing capacity greatly varied but was estimated that pork processing capacity had been reduced by as much as 20 percent and beef processing by 10 percent. Moreover, weekly slaughter at facilities has been greatly reduced as less animals are brought in and facility efficiency is decreased.

[15] Market Intel (May 7, 2020). "As Processing Facilities Struggle with Labor, Spread Between the Wholesale Price of Meat and Livestock Prices Widen." https://www.fb.org/market-intel/as-processing-facilities-struggle-with-labor-spread-between-the-wholesale-p

Since the initial impact of the pandemic on processing facilities, the industry started to recover and slaughter numbers began to align more closely with numbers from the previous year. In an updated report from July 10, 2020, the weekly slaughter of both cattle and hogs has mostly recovered and reached levels like, and exceeding in some instances, pre-COVID-19 levels.

Figure 12: COVID-19 Impact on Weekly Cattle and Hog Slaughter[16]



Market Impacts

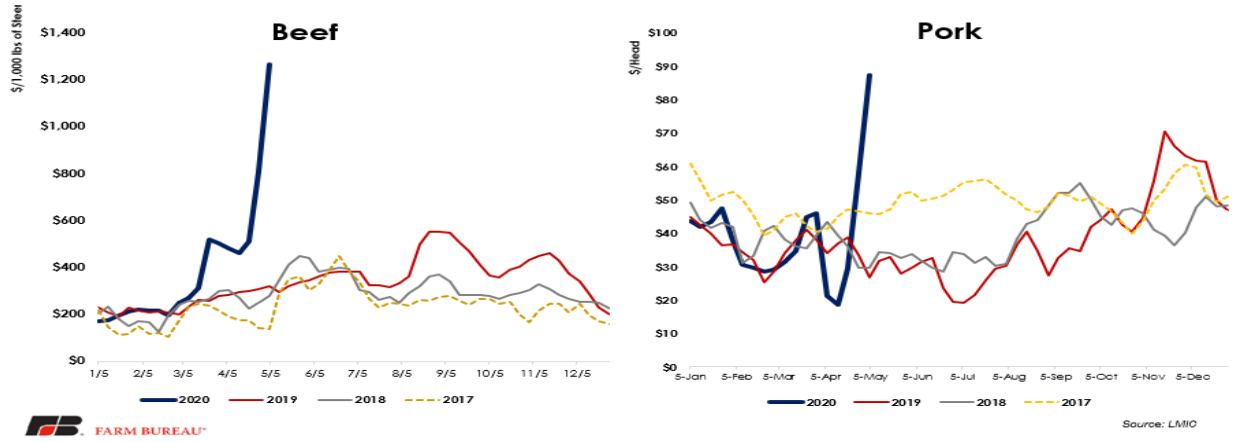
As shown by the COVID-19 outbreak, the widespread impact on both business operations and everyday activities has the potential to impact how entire systems of the economy function. This is no different for the food system. As businesses and institutions are forced to close or shift to social distancing practices, the way in which people buy and sell food is changing. Not all businesses, however, are in position to endure such changes. Shifts in market activity will require facility owners to potentially modify their target customers, their operational practices, and their role in the food supply chain. It is not known yet how long these shifts will last or if new ones will come about before there is a return to some semblance of normalcy.

Market Prices

With the decreased supply of meat products into the market due to restraints on the processing facilities, the wholesale prices of meat have substantially increased, while livestock prices have decreased. The following graphs represent the live-to-cutout spread, or the different between the inputs and the outputs.

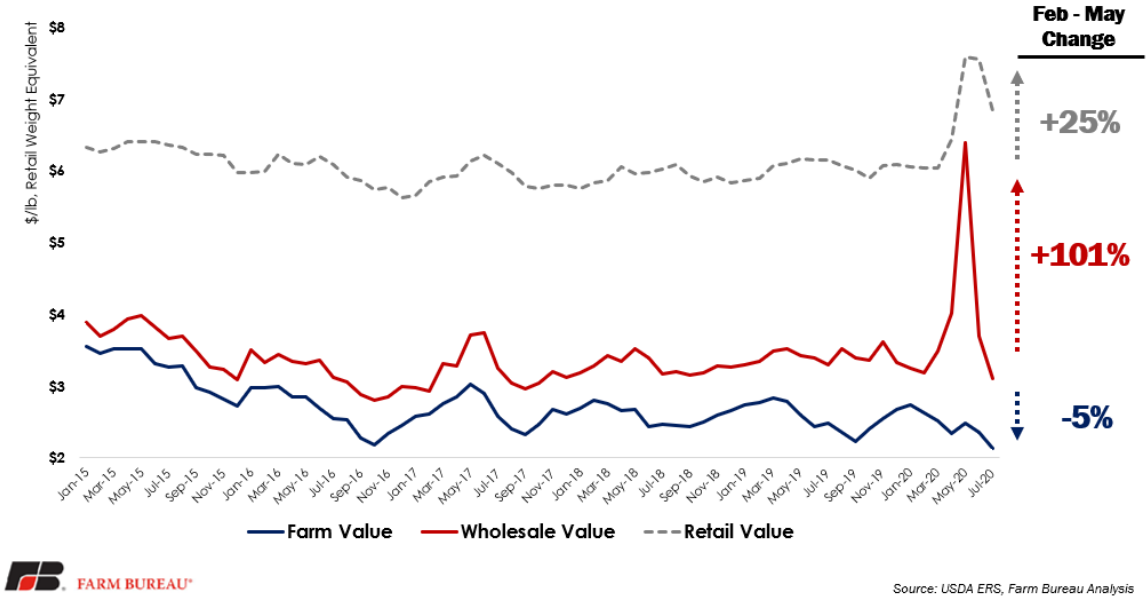
[16] Market Intel (July 10, 2020). "Beef and Pork Supply Chain Recovering." https://www.fb.org/market-intel/beef-and-pork-supply-chain-recovering

Figure 13: Beef and Pork Live-to-Cutout Spreads



Another figure from the American Farm Bureau further shows the changes to prices caused by the pandemic. In the figure below, the retail and wholesale price of beef increased from February to May 2020, well above average prices over the previous year. Between February and May, wholesale prices for beef increased by 101% while retail prices increased by 25%. However, the farm-gate price for beef decreased by 5% during this same timeframe.

Figure 14: Beef Wholesale, Retail, and Farm-Gate Prices



Restaurants and Institutions

The National Restaurant Association reported that during March, restaurant sales declined 47 percent nationally and approximately 44 percent of restaurants closed temporarily. They also reported that 3 percent of surveyed restaurant owners around the country had closed

permanently by the end of March, representing approximately 30,000 locations. It was estimated that up to 11 percent, or an additional 110,000 locations, could be closed by the end of April.[17]

In an updated report published in June 2020, the National Restaurant Association reported that the restaurant and foodservice industry lost $120 billion in sales between March and May and is predicted to lose $240 billion in sales by the end of the year. Additionally, 75 percent of restaurant operators stated that it is unlikely that their restaurant will be profitable within the next six months.[18]

Not all restaurant owners have been content with the limited operations. Across the country there have been calls for states to allow for the reopening of certain establishments, such as restaurants. As of the first week of May some states have begun allowing outdoor dining at restaurants, while others have allowed a return to full-service barring certain standards to distance and protective equipment.[19] This has come while cases continue to rise for many of these states. There is speculation that these premature re-openings could lead to a second wave of cases that could send these states back into lockdown.

Grocery Stores

Grocery stores, online food sales, and other common points of sale have also seen dramatic shifts in activity trends as consumers have adjusted to the restricted food supply chain. Grocery stores have experienced waves of market shifts since the effects of COVID-19 began impacting the states. SafeGraph tracked foot traffic for various grocery store chains since the crisis began. The shifts in traffic for various grocery store chains can be seen in the figure below.

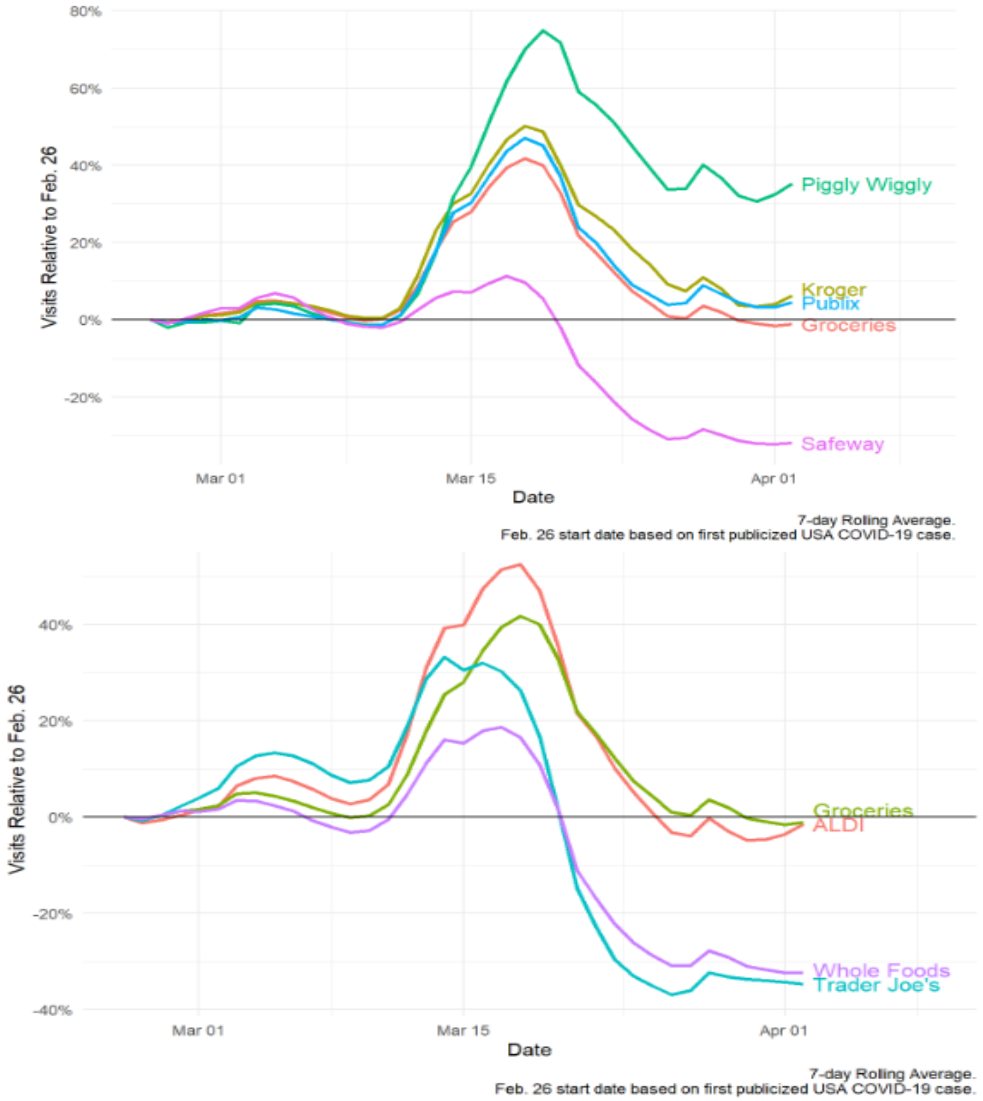
They found that following the announcement of the first coronavirus-related death and the cancellation of large events such as March Madness and Coachella at the beginning of March, there was a small surge in grocery store traffic. This quickly settled back down to normal traffic during the second week of the month, but just as quickly began a sharp increase around the middle of the month as cases continued to spread and states began to act. Consumers began purchasing food in preparation of being confined to their homes or certain items running out. By around March 18th, the peak of this panic shopping was reached, with average food traffic for grocery stores overall up by 42 percent over February levels.

[17] Jonathan Maze. "A Lot of Restaurants are Already Permanently Closed." *Restaurant Business*. Mar. 2020. https://www.restaurantbusinessonline.com/financing/lot-restaurants-are-already-permanently-closed

[18] National Restaurant Association. "The Restaurant Industry Continued Impact." June 2020. https://restaurant.org/downloads/pdfs/business/covid19-june-update

[19] Sarah Mervosh, et. al. "See Which States Are Reopening and Which are Still Shut Down. *New York Times.* May 5, 2020. https://www.nytimes.com/interactive/2020/us/states-reopen-map-coronavirus.html

Figure 15: Daily Percent Change in Grocery Store Foot Traffic[20]



Once consumers had stocked up, we see a decline in traffic, which for some grocery chains such as Safeway, Trader Joe's, and Wholefoods, reached well below February levels. For most grocery chains, this return decline has put traffic around or somewhat higher than the baseline. Piggly Wiggly, an outlier, saw sales remain around 37 percent higher than February levels. At this time, we do not know what led to these varied results, or if this trend will continue or see a leveling out over time.

Store location could play a part. It could be that since Safeway, Trader Joe's, and Whole Foods are seen as "high-end" grocery stores, people have reverted to shopping at other places due to reduced incomes, wanting their money to go further. Similarly, these could be in affluent communities that can afford to stock up or use other sources for their food, unlike lower income communities where the selection of stores is already limited. Piggly Wiggly is more common in

[20] SafeGraph. "COVID-19's Striking Impact on Grocery Store Food Traffic." *SafeGraph*. April 2020. https://www.safegraph.com/blog/covid-19s-shocking-impact-on-grocery-store-foot-traffic

rural communities, where their shopping options are more limited, potentially resulting in an increase in grocery store visits while restaurants are closed.

Safety and regulatory factors may also have contributed to the results. It could be that stores where traffic dropped the most took additional precautions that others did not, which continued to reduce their foot traffic, but on purpose, not necessarily driven by customers. Or it is possible that more of these stores are in states that adopted social distancing early on or had more strict social distancing measures enforced at a state or local level.

Local Food

The value of local food and strong local food systems is seeing an increase in recognition as across the country, gaps in the traditional supply chain are emerging and local food is being utilized in new capacities. Employee illness, regulatory enforcement, and facility closure has impacted many agricultural industries and disrupted the regular supply of food. Meats have been hit hard as processing plants across the country have been forced to close.[21] This has created an additional market for local products that are now being increasingly sought after by restaurants, grocery stores, and food access groups. Government agencies and food relief organizations such as food banks are also looking to local food distributors to assist them in providing fresh produce, meats, and dairy to those in need during this time.

[21] Dan Charles. "How One City Mayor Forced a Pork Giant to Close its Virus Stricken Plant." *NPR.* April 14, 2020. https://www.npr.org/2020/04/14/834470141/how-one-city-mayor-forced-a-pork-giant-to-close-its-virus-stricken-plant

VIRGINIA RED MEAT INDUSTRIES



Virginia's largest private industry is agriculture, with total market value of agricultural products of over $3.96 billion in 2017, providing over 334,000 jobs. According to the Virginia Department of Agriculture and Consumer Services, "Every job in agriculture and forestry supports 1.7 jobs elsewhere in Virginia's economy."[22]

The livestock industry in the Commonwealth of Virginia has a long tradition and is an important source of revenue for producers. The 2017 USDA census reports that Virginia had 25,483 livestock and poultry farms with a combined market value for products of almost $2.6 billion. Within the livestock industry, red meat production accounts for a large portion of inventory and production. Over the past twenty years, inventory in most of the red meat categories has decreased, as shown in the following table.

Table 11: Red Meat Inventory in Virginia, 2000-2019

Year	Beef Cattle Inventory	Hogs Inventory	Sheep and Lambs	Meat Goats
2019	631,000	340,000	79,000	43,000
2018	633,000	345,000	75,000	42,000
2017	643,000	240,000	80,000	41,000
2016	629,000	255,000	75,000	45,000
2015	637,000	270,000	75,000	47,000
2014	637,000	280,000	83,000	46,000
2013	696,000	260,000	87,000	45,000
2012	664,000	230,000	84,000	52,000
2011	685,000	245,000	90,000	51,000
2010	665,000	355,000	89,000	50,000
2009	643,000	360,000	75,000	49,000
2008	692,000	355,000	81,000	58,000
2007	710,000	370,000	72,000	
2006	727,000	365,000	67,000	
2005	705,000	490,000	61,000	
2004	695,000	375,000	55,000	
2003	684,000	380,000	62,000	
2002	690,000	400,000	59,000	
2001	671,000	415,000	61,000	
2000	651,000	425,000	61,000	

[22] VDACS (2020). Virginia Agriculture Facts & Figures. https://www.vdacs.virginia.gov/markets-and-finance-agriculture-facts-and-figures.shtml

The data from the table above was provided by USDA National Agricultural Statistics Service (NASS) Quick Stats.

As shown in the table above, the inventory of beef cattle, hogs, and sheep and lamb have decreased in Virginia since 2000. Beef cattle inventory has decreased by 20,000 head during this time-period. During this time, beef cattle inventory peaked in 2006 when it hit 727,000 head and has dropped by over 15% since then.

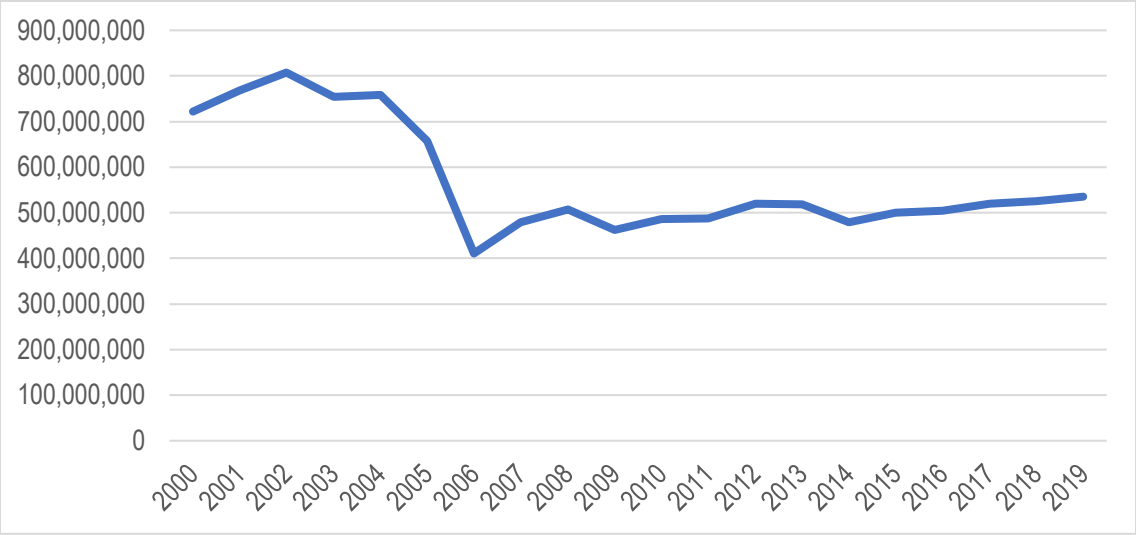
Similarly, the inventory of hogs and pigs in the state has decreased by 85,000 since 2000 with a peak occurring in 2005 when the inventory hit 490,000. Since 2005 this peak, the total inventory has dropped by 44%.

Sheep and lamb inventory have increased over the past 19 years, growing from 61,000 to 79,000 head. During this time period, the inventory for sheep and lamb peaked in 2011 when it reached 90,000 and has decreased since then by almost 14%.

Data for the inventory in Virginia for meat goats was only available starting in 2008 from NASS, but data from this time also shows a decrease in inventory. Between 2008 and 2019, the inventory of meat goats in the state decreased by 15,000 and meat goat inventory was at its peak in 2008.

Between 2000 and 2019, the amount of red meat slaughtered in the state has also decreased by almost 26%. As shown in the figure below, red meat slaughter dropped significantly between 2000 and 2006, a decrease of over 43%. Since then, the red meat slaughter and processing industry has increased slightly and has not yet reached the same level it was before 2006.

Figure 16: Red Meat Slaughter Commercial Production in Pounds, Virginia 2000-2019[23]



[23] National Agricultural Statistics Service (2020). Red Meat, Slaughter, Commercial Production, Measured in Lb. Quick Stats. https://quickstats.nass.usda.gov

Virginia Beef Cattle Industry



According to the 2017 Census of Agriculture, Virginia had 21,880 cattle farms across the state, and about 84 percent of those were beef cow farms. The total number of cattle in the state, including both beef and dairy cows, has been declining over the years. Since 2002, the total number of cattle farms has decreased by over 21percent, and the number of beef cow farms has decreased by almost 20 percent. Similarly, the number of total beef cows in the state has decreased since 2002 by over 6 percent.

Within the state, Rockingham and Augusta counties lead in terms of total cattle in 2017. According to the USDA NASS Virginia Field Office, Rockingham County had over 105,000 head of cattle and calves, with 24,000 in beef cattle. Augusta County had 88,000 head, with 35,000 in beef cattle, making it the county with the highest beef cattle inventory in the state.[24]

The following table highlights information across the Censuses of Agriculture in 2002, 2007, 2012, and 2017 for beef farms and production in Virginia.

Table 12: Virginia Beef Cow Industry 2002-2017

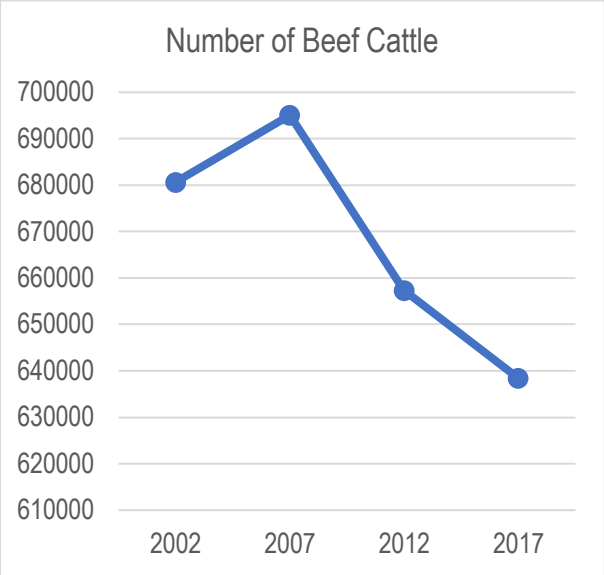
Virginia Beef Industry	2002		2007		2012		2017	
Farms with cow herd size of:	Farms	Beef	Farms	Beef	Farms	Beef	Farms	Beef
1 to 9	6,301	33,117	6,662	33,356	5,579	27,717	5,062	24,362
10 to 19	6,124	82,800	5,328	72,408	4,686	63,788	4,233	58,034
20 to 49	7,367	217,431	6,276	188,883	5,782	174,751	5,673	169,967
50 to 99	2,113	139,956	2,328	153,668	2,216	146,497	2,130	138,773
100 to 199	811	105,070	922	120,870	961	126,200	953	123,710
200 to 499	285	79, 743	357	100,130	331	88,638	361	92,639
500 to 999	22	13,664	28	18,886	32	19,236	34	22,829
1,000 to 2,499	7	8,829	6	6,860	9	10,493	7	8,104
Total for all Farms	23,030	680,610	21,907	695,061	19,596	657,320	18,453	638,418

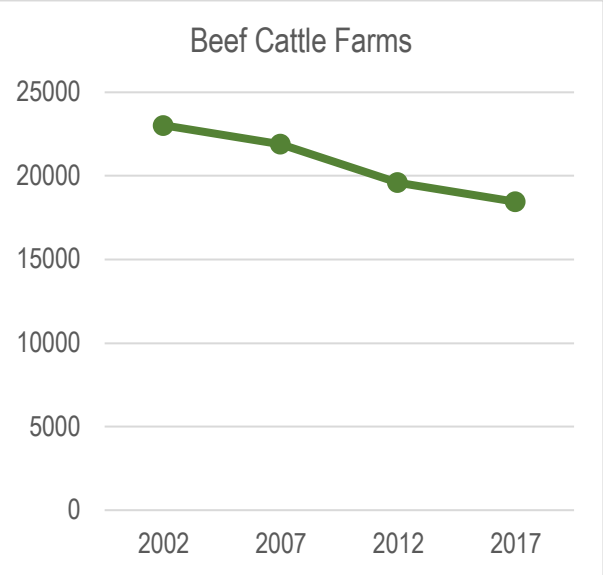
Source: 2007 and 2017 Census of Agriculture

The following figures further represent the decline of the beef industry in terms of number of farms and total inventory of beef cattle in Virginia according to the census.

[24] Virginia Field Office (May 15,2017) Cattle County Estimates-Jan. 1, 2017. USDA NASS. https://www.nass.usda.gov/Statistics_by_State/Virginia/Publications/County_Estimates/Cattle17_VA.pdf

Figures 17 and 18: Number of Beef Cattle and Beef Cattle Farms in Virginia





Virginia Swine Industry

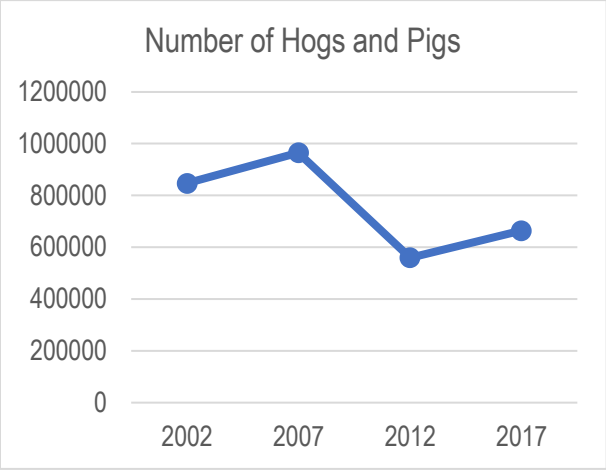
Most of the hog production for Virginia is in the southeastern region. In 2007, an estimated 964 hog and pig farms had sales, and by 2017, this number grew to 1,244 according to the 2017 Census of Agriculture. The total number of hogs and pigs in the state was 664,342 for that year, a decrease of about 31 percent over the previous ten years. In 2007, sales for hogs and pigs totaled $56.9 million in Virginia, and reached over $96 million in 2017.[25][26]

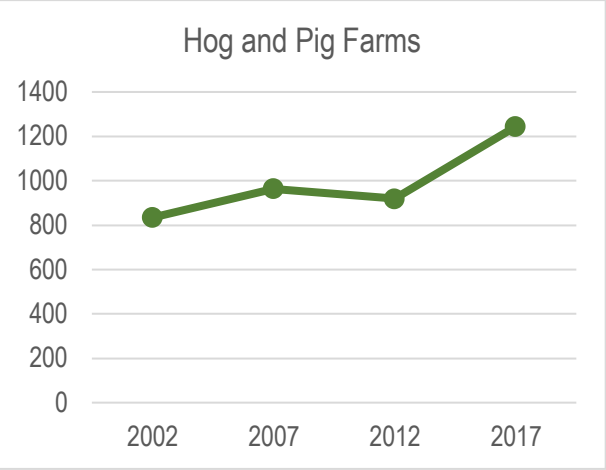


As shown in the graphs below, the number of pig and hog farms with sales decreased slightly between 2007 and 2012 but had a large increase by 2017. Most of the increase in farms occurred among farms selling fewer than 50 animals per year. Conversely, the number of hogs and pigs in the state declined drastically between 2007 and 2012, with a slight raise between 2012 and 2017. Sales of hogs and pigs however have experienced a steady increase across the two censuses, with a more gradual increase between 2012 and 2017. The following graph shows the changes in the swine industry for Virginia:

[25] (2007). 2007 Census Volume 1, Chapter 1: State Level data. USDA
[26] (2017). 2017 Census of Agriculture: State Level Data, Virginia. USDA

Figures 19 and 20: Virginia Hog and Pigs Farms with Sales, Number of Hog Sold



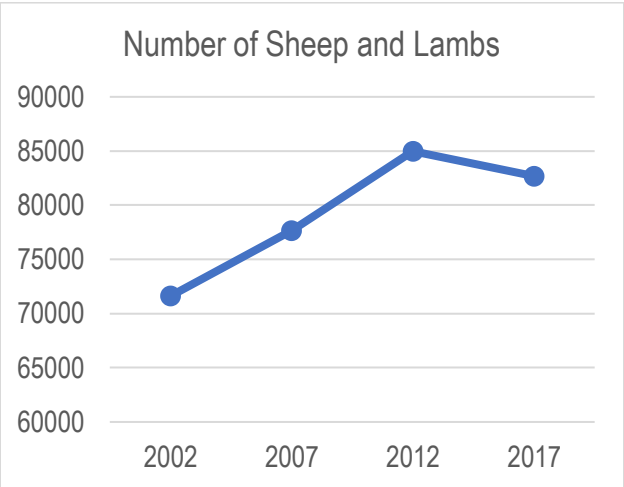


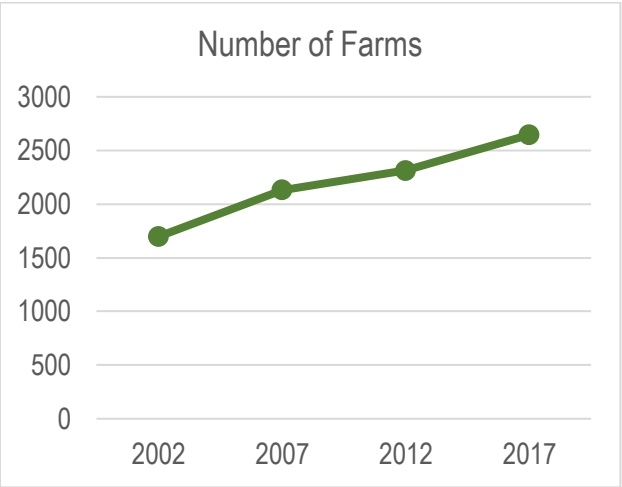


The Virginia Sheep and Lamb Industry

The Virginia sheep industry mirrors the state's cattle industry by taking advantage of ample forage and grazing opportunities. Most of Virginia's sheep production occurs west of the Blue Ridge Mountains in the Shenandoah Valley. In 2002, Virginia had 71,819 sheep on 1,697 farm operations. In 2007, the census states that Virginia had 77,648 sheep, including lambs, on 2,132 farm operations. In 2012, the census shows that Virginia had 84,983 sheep on 2,315 farms. By the 2017 census, this had changed to 82,661 sheep and lamb on 2,646 farms.

Figures 21 and 22: Number of Sheep and Lambs; and Farms with Sheep and Lambs



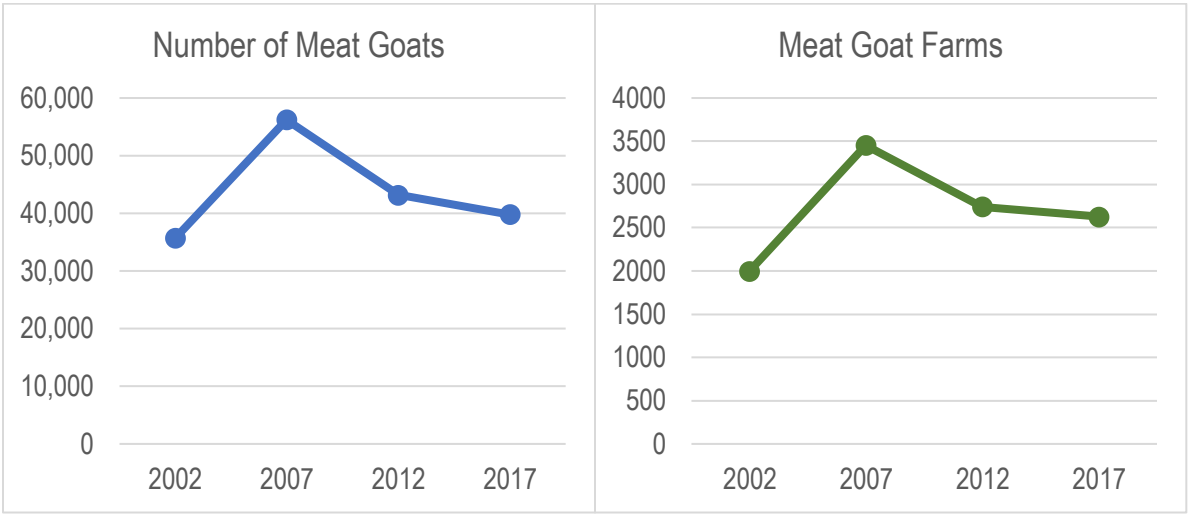




The Virginia Meat Goat Industry

Although there were few statewide or county statistics for the meat goat industry in Virginia, this sector has seen significant growth in the past. According to the 2002 Census of Agriculture, there were 35,710 non-dairy or wool goats in Virginia on more than 2000 farms, a significant increase from the 21,010 head recorded in the 1997 Census. By 2007, the USDA census reports an inventory of meat goats and other types of 56,214 on 3,452 farms in the state. The 2012 census shows a decline as Virginia had 43,181 meat goats on 2,742 farms. This decrease has continued into 2017 with meat goats in the state totaling 39,817 on 2,626 farms.

Figures 23 and 24: Meat Goat Inventory and Meat Goat Farms

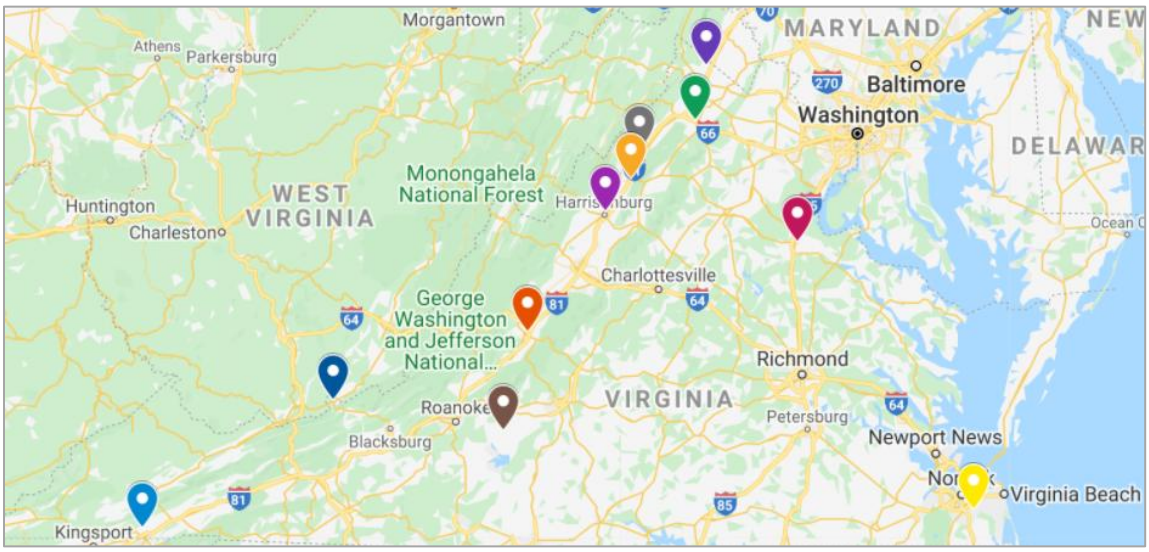


VIRGINIA MEAT PROCESSING

The Federal Meat Inspection Act (FMIA) mandates inspection of cattle, sheep, swine, goats, horses, mules, or other equine slaughtered for use as human food. The slaughter and processing of other meat animals are not subject to the inspection requirements of the FMIA but are subject to other federal and state laws. Meat inspection activities in Virginia fall under the auspices of the Office of Meat and Poultry Services (OMPS) within the Virginia Department of Agriculture and Consumer Services (VDACS). It is a state-run meat/poultry inspection program, and USDA certifies its employees. OMPS/VDACS administers the Virginia Meat and Poultry Products Inspection Act and has also adopted federal meat inspection regulations by reference.

The Office of Meat and Poultry maintains a listing of inspected meat slaughter facilities around the state. While the is not comprehensive, it includes those facilities that have responded to VDACS's survey conducted in March 2020.[27] The listing is continually updated to reflect new plants that request to be added and this information is current as of September 2020.

Figure 25: Virginia Inspected Processing Facilities, March 2020



As shown in the map above, most of the reported processing facilities are located along Interstate 81, with just one processor serving the southeast Virginia. Many of the facilities are also clustered along the northern portion of I-81 near the top beef cattle counties in the state, Rockingham and Augusta counties. The map shows the potential need for more processing facilities in Central and Southern Virginia to serve farms located in those areas.

The following table further lists the inspected slaughter and processing facilities in Virginia as of September 2020. These facilities are inspected, and the table details the types of animals each facility slaughters, as well as additional inspected services/ products they may provide.

Table 13: TA Slaughter and Processing Facilities in Virginia

[27] VDACS Office of Meat and Poultry (March 2020). Inspected Slaughter Plants in Virginia. https://www.vdacs.virginia.gov/pdf/Inspected%20Slaughter%20Plants%20in%20Virginia.pdf

Name	County/City	Animals/ Services
Washington Co. Meats	Bristol/Washington Co.	Beef, Pork, Sheep and Goats
Central Meat Packing	Chesapeake/Chesapeake City	Beef, Pork, Sheep and Goats; Custom Exempt
Gore's Processing	Edinburg/Shenandoah Co.	Beef, Pork, Sheep and Goats; vacuum seal, flash freezing
Salitan/Cloud (T & E Meats)	Harrisonburg/Rockingham Co.	Beef, Pork, Sheep and Goats; sausage, smoking, and curing
Donald's Meat	Lexington/Rockbridge Co.	Beef, Pork, Sheep and Goats
Blue Ridge Meats of F.R.	Middletown/Warren Co.	Beef, Pork, Sheep and Goats; sausage, smoking, further processing
Ecofriendly Foods	Moneta/Bedford Co.	Beef, Pork, Sheep Goat, Chicken, Turkey, Duck, Ratites, Geese, Guineas
Smith Valley Meats	Rich Creek/Giles Co.	Beef, Pork, Sheep Goat, and Buffalo
Safa Halal Meats	Fredericksburg City	Beef, Sheep, Goats
New Market Poultry, LLC	New Market/ Shenandoah Co.	Chickens
Gentle Harvest Custom Processing	Winchester City	Beef, Pork, and Sheep; sausage, smoking, grinding

Selling Meat Products in Virginia

VDACS provides oversight on all aspects of meat processing and meat sales within the state. Their Office of Meat and Poultry Services (OMPS) provides guidelines on selling meat products in the state, including who can sell meat and what inspections are required. According to their guide,[28] all "amenable" species including cattle, swine, sheep, goats, and poultry must be inspected if they are slaughtered and sold, unless exempt. Wild birds and animals cannot be sold for food, only meat from domestic raised birds and animals.

Resource

A Guide to Selling Meat and Poultry Products in Virginia, VDACS Office of Meat and Poultry Services

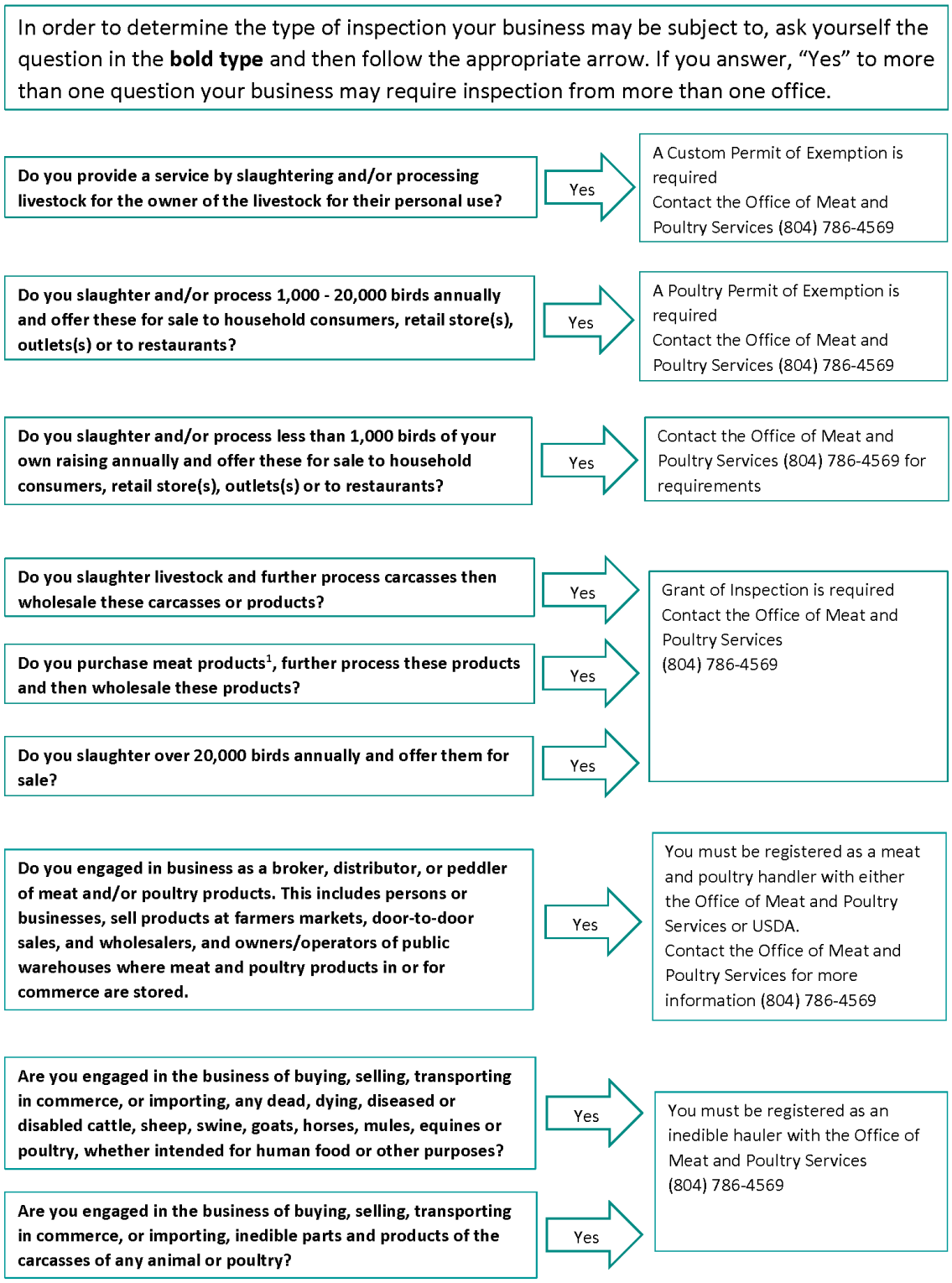
Products that have been processed at a USDA/FSIS facility or VDACS OMPS inspected facility can be sold at farmers markets, to restaurants, at retail stores, and through online stores. A Meat Handlers Permit may be required for any facility that is a broker, distributor, or peddler of meat and/or poultry products. A business that has been inspected by the Virginia Department of Heath and/or VDACS Office of Dairy and Foods may sell meat products.

A product that has been inspected should have the appropriate labeling indicating if it was inspected by the USDA or by VDACS. Products that only have state inspection labels are not able to be sold across state lines.

[28] VDACS. "A Guide to Selling Meat and Poultry Products in Virginia." https://www.vdacs.virginia.gov/pdf/inspectionguide.pdf

The following flow chart is provided by VDACS OMPS to determine what inspection permits are required:

Figure 26: Inspection Permit Requirements



Slaughter and Processing Facility Considerations

OWNERSHIP BUSINESS MODELS

The business models for slaughter facilities and processing plants will vary depending on multiple factors including the products to be processed, number of farmers needed, and location. This section provides some context into the different types of business models that have been successful for slaughter and processing facilities, including a look at ownership and tax structure options and service models such as toll processing and mobile processing. The next major section titled Slaughter and Processing Facility Needs provides more in-depth information about facility operations and needs.

Legal Ownership Models

The legal structure refers to how a business is organized and registered with the state. Legal structures determine how many owners the entity can have, as well as determine the need for a board of directors or other such governing entity. Below are the three most popular legal structures for business operations. Other options such as sole proprietorship or partnership are available as well but generally less suited to these types of operations.

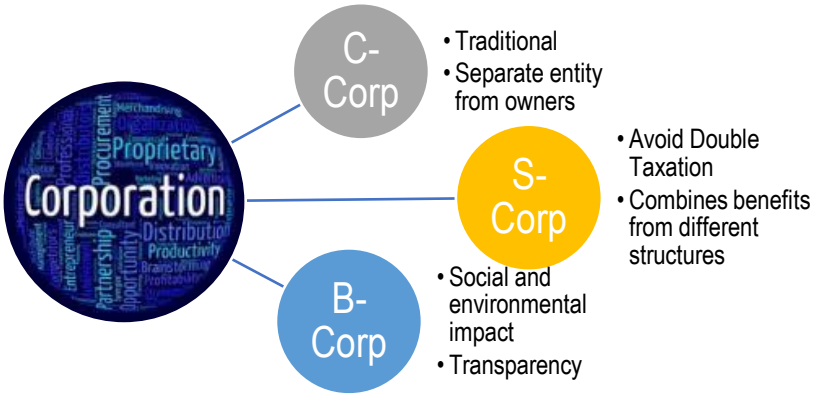
- Corporation
    - C-Corporation
    - S-Corporation
    - B-Corporation
- Limited Liability Company
- Cooperative

Corporation

A corporation is an organization that is authorized by the state to act as a single legal entity. Ownership is determined by stockholding status, meaning that corporations exist perpetually and offer limited liability protection to the investor. While a stockholder's investment in the corporation is exposed to the risks of the corporation's business and activities, typically those risks do not reach beyond the stockholder's investment. Thus, creditors and claimants are generally limited to recovery from the corporation's assets; they typically cannot reach the stockholder's personal assets. Additional capital can be raised by the sale of stock in the company allowing for quicker cash injections than other structures. Corporations are also registered with and regulated by the state and require a board of directors to oversee operations.

The day-to-day management of a corporation is carried out by its officers who are elected by, and accountable to, the board of directors. Board action is required for decisions that have not been delegated to officers and for certain material decisions which are assigned to the board by statute. Unless otherwise provided by the corporation's Articles of Incorporation, bylaws or stockholders agreement, stockholders have a limited number of decisions on which their vote is required. Their most effective power is in their ability to elect, and remove, directors. Stockholders vote according to the number of shares they own.

Figure 27: Types of Corporations



- **C-Corporation**
  Corporations are the most common form of organization for large businesses in the United States. They are classified as separate entities from their owners, meaning they face double taxation. Upon incorporation, a corporation is a separate taxpayer and, as such, it pays corporate tax on the profits of the corporation's business. When those profits are distributed to stockholders in the form of dividends, the stockholders pay income tax on those dividends.

- **S-Corporations**
  S-Corps, another form of corporation, avoid the double taxation which impacts C-Corps. As a "pass-through" entity, the stockholders are taxed directly similarly to an LLC or partnership. This classification, however, requires special designation by the IRS to already existing entities. S-Corps also face restrictions such as US residency requirements, limited share class, passive income limitations, and others.

  Entrepreneurs and small business owners often take advantage of the S-corporation structure because it combines many advantages of the sole proprietorship, partnership, and corporate forms of business.

- **B-Corporations**
  B-Corps, or benefit corporations, are a type of for-profit corporate entity that differs from traditional C-corporations in that their goals include creating a positive impact beyond their shareholders. Their mission includes generating positive impacts for society and the environment, in addition to making a profit for shareholders. B-corps are required to meet standards of social and environmental performance, accountability, and transparency, which are reported regularly to ensure compliance.



As of 2019, there are 36 states that have enacted legislation to officially recognize b-corps within their state, and 5 that are working on legislation.[29] In some states, it is still possible to operate a b-corp through two methods; registering your business in a state that allows b-corps and operating in your home state as an out-of-state entity, or registering your business as a Certified B Corporation through the global nonprofit, B Lab. Certified B Corporations through B Lab are not legally b-corp entities, rather they are a traditionally incorporated business that must meet b-corp standards that are monitored by B Lab as opposed to a state government.

Limited Liability Company (LLC)

An LLC's purpose is to combine the limited liability for its members usually found in the corporate structure (and to limited partners in limited partnerships) with the pass-through tax advantages of the general partnership and s-corp. Any profits or losses pass through the business to the investor and their individual tax return. Other characteristics may be similar to or different from corporate characteristics, depending upon how the LLC members wish to structure the entity and comply with IRS regulations to receive favorable tax treatment. For LLCs that have only one member, the LLC is "disregarded" for tax purposes, meaning the sole owner is responsible for all taxes on the LLC's profits. Losses likewise pass through the LLC to its owner(s).

LLC formation and liability characteristics are like that of a corporation. To form a corporation or LLC, the necessary documents must be filed with the designated state agency. Unlike a general partnership, shareholders are not personally liable. Therefore, an LLC has some, but not all, of the characteristics of each entity. Just one person may form an LLC, but it commonly requires two or more persons.

If the LLC has more than one member, the LLC members are well-advised to execute an operating agreement (essentially, an owners' agreement), which should address, among other things:

- How the LLC will be governed, i.e., by all the members or by one or more managers? Will managers have unlimited authority, or will members have a vote on material decisions? How will successor managers be appointed?

- How the profits will be divided, i.e., if one member is contributing cash and the other services, will profits first be used to pay back the member contributing the cash or to pay some kind of priority return on that investment?

- How/when a member may exit the LLC, i.e., what happens upon the death of a member, or an active member ceasing to be involved with the business, or when a member wants to sell out? Absent an operating agreement, LLC members are free to transfer their ownership in the LLC at any time to any person, an event that would give the remaining owner(s) a new business partner, like it or not.

[29] B Lab. "State by state Status of Legislation." Dec. 2019. https://benefitcorp.net/policymakers/state-by-state-status

Table 14: Legal Structure Advantages and Disadvantages

C-Corporation	S-Corporation	B-Corporation	LLC
• The most complex structure, as it acts as its own legal entity • Control depends on stock ownership • Stockholders are at risk only for money they have invested • Allows capital to be raised more easily through stocks or bonds • Can continue to function even without key individuals • Double taxation occurs because the business exists as a separate entity	• Restrictions on the number and type of ownership • S-corporations have the same basic advantages of the general corporation • Avoids double-taxation	• Not all states recognize b-corps • B-corporations are designed for groups who work to positively impact society • Allows an entity to focus on goals other than profit making.	• Provides its members limited liability • Allows members to escape double taxation • Any "person," either natural (an individual) or legal (another legal entity, such as a partnership), can be a member • Members may actively manage the LLC without incurring personal liability • Uncertain tax status • Drafting the agreement can be fairly complex

Cooperative



Cooperatives are organizations that are owned and operated by the individuals who use it, whether they are the producers, the workers, the community consumers, or all the above. Cooperatives allow for producers, especially smaller ones, to increase market access, grow profits, and reduce risk. This structure allows producers to have access to pricing and marketing opportunities that otherwise may not have been available. Producers may not be aware of various marketing opportunities and, even if they are aware, they may not have been able to access them because of size requirements or high costs associated with these opportunities. However, because of the complex nature of cooperative operations and the large number of invested owners, establishing rules of governance that fit the needs of all involved can be complex. The following breaks down the distinct cooperative operational structure:

- Cooperatives are managed by a board of elected directors who are directly elected by members. All or most of the directors must be cooperative members, this ensures that the leadership are made up of people who use the cooperative and have its interests in mind

- Equity comes mainly from members instead of outside investors. Equity is generally obtained through contributions, membership fees, portions of sales, stock sales, income withholding, or other internal methods. Member liability is limited to the amount of equity each member invested in the venture.

- Earnings and losses on business conducted on a cooperative basis, often called net margins, are allocated to the members based on how much they make use of the cooperative, not on the basis of equity held. The allocations may be distributed in cash or retained in members' accounts within the cooperative and distributed later. Members usually receive a combination of cash and an allocation of equity.

In addition to state and federal statutes and regulations that must be complied with for a business to qualify as a cooperative, the USDA lists three principles and their accompanying descriptions as being widely recognized and practiced for cooperatives:

- **The User-Benefits Principle** - Members unite in a cooperative to get services otherwise not available - to get quality supplies at the right time, to have access to markets or for other mutually beneficial reasons.

- **The User-Owner Principle -** The people who use a cooperative own it. As they own the assets, the members have the obligation to provide financing in accordance with use to keep the cooperative in business and permit it to grow.

- **The User-Control Principle -** As owners, a cooperative's members control its activities. This control is exercised through voting at annual and other membership meetings, and indirectly through those members elected to the board of directors. Members, in most instances, have one vote regardless of the amount of equity they own or how much they patronize the organization.

Cooperatives are divided into many different categories. Structurally, cooperatives vary as much as the products or services they provide, such as dairy, livestock, etc., as well as services and supplies. Some examples include: marketing cooperatives, supply cooperatives, service cooperatives, joint ventures, and new generation cooperative.

Tax Structure

Tax structures are how the business is organized in the eyes of the Internal Revenue Service and fall into two categories; For Profit and Non-Profit. Each structure has its benefits to groups based on their ability access capital, their priorities, and their mission.

For-Profit

For-Profit organizations generally determine the success of their organization based on their ability to generate profits. Profits earned by this type of organization can be used to pay operational costs and be distributed to the owners. For-profit organizations are not exempt from paying federal or state taxes. Any donations to the company are not tax deductible for the donor. Assets of a for-profit organization belong to the owners of the business. If the business dissolves, the assets are distributed to the owners of the business, based on their level of ownership.

This type of organization has many viable fundraising options including offering an ownership percentage to investors. These investors can provide property, services, and money in exchange for shares of the business's stock. For-profits may still have the option to obtain funding from grants and solicited donations depending on the requirements of the donation source.

Non-Profit

Non-Profit organizations are generally community development or capacity building mission focused. Profits earned by non-profits are not intended for paying owners, but instead are used only for operational expenses such as employee wages, rent, utilities, etc. Non-profit organizations often raise funds through donations from other businesses and individuals. These organizations may sometimes find it easier to attract government and private grants. Donations made to a qualified nonprofit organization are also tax deductible for the donor.

Non-profits are also required to file a longer application process to verify their status and if the group dissolves, assets are given to other non-profits instead of owners. During the application period, the entity is often allowed to operate as a nonprofit pending a final determination of their application. Nonprofit organizations may also qualify for state and federal tax exemptions, as determined by the Internal Revenue Service.

For-Profit

- Money returned to owners
- Not exempt from federal or state taxes
- Assets distributed to owners after dissolution
- Funds are raised by offering investors a percentage of ownership

Non-Profit

- Money returned to the organization
- Typically exempt from federal and state taxes
- Assets distributed to other non-profits after dissolution
- Funds are raised by soliciting donations and applying for grants

SLAUGHTER AND PROCESSING BUSINESS TYPES

A facility can serve may functions in the meat industry. These can be defined by the products offered for sale by the facility. Similarly, a processing operation can be defined by whether it operates as a service provider or buys the animals from farmers for resale.

Service Models

A slaughter and/or processing facility can offer a range of services including just simple animal slaughter, to full value-added processing and packaging. A report from USDA ERS titled "Local Meat and Poultry Processing: The Importance of Business Commitments for Long-Term Viability" presents key terms for defining the end products that could be produced by a slaughter and processing facility.

- **Slaughter**: stunning, skinning, evisceration, and cleaning; end products are carcass halves or quarters, which go into a cooler for immediate chilling.

- **"Cut and wrap:"** cutting chilled half/quarter carcasses to desired end size (primal, subprimal, or retail/fabricated cuts) and packaging as desired (e.g., vacuum-packed subprimals, "case-ready" retail packages).

- **Value-added processing**: grinding, casing, smoking, cooking, drying, and otherwise transforming meat and trimmings from the cutting step into sausage, ham, bacon, jerky, and other products; includes "portion cutting," cutting subprimals into fixed-weight steaks, roasts, and other retail cuts.

The services provided will depend on the farmer-user needs and will also influence the operational structure of the facility. This section discusses the different service models for a facility, including toll processing and mobile slaughter units.

Company-Owned/Resale

In this model, a resale facility does not necessarily function as a direct service to the local farmers, but rather a buyer for their live animals. This type of facility will purchase the animal from the farms and farmers who supply them to be processed into products as needed for the end market. This type of facility may be responsible for pick-up of inputs and delivery of end products, thus increasing cost for transportation for the facility, but reducing strain on the farmers to deliver product.

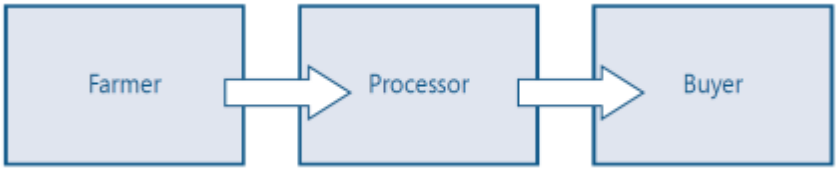
The business is also responsible for selling the end-products, either through wholesale or retail sales channels. Some processing facilities even maintain a store front of their own to sell products directly to customers. A facility that maintains ownership of the product will need to find outlets for all salable portions of the animal possible in order to reduce operating costs. This includes unpopular, undesirable cuts. The facility will be responsible for determining the market demand and choosing to process specific cuts of meat or value-added meat products to meet sales goals.

Toll Processing

A toll processing or "fee-for-service" facility must rely on contractual arrangements with local producers. It provides the slaughter service and they maintain the ownership of the meat. Therefore, it is vitally important that there is a clear understanding between the processing facility and customers as to how long the animal is to be hung after slaughter and how the animal will be cut up and packaged for the end user. The way the animal is cut may vary from time to time and even from individual animal to animal. This understanding/arrangement needs to be in writing with clear expectations of both the processor and the customers. The facility may have to book harvesting and processing capacity well in advance. This may lead to some of the capacity booked not being used. However, this must be taken as a cost of business to ensure that the end user gets the cuts and the quality required in a timely fashion.

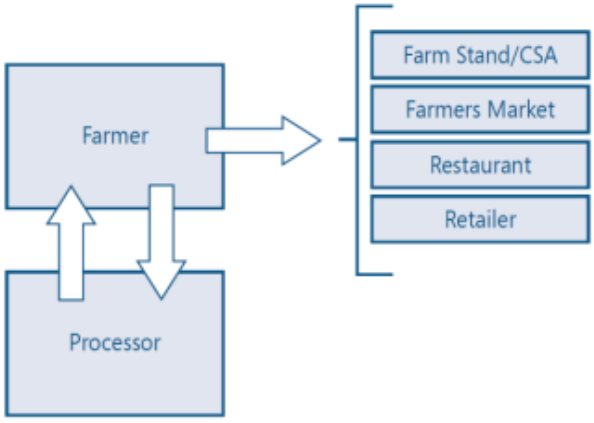
An Oregon State University Article titled "From Convenience to Commitment: Securing the Long-Term Viability of Local Meat and Poultry Processing" outlines the three basic relationship types that are frequently found in slaughter and processing operations. The first category described is "Very Local", an arrangement in which the buyer purchases animals from the farmer and subsequently pays for the slaughter and any value-added processing to be done.

Figure 27: "Very Local" Processing Arrangement



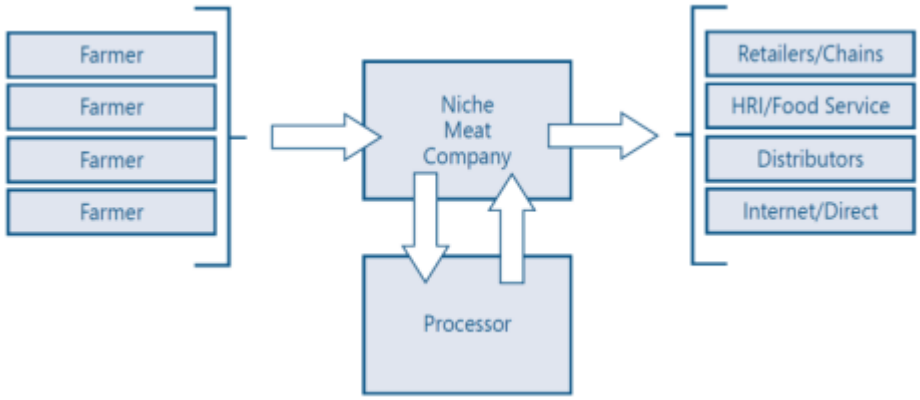
The next type of arrangement specified is a "Local-Independent" arrangement, which is often also known as toll-processing. In this arrangement, the farmer-producer also becomes involved in the sale of the processed product by paying for slaughter and processing services from the processing facility. The farmer then handles the sale of product either through direct-to-consumer or wholesale sales channels.

Figure 28: "Local-Independent" Processing Arrangement



The third type of general arrangement, described as "Regional-Aggregated" consists of the establishment of an intermediary meat company that handles the processing, marketing, and sales of meat, generally for sale to wholesale food chains.

Figure 29: "Regional-Aggregated" Processing Arrangement



Mobile Meat Slaughter

In addition to the brick and mortar type of operations as described above, mobile slaughter units (MSUs) are becoming increasingly popular to provide slaughter and processing services directly at farm locations. Many rural and remote areas cannot support a full-sized or even small livestock processor, and many small farmers are left transporting their livestock hours away to the nearest slaughter and processing facility. This practice increases costs for the farmers and reduces their time spent on the farm or managing their business. With the growing demand for local foods and the increasing issues of food access in underserved areas, farmers need a way to easily and affordably slaughter and process their livestock. Mobile slaughter units may provide an alternative for farmers to address this need.

What is a Mobile Slaughter Unit?

"A mobile slaughter unit (MSU) is a self-contained slaughter facility that can travel from site to site."

-USDA Federal Safety and Inspection Service, Mobile Slaughter Unit Compliance Guide

According to the USDA Federal Safety and Inspection Service (FSIS), mobile slaughter units typically reduce the processing costs for producers, cause less stress for the animals that no longer needs to be transported long distances, decrease the upfront and long-term capital investment needed for a facility, and encounter less resistance and "red tape" from local governments and communities.[30]

MSUs may be incorporated into an existing processing facility or business or can be a stand-along entity. An existing processor may choose to implement an MSU to help reduce wait times at the plant or increase their customer base to farmers located further away. This option can help increase the business's processing capacity, without the need to expand infrastructure at the

[30] USDA Federal Safety and Inspection Service (May 2010). Mobile Slaughter Unit Compliance Guide. https://www.fsis.usda.gov/wps/portal/fsis/topics/regulatory-compliance/guidelines/2010-0001

facility. Additionally, a cooperative or group of farmers seeking inspected slaughter may partner with an existing processing facility to slaughter the meat at the MSU, but then provide further processing at the plant. An MSU could also be an on-farm option for a large farmer who just keeps the unit for their own farm use.
No matter what the arrangement may be for the MSU, there are multiple considerations, benefits, and hurdles to keep in mind if thinking about starting or utilizing an MSU.

Ownership and Operations
Determining the ownership and how the MSU will operate is a major consideration at the beginning of the planning process. Determine who will own the unit, if any partnerships will be involved, and who will operate the unit. Also determine the operations of the unit including, capacity, services to be provided, and how waste and water will be disposed.
Once these factors have been determined, an analysis of the cost to build the unit and the future potential revenues and expenses should be conducted.

The following tables provides example start-up expenses for a mobile slaughter unit as provided by Food and Livestock Planning, Inc. and the Niche Meat Processor Assistance Network. These expenses do not include the cost to maintain the unit over time, such as potential repairs or maintenance. As shown in both these tables, the overall cost to build and implement an MSU is under $250,000.

Table 15: Start Up Costs for Mobile Slaughter Unit

START-UP SUMMARY FOR A MOBILE SLAUGHTER UNIT	
EQUIPMENT	
Mobile slaughter unit	$200,000
Tractor truck	$26,000
Cell phone, laptop	$680
Unit equipment	$5000
MATERIALS	
Office supplies	$200
Hide tags	$30
USDA stamp	$350
Fees	
Dept. of Motor Vehicles	$1200
Organic certification (optional)	$350
Business license, permits	$300
Insurance	$1200
TOTAL START UP	$235,310

Source: Niche Meat Processor Assistance Network

Capital Ex.	
MHU trailer	$ 175,000
Truck (used)	$ 50,000
Equipment	$ 5,000
Working capital	
Fuel for truck (1 mo)	$ 500
Labor, 2 butchers (1 mo.)	$ 4,800
Supplies	$ 5,000
Insurance prepay	$ 1,000
Total	$ 241,300

Source: Food and Livestock Planning, Inc.

Regulations
The USDA FSIS provides full regulations and recommendations for how to meet regulatory requirements for operating a mobile slaughter unit within and across regions. More information can be found in the FSIS Mobile Slaughter Unit Compliance Guide.

Common inspection issues for MSUs include:
- Having an official address for the Grant of Inspection and other required paperwork. This is typical overcome by using an address associated with a permanent facility (in cases where the MSU is an extension of another facility) or the home address of the project manager.
- Coordination with the inspection personnel. The location of slaughter for inspection must be communicated to the inspection personnel a week ahead of time, and travel expenses as well as travel time must be considered in scheduling.
- Access to computers and telephone service. Depending on the location of the MSU, access to services for computer and telephone use may become an issue. This may be resolved with the use of a wireless card.

Water and waste control also present issues for MSUs as there is not typically a dedicated waste disposal area as there are in permanent facilities. Under FSIS guidelines, water for processing must be potable and certified that it is so. Some sites may have limited water availably and if multiple sites are used in a day, the MSU will need advanced planning for water access. Some MSU have addressed this issue by using a 500-gallon water tank that is only filled at certain locations where the water is certified potable. Water from a farm location may be used for cleaning outside of the unit. MSUs may also have tanks to hold up to 500 gallons of wastewater.

Benefits and Hurdles
Similarly, a report conducted by Food and Livestock Planning, Inc.[31] highlights multiple perceived benefits of MSUs (or Mobile Harvest Units, as the report refers to them). These benefits include:
- Lower costs than stationary, or permanent facilities
- Reduced stress for animals as they no longer need to travel
- Lower transportation costs for the farmers
- Waste could be composted and recycled on the farm
- Increased market opportunities for farmers

The report also states the potential hurdles that would need to be overcome with a Mobile Slaughter Unit, including those that are typically over looked during start-up, which lead to business instability and potential future failure. These hurdles include:
- Higher costs dues to smaller amounts of animals processed at one time, increase per animal costs
- Logistical issues with scheduling processing and inspection, as well as issues from weather or road conditions
- Limited storage on the unit to transport meat, and increased need for farmer storage
- Regulatory issues especially regarding waste disposal and crossing county or state lines.

[31] Food & Livestock Planning, Inc. (2011). Business and Marketing Models for Small Scale Meat Processing and Slaughterhouse Facilities. https://www.nichemeatprocessing.org/meat-plans-business-marketing-analysis/

Mobile Slaughter Units in Operation
While MSUs have their share of issues and challenges, there are multiple units currently in operation around the United States. The following is a list of red-meat MSUs and basic information about each (poultry-only MSUs have not been included in this list).

Table 16: Mobile Slaughter Units in Operation

MSU	Location	Animals Processed
Alaska Meat Company	Stitkinak Island, Alaska	Cattle for Alaska Meat Company
University of Alaska	Nome, Alaska	Reindeer
Central Coast Grown	San Luis, California	Cattle, lamb, swine, and goat; owned by Central Coast Agriculture Cooperative
Nebraska Prairie Harvest Project	Northeast Colorado	Cattle- operated by Ranch Foods Direct
Wild Idea Buffalo	Rapid City, South Dakota	Bison
Broken Arrow Ranch	Ingram, Texas	Venison, elk, antelope, and wild boar
Community Agricultural Development Center	Colville, Washington	Beef, hogs, sheep, and goats
Island Grown Farmers Cooperative	Bow, Washington	Beef, hogs, goats, and sheep
Puget Sound Meat Producers Cooperative	Tacoma, Washington	Beef, pork, sheep and goat

Many of the facilities above have case studies providing further information about how they started their MSU, as well as capacity and specifics about the operation of the unit. Links to these case studies are provided below. Most of these studies provide information on the location, capacity, and operations of the mobile slaughter unit.

1. **Coast Grown Mobile Harvest Unit Case Study:** Located in the Central Coast region of California, this MSU is owned by a farmer cooperative and focuses on beef slaughter.

2. **Puget Sound Meat Producers Cooperative**: This cooperative MSU serves areas of Puget Sound in Washington state. The unit is equipped to slaughter red meats.

3. **Ranch Foods Direct**: This MSU is operated by a food company with an existing meat processing plant in Colorado Springs, CO. They primarily process cattle.

4. **Modular Harvest Systems**: This unit was built by a non-profit in Cold Spring, NY and is used as a model for other MSU operations.

5. **Island Grown Farmers' Cooperative**: This MSU is the first USDA-inspected unit for red meat in the United States.

The following is a highlight of Island Grown Farmers' Cooperative, the first known inspected MSU in the United States.

Mobile Meat Slaughter Business Highlight

The first USDA-inspected mobile slaughter facility in the United States is the Island Grown Farmers' Cooperative (IGFC) mobile processing unit. The unit was implemented in 2002 by a group of farmers located in San Juan County in Washington state and provide basic slaughter services. Further value-added processing is conducted at a larger permanent processing plant. Since the unit was implemented, the business has grown to $500,00 in annual revenues from services provided (not included the sales of the processed meat).

The IGFC unit has the capacity to process 9-10 head of beef, 35 lambs, or 15 pigs in one day and operates about three to four days each week. The unit consists of a 34-foot trailer operated by two butchers for about eight hours each day, plus drive time of about two hours. The unit was custom built by Featherlite Manufacturing in Iowa. Pulled by an F450 diesel flatbed, the trailer contains three sections: processing, refrigeration, and HVAC/storage. Pickup and trailer together are 49 ft. long and have a combined GVW of 32,000 lbs. Cooler capacity is designed to hold 10 steers, or equivalent amounts of other types (e.g. 40 lambs, or 20 hogs). The unit has a 10 KW diesel generator and holds 300 gallons of water.

Cost for the unit was approximately $150,000 which included project coordination and testing. Developers worked with FSIS/USDA to assure the unit's in compliance with regulations. The regulatory approval of this facility took approximately 6 years and thousands of hours. The fees for slaughter, from this case study updated in 2018 by the Niche Meat Processor Assistance Network, are $105 per steer, $40 per lamb, and $55 per pig. More information about the Island Grown Farmers' Cooperative MSU can be found at their website .

Slaughter and Processing Facility Needs

This section provides a deeper dive into the specific considerations for starting and operating a slaughter and processing facility. These include information on transportation and logistics, facility location and infrastructure, operating procedures and human resource needs. More information about business structures and models is provided earlier in the document under Slaughter and Processing Business Models section.

The considerations provided in this guide is intended for informational purposes only and to help guide the thought process for those seeking to start or expand a facility.

Single Species vs. Multi-Species

Resource

Alternative Livestock Species in the State of Minnesota, Agricultural Utilization Research Institute

The overall facility and business needs, such as equipment, infrastructure, and labor will depend on the types of products the facility intend to slaughter and process. Typically, a facility that processes one species or similar species will have a more stream-lined process, with less facility and operational needs versus a facility that processes multiple different species that will need to implement a process and infrastructure for each species. This section highlights some of the challenges and needs of operating a multi-species facility.

Operational and Facility Requirements

Standard operating procedures of a multi-species facility will also differ from a single species facility. If different species are processed on the same day, slaughter activities must be stopped, and physical cleaning of equipment and facilities needs to take place between the slaughter of these meat products. This process would add to the time and inefficiency of the operation. The additional documentation required by many of these programs also represents another inefficiency cost.

Additionally, handling and slaughter of various species of animals requires more equipment that is appropriately sized and designed to handle the respective species. The height of the slaughter and processing lines may need to be different, as well as the size and type of equipment used for carcass movement through the slaughter process. These all represent additional costs for the facility during start up, as well as the need for more specialized maintenance over time.

Segregation of various species of meat during holding, slaughter, and nearly every other process of the slaughter facility will also require additional space in the facility to accommodate this separation. Extra room on the kill line and modified holding areas will also be required for larger animals, such as bison. Additionally, any niche programs, such as organic, natural, etc. also requires separation and segregation protocols in many instances.

Plant Scale Overview

A publication titled “Solving Processing Issues a Key to Successful Local Meat Marketing” presents a basic description of the various size entities that is useful for understanding the various scales of facilities that could be operated:

1. **Very Small Custom- Exempt**

This entity is described as a very small processing plant estimated to be about 2,000 sq. feet. Among the livestock that a facility this size can slaughter/fabricate are beef, pork, sheep, and

goats and the business will be able to sell meat products to the general public with proper inspections. A facility this size, however, may have limited sausage making, smoking, and curing services, but they do have the option for some vacuum packaging for cooked sausages. This processing facility will also package all raw meats in butcher paper and then freeze them. This facility would not typically have scale labeling, which is applying labels with actual, "catch" weight to individual packages or cases, and they would have around 4 full-time employees.

2. Small Inspected

A small inspected facility is described as about 4,000 sq. feet in size. Although this facility is USDA or state inspected, it may still do custom-exempt work. The facility also slaughters/ fabricates beef, pork, sheep, and goats, and they are not limited to sausage making, smoking and curing services. They also package and freeze all their raw meats, and they vacuum-pack cooked sausage and other boneless cured meats. They have very basic scale labeling and up to ten full-time employees.

3. Regional Inspected

A regional inspected meat processing facility is described as about 15,000 sq. feet and slaughters /fabricates USDA inspected beef and pork. They also have regular third-party audits, such as good manufacturing practices, food safety, animal welfare, and certified organic. This facility has a quality assurance department that monitors sanitation, product safety, quality, shelf life via microbial testing, and sensory evaluation. They also have sausage making, smoking, and curing services, and exact weight portions when cutting steaks and roasts is offered. All raw and cooked meats are vacuum packaged fresh or frozen. They also have a complex labeling scale, and the 4-color preprinted labels are applied uniformly to packages. This facility also has up to 60 full time employees and offers health insurance and retirement matching benefits to their employees.[32]

Food Safety and Regulations

While the conventional approach of processing a single species per plant is largely done for cost efficiency reasons, there are food safety concerns that arise from operating a multi-species slaughter and processing plant. An example of contamination risk from operating a multi-species facility is the possibility of transferring disease from one species to another. A common concern is the possibility of transferring scrapie[33], a degenerative disease most often affecting sheep and goats to other species such as cattle. For this reason, some sources caution against including sheep in a multi-species slaughter facility to avoid the potential for contamination and product loss.

Another well-known example of contamination is the inadvertent spread of bovine spongiform encephalopathy (mad cow disease). Should this type of contamination occur, or a contaminated cow be processed at the plant, it could spark a significant product recall that may damage the reputation of the plant and inflict unrecoverable financial damage.

[32] Stillman, Richard; Gwin, Lauren; Thiboumery, Arion. (June 2013). Solving Processing Issues a Key t Sucessful Local Meat. United States Department of Agriculture

[33] Iowa State University Extension. (November, 2003). "Co-Location Of Industries With Livestock Slaughter Facilities."

To avoid potential cross contamination, the facility would need to potentially process these products on separate days, reducing the overall amount that could be processed on each species. The facility could also have different processing areas that are completely separated, each with their own storage, equipment, and labor to reduce the threat of cross contamination. Both options would cost the facility including reducing the amount of product processed, or increased facility and labor expenses.

In addition to food safety concerns, the facility would also need to remain compliant with all regulations associated with the different species to be processed. Regulations and standards may be different for each species and the plant may need to obtain additional licensing depending on which products would be processed.

Transportation and Logistics

The Commonwealth of Virginia possesses an extensive and efficient interstate highway system and numerous commercial airports, thereby providing marketing opportunities for high-value products and niche market products. It is possible to access the consumer demographics that are upwardly mobile in terms of income, cultural and ethnic diversity, and education.

The venture's ability to move product into and out the facility and surrounding area is a crucial factor for this project to be successful. Having ready access to roads and major highways will make transportation in and out of the area much easier.

The venture will need to decide how transportation will be handled and it may all depend on the operations and services offered. For example, if the facility provides toll processing, it would be the responsibility of the farmer to transport the livestock to the facility and then arrange to transport it back to their own facility or customer. However, if the processing facility maintains ownership of the product, then it is anticipated that most of the transportation for the product will be the responsibility of the facility owners.

Associated Costs

Vehicle costs are a large portion of operating expenses depending on the size, number of vehicles in operation, number of trips taken, and distance to destination. If available, a third-party distribution company can be used to limit transportation needs. It is a balancing act to determine whether the additional sales from those new markets will be able to cover expenses.

To purchase, or not to purchase?

Purchasing = higher upfront costs and directly responsible for maintenance cost, but longer lifespan and lower cost overall cost

Renting/leasing = lower upfront costs and maintenance typically covered by leasing company but may be more expensive over time.

Fuel, maintenance, and reserves for vehicle failure must all be factored into a business's operational budget. Fuel must be accounted for on a roundtrip basis, and labor time of loading delivery vehicles, drive time to the destination, unloading at the end point, and drive time back to the farm can add up quickly. If a vehicle is wrecked or succumbs to a mechanical issue at a key time of the season, income and reputation can be severely damaged.

There is also the decision between purchasing and leasing, and new and used vehicles. **Purchasing vehicles results in higher upfront costs but with the benefit of reduced maintenance fees and a longer lifespan. Renting or leasing a vehicle may lower upfront costs but may become more expensive than outright ownership over time.** Additionally, if a leased vehicle experiences a mechanical problem, the company providing them can often offer a loan vehicle to use in the meantime

If the facility decides to use their own truck, management will need to decide if they will lease or purchase a truck. There are multiple benefits to both owning or leasing a truck, so management will need to determine what works best for their needs, as well as the finances of the business.

If the owners do not intend to own or lease a truck for the company, the transportation will need to be arranged through an external shipping method. The trucking company the venture decides to use will need to be able to safely transport meat and guarantee one-day shipping to consumers to maintain the freshness of the product.

Location and Site Specifications

There are several attributes to consider about the site and location of a processing facility. The table below presents basic requirements for site development. Local requirements and the exact type of facility to be constructed will determine the exact site requirements.

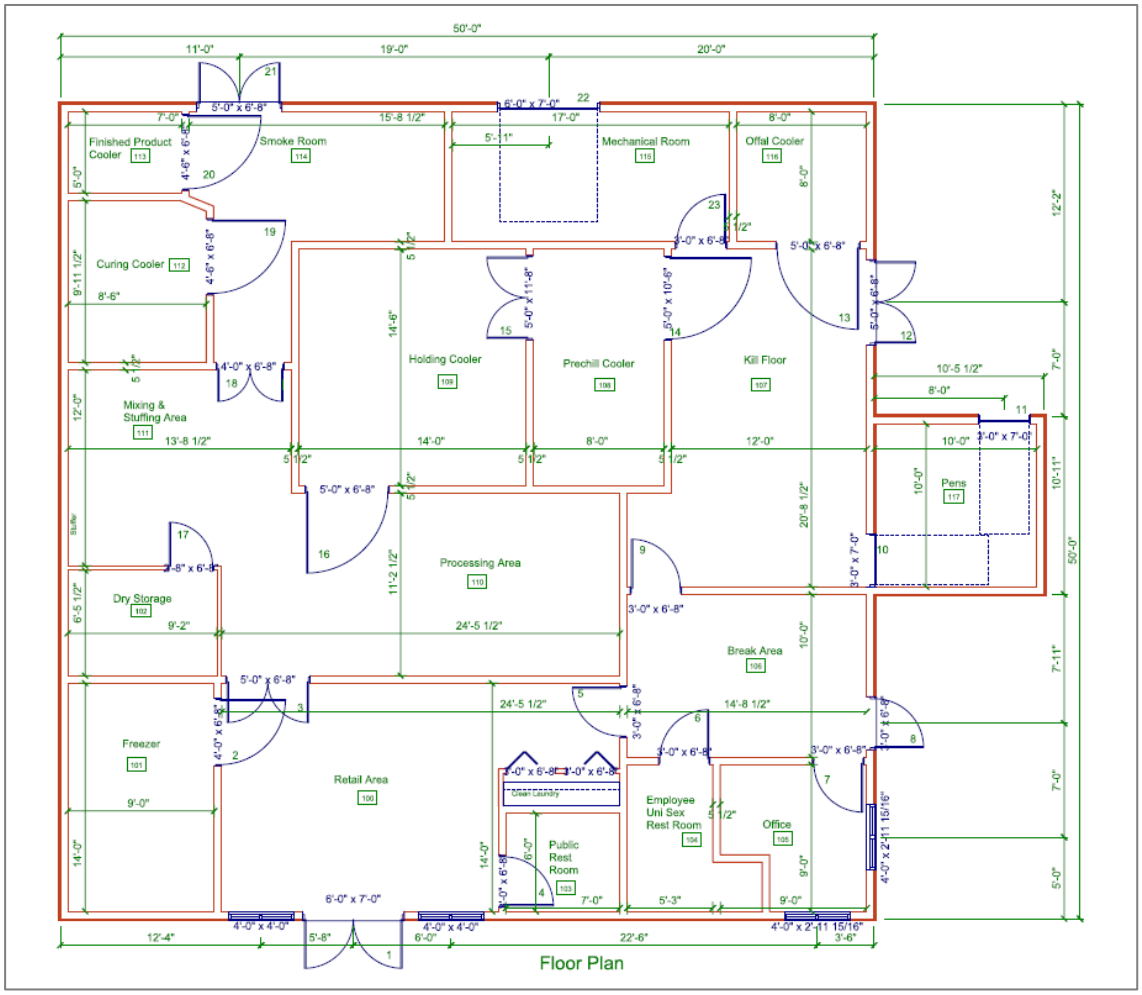
Table 17: Standard Requirements for Site Development

Steps recommended for site development:
(1) grade the site to a 2 to 4 percent slope
(2) slope the site toward a collection pond
(3) add minimal paving under the facility
(4) build berms around the perimeter to control run-off and run-on if required
(5) plan areas for raw materials storage, slaughter processing, curing, storage, and freezing
(6) set up equipment in locations convenient to the process
(7) construct retainer walls and footings
(8) develop a screen around the site (fencing/plants/shrubs/trees)
(9) build a fence and gate to control access to the site
(10) install appropriate utilities depending on the method and process (2-inch minimum water main, storage and tool building, office and lab, maintenance shed)
(11) obtain proper permits (this is mandatory) —local: zoning, building, land use —state: water discharge, composting, transporting, air, health department

The size and space of a facility is considered key for the long-term operational success of the venture. The estimate of necessary space should include room to allow for expansion over time, and the start-up of the venture will utilize space as necessary based on initial sales. The site should have space to handle the initial operations and room for growth should demand make this necessary. The owners of the venture will need to determine the amount of space needed based on intended operations.

The facility should consist of the appropriate buildings for storage and should include freezer and cooler storage areas as well as the equipment necessary for the level of processing and preservation that is intended to be performed. The following is a basic layout of a prototypical small-scale commercial meat slaughter and processing facility.

Figure 30: Sample Slaughter and Processing Plant Layout



Source: Iowa State University Extension "Guide to Designing a Small Red Meat Plan"

The overall setup of the facility will change depending on the available space, services to be provided, and capital available at start-up. However, a basic facility would expect to have the following areas and rooms: pen area, kill/cut rooms, carcass chill room, processing floor, staging

coolers, and related equipment as well as room for office space, employee changing and locker rooms, shower facilities, and bathrooms.

Depending on throughput capacity, the facility would likely need to have access to several acres to allow for the holding of animals yet to be slaughtered. Buildings often need to be above the ground water table for environmental reasons. Interior walls would consist of non-porous surfaces to comply with slaughter regulations.

Due to the needs of the slaughter and odor considerations, the building would need to include appropriate ventilation systems. These systems would maintain the processing part of the facility at 50 degrees to assist in meat preservation and quality.

Buildings are typically on reinforced concrete and may require additional site preparations depending on the specific soil compaction and drainage characteristics of the plant site. Also depending on these characteristics, a facility may need to construct areas for runoff retention, such as a pond.

Typically, energy efficient, or "green" facility features are not considered in the location and site specifications. These features, such as solar panels, tend to represent higher costs and are not considered a necessity for the site.

Animals will likely be delivered to the plant via truck, either by the facility or by farmer. Before the animals are slaughtered, they will need to be placed in holding pens. Animals from different producers will be segregated to maintain identity preservation of animals throughout the entire process. The facility will not provide feed for the animals in the holding pens. To meet inspection requirements, there would also need to be a separate pen for any suspect animals; all pens will be under cover, but open sided for ventilation. Depending on the animals being held, the facility may need modified holding areas, with may include modified fencing and pens.

Water and Wastewater

Water and wastewater are major inputs and outputs of slaughter and processing. Almost every step of the in the facility will involve water. A facility should consider connection to a city or county utilities for sewage and water. The water will be treated for removal of fats and monitored for other waste loads. The facility will have shower and toilet facilities for employees and the inspector. These often have separate connections to the public utility because the volume of water required is lower and this wastewater can often be routed through conventional sewer systems rather than having to be treated.

The amount of water the facility will use will depend on many factors including the number and type of animals processed. Iowa State University Extension has estimated that a processing facility will use about 150-200 gallons per head of beef or equivalent.[34]

[34] Thiboumery, A. (March 2009). Guide to Designing a Small Red Meat Plant with Two Sizes of Model Designs. Iowa State University Extension.

Zoning – General Requirements
Zoning is a critical factor. The key to securing local approvals is a combination of sound site planning, presentation and persistence. A properly zoned site makes it easier to provide continued protection against incompatible uses.

Zoning is the enactment of county ordinances to regulate land use to conform to state land conservation and development laws and the county comprehensive land use plan. Areas are typically zoned for residential, commercial, industrial, or other uses.

All 50 states have zoning enabling legislation for municipalities, and many states also have zoning enabling legislation for counties. Zoning laws are found in virtually every municipality in the U.S., affecting land use, lot size, building heights, density, setbacks, and other aspects of property use.

Zoning regulations become especially important when a business seeks to expand its current operations, through either the addition of production or a physical increase in the building and/or property designed to change the use of the land and existing facilities. The current operations legality does not guarantee the right of the owner to expand or modify in the future and is subject to current zoning restrictions and codes.

In terms of defining slaughter facilities by size for the purposes of enacting zoning legislation, there are varying methods of defining and categorizing slaughter plants. A 2012 USDA Economic Research Service Report titled "Slaughter and Processing Options and Issues for Locally Sourced Meat" divides facilities into small, medium, and large by the following characteristics:

- Small Establishment: Processing less than 10,000 head of livestock annually.
- Medium Establishment: Processing from 10,000-999,999 head of livestock annually.
- Large Establishment: Processing 1 million or more head of livestock annually.

The Food Safety Inspection Service (FSIS) designates plant size according to number of employees:

- Very Small: Less than 10 employees.
- Small: More than 10 but fewer than 500 employees.
- Large: More than 500 employees.

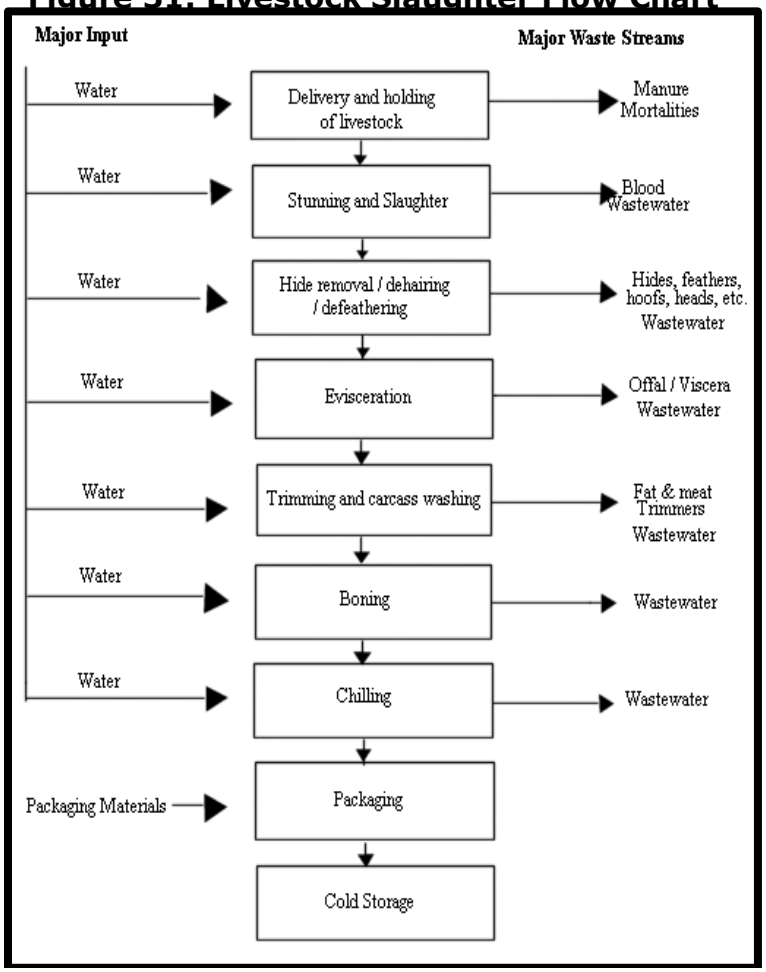
Zoning regulations should provide well-defined criteria in order to properly target a specified use and minimize any unintended effects. Another consideration is to clearly stipulate any exemptions that may be granted for individuals or custom-exempt type slaughter facilities.

General Slaughter and Processing Procedure Overview

This section is intended to outline the typical procedures for a slaughter and processing facility. However, actual operations will change depending on the size and scale of the plant, the species to be processed, and the overall services to be provided. The information provided here is for general guidelines and to help potential facility owners begin thinking through how a potential facility would operate.

Meat slaughtering incorporates a range of activities, from simple slaughtering and butchering of various species, through to complex cooked and preserved production. These processes add value to the product by dividing it into smaller units or transforming them into more complex products. The figure below was developed by Iowa State University and presents a basic flow through procedure for generic meat processing. Though similar, these steps can vary depending on the species slaughtered.

Figure 31: Livestock Slaughter Flow Chart[35]



Typically, slaughter is thought of as a different process from processing, and the two processes may take place on different days/times. The facility can be thought of in several steps or components. These are discussed in general as follows.

Holding Pens (Lairage)

When animals are first brought to the facility, either by the facility's own transportation or the farmer, the animals will be held in a holding area prior to slaughter. This area, called the lairage, needs to be of sufficient size to accommodate adequate numbers of animals to supply operations. The needs of this area will depend on the types of animal slaughtered and will need to be sized accordingly (larger animals will need a larger holding area). The area should also have

[35] Iowa State University Extension. (November, 2003). "Co-Location Of Industries With Livestock Slaughter Facilities."

infrastructure in place to deal with animal waste, as well as the separation and segregation of species, if the facility is processing multiple species. The animals may also need to be held separately for each farmer, or a way to track the animals entering the facility.

Slaughter Floor

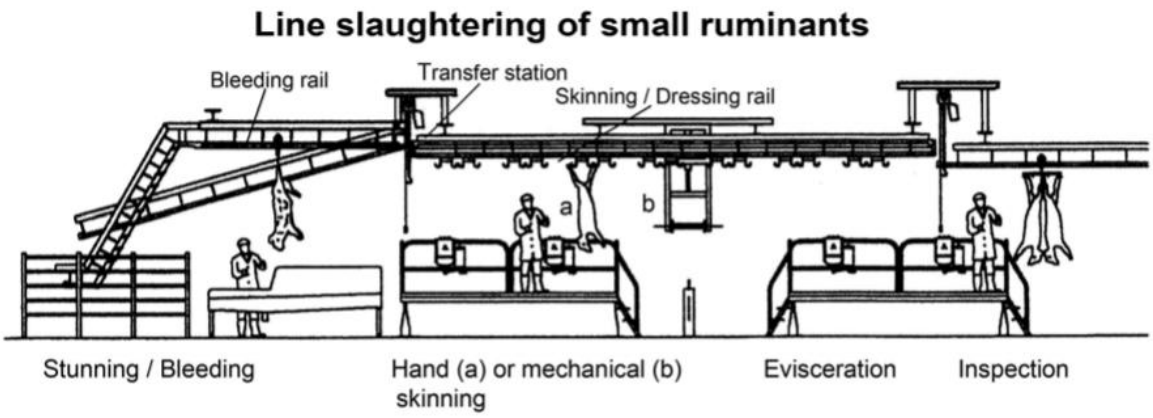
When ready for processing, individual animals are brought to the reception and stunning area of the facility to begin the slaughter process. The animal is placed in a species specific "stun box" constructed for the purpose of humanely restraining the animal and physically immobilizing it to allow the stunner to access the appropriate location on the animal for stunning.

The stunning process can be achieved through several means, the most frequent of which includes the use of a captive bolt percussion stunner or electrical stunning in order to render the animal insensitive to the slaughter process. The animal is then immediately shackled and hoisted for movement to the bleeding/slaughter area by means of a chain style conveyor system. The animal will be suspended by its hind legs and a sticker or bleeder will be responsible for severing the appropriate arteries to allow for proper blood drainage.

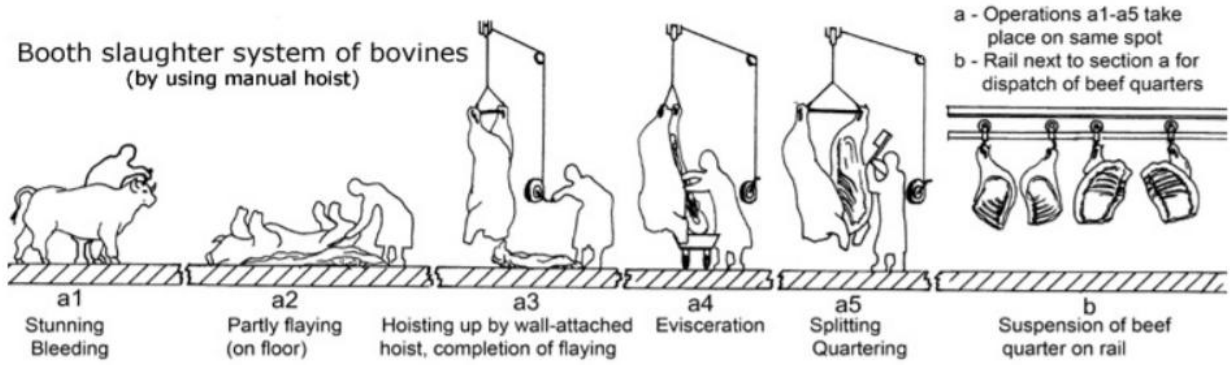
During the construction or development of a facility, the owners will need to be aware that the setup and requirements of the slaughter floor will change depending on the animals processed. For example, processing larger animals, such as bison, will require taller ceilings and an appropriate suspension system to handle the weight and size of these larger animals.

The following provides a general diagram for line slaughter of small ruminants.

Figure 32: Slaughter of Bovines and Small Ruminants[36]



[36]"Design and equipment recommendations for small- to medium-sized abattoirs." FAO. www.fao.org



After the animal has expired and proper blood drainage has occurred, the carcass is moved on to the hide removal and evisceration process. Offal and byproducts will be collected or harvested as necessary to capture value or simply to separate waste properly for disposal. Depending on the end products produced and processed by the plant, this step may also involve a separate area for processing edible offal, such as tripe (edible stomach). At this stage the head and legs are often removed and the resulting carcass either stored at the proper temperatures for further processing or quartered to turn the carcass into a more manageable size for proper chilling and storage.

Boning and Processing

A facility may elect to provide further processing and cut-up beyond the general slaughter procedures as outlined above. This is recommended to provide a value-added product to the farmers that would capture a higher price in the market.

The slaughter and butchering processes often operate independently of each other and utilize different employees for each process. Allowing the processes to occur simultaneously will enable the plant to be more efficient in processing and throughput.

For further processing, individual carcasses are removed from storage and boning and processing personnel are responsible for the butchering of the carcass into primal, subprimal, and other value-added cuts of meat, as well as the subsequent packaging based on meat cut and yield. The actual cuts and processing provided will depend on the needs and requests of the farmers, as well as the current demand in the market. Additional processing services such as smoking, curing, and sausage making may also be offered by the facility, but those processes are not included in this guide. After packaging, the product will be labeled and stored appropriately for return to the producer.

The following figures provide more information about the types of cuts that can be obtained from cattle, hogs, and goats.

Figure 33: Cuts of Beef[37]

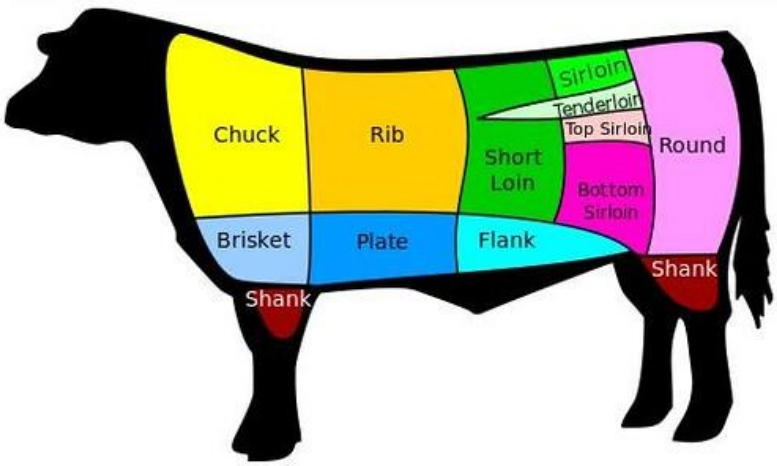
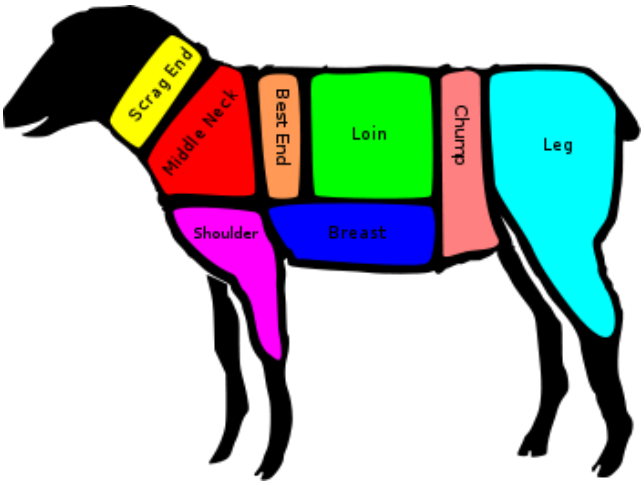


Figure 34: Goat Meat Cuts

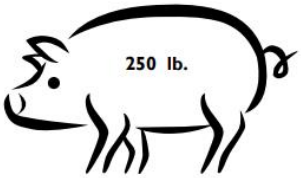


This Photo by Unknown Author is licensed under CC BY-SA

[37] "beef cuts" by daves cupboard is licensed under CC BY-NC-SA 2.0

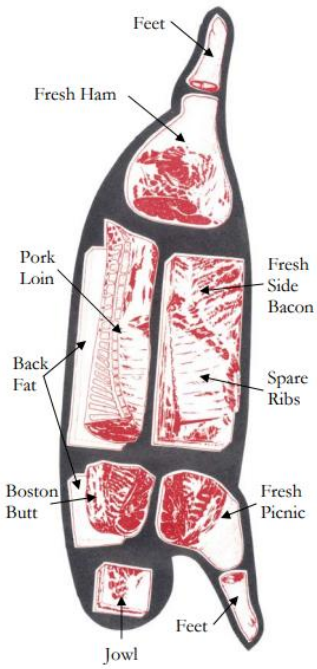
Figure 35: Hog Processing and Cuts

250 lb. Hog
(on the hoof)



Not all of the pig is edible pork. On average about 57% of a hog make it from the pen to the pan. A 250 lb. hog will yield approximately 144 lbs of retail cuts. Around 28% of a hog's live weight is inedible product removed during the slaughter and dressing procedure bringing our 250 lb. live hog to 180 lbs. dressed. The internal organs, hair, blood, and other inedible products account for most of this loss. Once the carcass is sanitarily dressed it is hung on a rail and placed into a cooler where it is quickly chilled. Once the carcass is thoroughly chilled it can be cut into retail cuts where another 20% of the weight is removed bringing our 180 lb. carcass to 144 lbs. of retail cuts. Bone dust, fat trimming, boning, grinding, and moisture loss account for this unpreventable waste. Hams and bacon are typically cured and smoked after cutting.

180 lb. Dressed
(on the rail)



144 lbs. Retail Cuts
(cut & wrapped, bring home)

- **Fresh Hams** 28 lb
  - Fresh Ham
  - Cured & Smoked Ham
  - Ham Steaks
  - Ham Hocks
- **Pork Loin** 23 lb
  - Country-Style Ribs
  - Pork Chops
  - Center Cut Pork Loin Chops
  - Center Cut Pork Rib Chops
  - Boneless Pork Loin Roast
  - Pork Tenderloins
  - Boneless Butterfly Pork Chops
  - "Baby" Back Ribs
- **Fresh Side Bacon** 23 lb
  - Fresh Side
  - Salt Pork
  - Smoked Bacon
- **Spareribs** 6 lb
  - Spareribs
- **Boston Butt** 9 lb
  - Pork Steak
  - Boston Butt Roast
  - Smoked Shoulder Bacon
- **Fresh Picnic** 12 lb
  - Fresh Picnic
  - Pork Shoulder
  - Smoked Picnic
  - Smoked Hocks
- **Feet** 3 lb
  - Pigs Feet
- **Head** 5 lb
- **Back Fat** 23 lb
  - Lard
- **Misc. Trim** 9 lb
  - Breakfast Sausage
- **Jowl** 3 lb
  - Smoked Jowl
  - Breakfast Sausage

Waste Disposal and Odor

Any product attributes that may provide additional value, such as organic, grass-fed, or other designations do not usually apply to offal and waste products, or by-products in general. Products that do not have a ready market will need to be disposed of, likely at a cost to the facility. Due to the slim margins of the meat industry in general, facilities often rely on offsetting these costs by reaping value from the slaughter and processing by-products when possible.

As noted in an Iowa State University Extension document titled *Co-Location of Industries with Livestock Slaughter Facilities*:

> "The economics of the world's competitive meat industry is such that value often needs to be extracted from the marketing of animal co-products. In fact, to offset the added and increasing cost of disposal of some of these products (spinal cord, brains, skull, vertebrae, etc.), it is vital that as much value as possible is extracted from those that have a ready market. Over time, the value of animal by-product relative to the value of the live animal has declined due to the technological progress in producing competitive products from non-animal sources such as synthetic materials to replace leather, synthetic fibers to replace wool, vegetable oils to replace animal fat, and synthetic detergents to replace soap made from animal fat, etc."

A facility will generate large amounts of waste material that will need to be held in a sanitary manner until it can be picked up by a rendering plant or animal waste material recycler. Storage tanks are typically utilized with regular pick-ups scheduled to remove the material in a timely manner.

In some cases, incineration is an allowable method of disposal of animal by-products and offal, but there are restrictions that govern the amount of product and method by which it may be incinerated.

Odor control has also become a significant issue for facilities in urban and suburban communities. Many are addressing the issue through proactive odor control systems. In many cases, the local acceptance of a facility may ride almost entirely on the odor issue. Volatile organic compound (VOC) control is achievable on a variety of gas streams. Control of xylene, toluene, styrene, and similar volatiles is possible. Typically, pilot testing is advised for specific VOC emissions to verify applicability and bio-filter sizing.

Chilling and Storage

One the meat has completed the slaughter process and any further processing; the products are chilled and moved to cold storage. The size of these areas will depend on the types of animals processed, as well as the need for additional aging. The amount of space required for chilling versus freezing will depend on the demand for end products exhibited by customers. Some may prefer to pick up their meat frozen, while others may intend to sell their processed meat as fresh.

Cooling facilities often include a quick chill area utilizing a water spray to prevent meat shrinkage. Cooler capacity should consider the need to store carcasses for aging as well as room for longer-term chilling. Coolers include monitoring equipment to record humidity and

temperature. Facilities also frequently include chest unit blast freezers as well as a walk-in freezers that provide capacity for storage. A facility may also contain two rooms for dry storage to be used for packing and shipping goods.

Many facilities do not hold large amounts of inventory and choose instead to process inputs sufficient to meet immediate demand. However, through necessity, some inventory will be held over. This may be caused by producers who have contracted for processing but do not arrive to pick up their product when specified. Frozen storage capacity is not only expensive to purchase/own, it can also be expensive to operate.

A facility would need to maintain coolers with capacity sufficient to allow for hang time or long-term chilling or aging. At least a portion of one of the cooling areas should include a separate area for suspect meat. Coolers would need to include monitoring equipment to record humidity and temperature.

The facility may need to consider including a chest unit blast freezer or walk in freezer that would have capacity for several days of processing. The facility may wish to offer onsite freezing as a service for producers.

Equipment

There are numerous pieces of equipment and supplies that would be necessary for the operation of a meat processing facility. The specific items required would be highly dependent on the facilities intended inputs, the desire level of processing for outputs, as well as facility infrastructure and access to waste handling facilities.

The following is a basic equipment list that was adapted from an FAO (Food and Agriculture Organization of the United Nations) document titled “Standard Plans for a Small Abattoir and Meat Market.”

Table 18: Typical Slaughter and Processing Equipment List

Description		
Bleeding Hoist & bracket (small stock)	Rail - cutting & processing room	Spreader and hoist (hand)
Bleeding Hoist & bracket (cattle)	Table - cutting & processing room	Small stock skids and looks (also used for beef quarters)
Floor rings	Water storage tank	Hoist (electric)
Stunning pistol	Water pump	Head workup rail
Scald tank	Effluent Screen	Viscera buggy
Lifting frame	Boiler	Working platform
Scraping table	Piping to boiler	Hide drying frames
Wash trough – tripery	Chopping block (local supply)	Bleeding shackle and chain
Viscera inspection table	Rail – tripery	Dressing cradle
Hide horse	Gambrels – various	Wash hand basin

Specific species will require specialized equipment, even if only to accommodate the differences in carcass size. Other species, such as game animals, including bison and deer, will require a larger facility with specialized infrastructure to accommodate slaughter and processing. These requirements include upgrades to fencing and animal control facilities, as well as extra room on the kill line and chutes designed with these animals in mind.

Slaughter equipment will include the stun box and stunning equipment, hanging chain conveyor system, chain hoist, knives, hooks and gambrels, hide skinner, breaking saws, breaking tables, conveyor tables, scales, freezers, strapping machines, vacuum pack machine, gear for slaughter personnel (suits, gloves, knives, buckets/shovels/carts for removal of offal, hides, and waste (head, hooves, etc.), floor drainage for waste (blood, offal and effluents) and waste water removal, butchering equipment such as knives, saws, blades, waste containers for trimmings and fat, chain mail gloves, suits, gloves, face shields, bonnets and bouffant caps, boots, packaging equipment. It also includes daily operational equipment and cleaning supplies such as mops, brooms, cleaning products, floor squeegees, hoses, fittings, and emergency equipment such as fire extinguishers, first aid kits, and smoke detectors.

Many projects rely on a mixture of new and used purchases. Used equipment is often available in good condition for many of the facility's needs. The Appendix contains a listing of equipment taken from previously conducted studies.

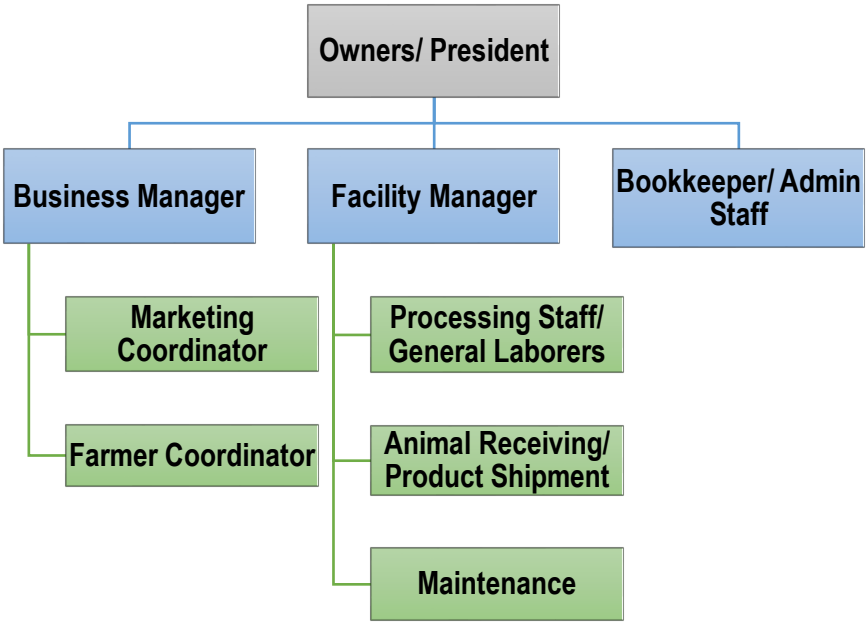
Most equipment is typically purchased during the first year of operation in order to provide for start-up operations, with other equipment added later to accommodate additional species or additional processing activities as necessary.

Human Resources

For the efficient operation of a meat processing facility, numerous roles have been identified that are necessary. In many cases, multiple roles can be fulfilled by one individual employee, and where possible, individuals may be shared for several roles within the facility based on availability. It may also be necessary to add other positions depending on the services provided by the facility. For example, if a facility intends to implement an on-site retail market for client's products, then the appropriate positions, such as a retail manager, will need to be added.

The following hierarchy provides a basic outline of the positions that would be necessary for a general slaughter and processing facility.

Figure 36: Processing Facility General Labor Hierarchy



It is recognized that training will be an important part of developing local personnel for employment at this facility, especially in obtaining employees knowledgeable about breaking down carcasses into retail cuts.

An overview of the functions of the basic roles as presented above are:

Owners/ President:

Depending on the ownership and management structure of the business, the owners may fill the role of the facility President, overseeing all operations. If this position is hired, it should be someone with experience in managing a meat processing facility. This is a key position for the "big picture" decisions and he or she will oversee other management including the business manager and facility manager. This position will also work closely with administrative staff and the bookkeeper to monitor the facility's overall financial standing.

Business Manager

The business and sales manager will oversee successful sales operations. This can include the sale of cut products, or the sale of services to clients. Their overarching objective will be to establish, achieve, and grow sales-plan goals. They will also oversee not just maintaining existing accounts but also finding and developing new business relationships.

Marketing Coordinator: This position will strengthen the company's marketing ability by helping coordinate marketing aspects to achieve the most efficient use of resources. To achieve this goal, the marketing coordinator will analyze and enter the sales, expenses, and business data of product line. From this data, the coordinator will create sales forecasts, marketing and advertising strategies, and promotional presentations. They will also have to organize meetings to convey marketing information and plans to relevant members of the facility's management.

Farmer Coordinator: This employee's purpose is to promote and organize operations between the beef processing facility and local cattle farmers. This will include marketing, maintaining, and strengthening business operations between current and new customers. The proper facilitation of this position is essential to the future success of this project. Due to the nature of this job, the farmer coordinator must coordinate operations and meetings with facility management and farmers.

Facility Manager

As plant/facility manager, this employee will be required to oversee many aspects of plant management. He will need to oversee all aspects of beef processing from slaughter to packaging and processing. He will need to lead food safety, provide direction, and effectively communicate between all departments relevant to facility operations. One of his most important duties will be to provide reports on operations to the facility president and other important leadership.

Processing Staff/General Laborers: These workers will need to participate in the various parts of the processing chain from creating the cuts of meat to placing them on pallets. Other general labor activities may be required. Requirements for this position include the ability to lift 50 pounds, work at line speed, and work in a variable temperature environment. Under a single species facility, most of the cutting floor labor will be skilled to process and handle that species, whether it is cattle, poultry, etc. However, under a multi-species facility, labor will either need to be cross-trained and skilled at processes all the products, such as cattle and poultry, or the facility will need to employ multiple people who are skilled in either one.

Either finding more highly skilled and cross-trained labor, or higher additional labor to fill the expertise gaps will cost the facility more money as labor wages will be higher, and the expense to provide additional training to employees will also represent a cost.

Receiving and Shipment: This position will conduct various aspects of the facility's receiving and product shipment operations. This employee will receive the animals as they are brought to the facility, ensuring that they are accurately marked and tracked.

Additionally, this position will be responsible for providing the cuts and products to the client or preparing them for shipment if needed.

Maintenance Coordinator: Will need the appropriate certification for the heating and ventilation systems and be able to provide general maintenance functions. Will need to coordinate external contractors i.e. electricians, plumbers and general engineers. Will need to be able to sharpen and maintain knives, saws and other equipment used in the processing. (In a small facility this person will also have other duties, such as processing)

Bookkeeper/ Administrative Staff

These employees will be important for management and organization of records and financial activities. Record keeping duties will consist of updating, processing, destroying, and storing files and information as needed. Booking responsibilities will include activities such as developing systems to record financial transactions and creating financial reports. These employees will also need to maintain and balance subsidiary accounts and general ledgers and report the financial records to upper management and other important operation management.

Additional Human Resource Roles

In addition to personnel directly employed by the meat processing facility, other roles may be filled either by outsourcing or contracting. For the meat processing facility venture, examples include roles/positions such as accountant, attorney, web administrator, or IT personnel.

IT/Web Services

Should the facility choose to maintain a web presence, it may be necessary to contract with an information technology firm to conduct the daily management of the website as well as any maintenance that may be required. Any website that is eventually utilized should be updated on an annual basis. Much of this role may be accomplished on a contract basis.

Office and Staff Management

The office manager will be responsible for the oversight of all office staff, including accounting and support staff, as well as customer service positions.

Accounting and Office Support Staff

Accounting and office support staff constitute the general labor need of all office related activities.

Labor Considerations

Hiring labor can provide extra capacity to an operation and allow for managers to focus on managing the business rather than general laborer activities. However, the managers must also decide at what point does the benefit of additional labor outweigh the additional cost. Is hiring and training new labor worth the time and effort? Will that investment continue to pay off in the future?

Hourly vs. Salaried Employees

There are two different types of labor positions you to consider: hourly labor and salaried labor. Hourly labor is considered a “variable” expense as you choose how long this employee will work

based on the amount of time you need assistance. These employees are paid by the hour and can be seasonal, part-time or full-time employees.

Salaried labor is typically a full-time employee who you will pay wages typically based on a 40-hour work week, but the wages do not change with the actual hours worked. These employees are considered a fixed cost. Salaried labor typically receives benefits (retirement, insurance, etc.) when compared to hourly employees.

There are pros and cons to each type of labor position. Hourly labor is generally lower cost, and you can have them spend less hours working for you during the off-season. However, you may have higher turn-around with hourly employees or may not be able to hire the same employee when needed during the next season. Salaried labor can be more costly, but you are guaranteed to have them available to you on a full-time basis. This can be great during peak months but cause issues during the off-season if you have less money coming into the business.

The exact positions that are hourly or salaried will vary depending on your needs and size. For example, management positions are usually salaried positions since they require a higher level of skill and stability in that position; however, if a business is not able to support a full salaried position for a manger, it may be better to employ them part-time.

Employee Costs versus Benefits to the Business
Labor has costs beyond direct wages that must be considered by the employer. An example of all costs would be: wages + taxes + benefits (if you provide any). Generally, your employees will cost you 25% to 40% more than their direct wages. For example, an employee receiving $17 per hour in wages will cost you anywhere from $21.25 to $23.80 after accounting for taxes, benefits, and other indirect labor costs. Please see this Small Business Administration article for more information on employee costs.[38]

If an employee costs over $20 an hour (includes wages, overhead, etc.), are they providing more than $20 per hour worth of work? This can be difficult to quantify in some cases but should be considered. It would be prudent to consider the facility's locale and economic market prior to hiring any labor positions. Required wages near/within urban centers will likely be far higher than required wages in rural areas. Additionally, rural areas may have less labor available simply due to population constraints. These must be considered prior to hiring any employees.

[38] https://www.sba.gov/blog/how-much-does-employee-cost-you

Food Safety and Quality Control

When operating a slaughter and processing facility, there are multiple food safety and quality control issues to consider and monitor. Good Manufacturing Practices (GMP), an understanding of microbiology, Standard Operating Procedures (SOP), safe procedures for cleaning and sanitizing, and a thorough understanding of the principles of Hazard Analysis and Critical Control Point (HACCP) development are all important considerations and requirements.

Links to more information about these food safety and quality control requirements and considerations are provided in the Resources section.

Sanitation Standard Operating Procedures (SSOP)

The USDA mandates SSOP for meat and poultry operations as of 1997. The regulation requires that procedures be developed to outline sanitary practices to prevent contamination of meat and poultry products. These procedures include written steps for cleaning and sanitizing all areas and equipment, and include sanitation guidelines for before and during processing. All procedures must be appropriately documented and validated. Purdue University Extension provides a helpful document, "SSOP and FMP Practices and Programs"[39] on further information about SSOP.

Good Manufacturing Practices

Good Manufacturing Practices (GMP) has two meanings when used in the context of a food processing facility. The first refers to actual federal code sections of GMPs and the second is a set of operating procedures based upon these codes. The actual codes provide the basis for both the federal and state food processing regulations that serve as guidance for facility construction, equipment and utensil selection, sanitation, personnel hygiene, food handing, and production and processing controls. These are contained in the Good Manufacturing Practices as detailed in Title 21 of the Code of Federal Regulations Subpart E-- Production and Process Controls. The CFR is accessible on-line via www.ecfr.gov.

While these GMPs are generic, it provides an excellent overview of most facets of sanitary facility operation. Once understood, a facility operator can use these codes to develop GMPs for their own facility. A typical GMP program consists of several parts, each of which has a written set of policies and a checklist based upon those policies.

A written GMP program should also include sanitation and pest control policies and documentation. The sanitation program should include information about the cleaning chemicals used in the plant, how effective they are handled and stored, and how the Material Safety Data Sheets (MSDS) are maintained. Additionally, the sanitation program should detail weekly, monthly, and periodic cleaning schedules and how that cleaning is to be monitored and recorded.

The GMP plan should include a section on "Production and Process Controls" that addresses the methods of preventing contamination, processing time, temperature controls, and other critical factors. The firm must have a means of lot coding each batch of product so that a product recall can be initiated, if necessary.

[39] Keener, K. "SSOP and GMP Practices and Programs." Perdue Extension. https://www.extension.purdue.edu/extmedia/FS/FS-21-W.pdf

Hazard Analysis Critical Control Point (HACCP)

As defined by the USDA Food Safety and Inspection Service (FSIS) the Hazard Analysis Critical Control Point (HACCP) system is a scientific approach to process control. It is designed to prevent the occurrence of problems by assuring that controls are applied at any point in a food production system where hazardous or critical situations could occur. Hazards include biological, chemical, or physical contamination of food products.

The Food Safety and Inspection Service (FSIS) published a final rule in July 1996 mandating that HACCP be implemented as the system of process control in all inspected meat and poultry plants. HACCP plans are currently mandatory in the juice and meat industry, with compliance in other industries being largely voluntary. A plan should be prepared in accordance with the Code of Federal Regulations (CFR) Hazard Analysis and Critical Control Point section (Part 417).

A HACCP Plan is a written document that outlines a process, identifies the points in that process where contamination is likely to occur, and then outlines a procedure for addressing those identified "critical control points" and establishes a procedure for dealing with variances that may occur that are not covered by the plan. It also encompasses the recording and documentation of the procedures and their effectiveness.

It is important to recognize that a HACCP plan only works if an effective sanitation program and documented GMPs are in place. A HACCP program is not designed to compensate for generally poor practices, but to use solid practices as a basis to provide the highest assurance of safety.

The writing and implementing of a HACCP plan involve a significant investment in time and planning. Because of the complexity and risk associated with slaughter of animals, the process will require detailed analysis to create a thorough plan. An approved plan will need to be in place prior to a facility beginning operations.

Inspection

The facility is intended to be federally inspected to allow the products to be sold across state lines. The facility will require USDA or designated representative (Talmadge-Aiken Act) inspection on a daily operational basis. A regular part of the slaughter process will involve inspection and removal of meat that does not meet regulations or food safety requirements.

Worker Safety

OSHA guidelines provide the basis for worker safety policies and procedures and will be in place upon commencement of the plant's operations. Day to day operations will involve wet conditions and care will be taken to maximize worker safety with safety equipment and proper apparel, such as non-slip boots.

In addition, increased worker safety and sanitization may be needed to conform to any federal and state requirements in response to the COVID-19 pandemic. These measures may include provide personal protective equipment, increased cleaning and sanitization of worker areas, temperature testing when employees enter the building, and minimizing large gatherings of employees or using distancing measures. A full section of information on addressing the COVID-19 guidelines is included in the Resources section.

Facility Budget Examples and Comparisons

Processing and Slaughter Operation Comparisons

The specific operational characteristics of red meat processing facilities can differ greatly among individual facilities. This portion of the document examines multiple examples of red meat processing facilities from across the country and compares their operating details. The facilities discussed were sourced from available studies from the past 20 years and range in revenue, head processed, labor, building size, and other metrics, showing the diverse nature of these operations.

All the studies examined here are classified as small or medium. In this context, small facilities are facilities processing less than 5,000 beef head equivalents while medium facilities are processing more than 5,000 beef head equivalent. Most red meat processing in the United States (80%+) is conducted by large scale processors and corporations. There are efficiencies to scale in this industry that result in large scale processors having lower costs on a per unit basis. These small and medium facilities are less efficient but are being presented due to interest in the region.

The studies below are used in the following comparison and analysis on processing and slaughter facility operations. For further reference, a list of studies and their components has been provided below. This list includes the study's name, location of the proposed facility and the date the study was conducted. The table also indicates how the study was used, for the small facilities comparison, medium facilities comparison, or just for general research and resources.

Additionally, some studies are not publicly available, so these are indicated as a Private Study. From this information, the costs of the various head count and beef vs. multispecies differences is addressed showing overall estimated costs and profitability of these differences.

Table 19: Meat Processing Facility Studies

Study List	Study Name	Location	Date
Small Facilities	Central Virginia Meat Processing Feasibility Study	Virginia	2004
	Slaughterhouse Feasibility Report	Vermont	2005
	Hudson Valley Livestock Marketing Task Force Meat Processing Feasibility Study	New York	2000
	Private Study A	N/A	2007
	Del Norte Meat Processing Feasibility Assessment	California	2011
	Confronting Challenges in the Local Meat Industry: Focus on the Pioneer Valley of Western Massachusetts	Massachusetts	2013
	Private Study B	N/A	2014
Medium Facilities	Del Norte Meat Processing Feasibility Assessment	California	2011
	Southern Maryland Livestock Producers Meat Processing Feasibility Study	Maryland	2006
	Southern Maryland Livestock Producers Meat Processing Feasibility Study	Maryland	2006
	Feasibility of a Beef Processing Plant in Beaverhead County, Montana	Montana	2006
Resource Studies	Demand and Options for Local Meat Processing	Connecticut	2008
	Study Reveals Meat Processing Needs	Wisconsin	2019
	Michigan Meat Processing Capacity Assessment Final Report	Michigan	2014
	Cattle and Beef Market Study - Final Report	Australia	2017
	Large Animal Meat Processing Feasibility in Western North Carolina	North Carolina	2012
	Meat Industry Capacity and Feasibility Study of the North Coast Region of California	California	2009
	A Feasibility Assessment of a Meat Slaughtering/Processing Plant or Feedlot in Northern Michigan	Michigan	2007
	Mendocino County Meat Plant Study	California	2013
	One Montana Meat Processing Facility Feasibility Study Final Report	Montana	2014
	Feasibility of a Tennessee Cull-Cow Processing Facility	Tennessee	2020
	Feasibility of a Local Processing Facility in Carroll County, Georgia	Georgia	2009
	Local Meat and Poultry Processing- USDA ERS	N/A	2013

Financial Comparison Studies

The studies listed for the small- and medium-sized facilities in the chart above **are** used in this financial comparison and discussion section. These studies all contained the financial information necessary for comparison such as head counts, facility costs, labor costs, and more. All facilities in this section are classified as small or medium and fit within the required parameters.

1. **Central Virginia Meat Processing Feasibility Study**. This 2004 study was published in response to increasing interest from livestock producers in the central Virginia region. The study examines construction of a fixed slaughter facility, centralizing processing, mobile slaughtering unit(s), and more.

2. **Slaughterhouse Feasibility Report**. This April 2005 study was prepared for Pride of Vermont by Sleeping Lion Associates, Inc. The study provides information on the overall feasibility of a slaughterhouse including regulations and regulatory issues, and assessment of the potential market, competition analysis, budgets for startup capital and operations, and recommendations.

3. **Feasibility of a Beef Processing Plant in Beaverhead County, Montana**. This study was conducted by Food and Livestock Planning, Inc in July 2006. It outlines the financial feasibility for a plan processing 40 head of beef per day in a facility that it about 16,000 square feet.

4. Private Study A. This study is not publicly available online but was provided for comparison in this document. This Virginia study examined the feasibility of a small-scale processing facility with producer-ownership. The study includes an examination of both technological and financial feasibility.

5. **Del Norte Meat Processing and Retail Facility Feasibility Assessment.** This study was conducted in 2011 by J Irwin Consulting and examines the feasibility of a slaughtering, processing, packaging, and market retail facility in Del Norte County, California. This study has two scenarios for facilities that are examined in the financial comparisons.

6. **Confronting Challenges in the Local Meat Industry: Focus on the Pioneer Valley of Western Massachusetts**. Published by CISA in November 2013, this study represents research to assess additional options for meat processing, with the goal of expanding the meat products available, giving producers a choice of services, and encouraging growth in local meat production.

7. Private Study B. This study was conducted to examine a beef processing facility serving a county in Virginia and surrounding areas. This study has not been made public but was provided for use in this report.

8. **Hudson Valley Livestock Marketing Task Force Meat Processing Facility Feasibility Study.** This feasibility study was conducted by Shepstone Management Company in January 2000. The study concludes that a processing facility would be feasible and outlines the conditions needed to establish and sustain a facility.

9. **Southern Maryland Livestock Producers Meat Processing Feasibility Study**. This is another study conducted by Shepstone Management Company in August 2006. It discusses the potential for a group of beef farmers to cooperatively sell meat under a combined trade name and the slaughter and processing capacity needed. This study has two scenarios that were used in the financial comparisons.

Resource Studies

The following studies are provided for further resources and information but were **not** used in the calculations in this section of the document. Some studies lacked the financial information necessary to be included while others were statistical outliers in terms of processing output or total costs and thus do not fit into the small-to-medium size facilities that are being examined. However, their information can still be valuable to review.

10. **Demand and Options for Local Meat Processing: Finding the way from pasture to market in the CT River Valley**. This study was conducted by Community Involved in Sustaining Agriculture in June 2008. The study provides highlights from previous studies, discusses potential solutions for shortages in slaughter options, discusses the results of a farmer survey on the demand of slaughtering services, and lays out the benefits and challenges of a small-scale facility.

11. **Study reveals meat-processing needs. Agri-view.** This April 2019 article from Lynn Grooms outlines the findings of a feasibility and demand study of farmers in Iowa and the potential to bolster slaughter facilities in that area.

12. **Michigan Meat Processing Capacity Assessment Final Report**. This study was published by Michigan State University Center for Regional Food Systems in August 2014. It details the results of a survey of processors to determine the current state of the meat industry and provide an overview of existing businesses, markets they serve, and future business plans.

13. **Cattle and Beef Market Study – Final Report.** This study was published by the Australian Competition and Consumer Commission (ACCC) in March 2017. The study reflects the findings of the ACCC into the livestock and processing industry and recommendations on how to potentially bolster the industry.

14. **Large Animal Meat Processing Feasibility in Western North Carolina.** Appalachian Sustainable Agriculture Project's Local Food Research Center conducted this study in October 2012 to determine the feasibility of establishing a multi-species large animal processing facility in Western North Carolina. The study outlines multiple requirements for the facility including come considerations and recommendations.

15. **Meat Industry Capacity and Feasibility Study of the North Coast Region of California.** This document was prepared by a team of authors in March 2009 under a grant award from the US Department of Commerce. The document summarizes four studies to determine the capacity and feasibility of creating a modern scale, multi-species meat processing plant.

16. **A Feasibility Assessment of a Meat Slaughtering/Processing Plant or Feedlot in Northern Michigan. Michigan State University**. This study published in January 2007 analyzes the feasibility of a small meat processing plant in Northern Lower Peninsula as well as the feasibility of a feedlot in the same area.

17. Meat Industry Capacity and Feasibility Study of the North Coast Region of California**.** This report examines several different studies and examines the potential for a small scale multispecies facility. The study examines cattle, lamb, and goats and is based on processing models most often found in New Zealand.

18. **A Feasibility Assessment of a Meat Slaughtering/Processing Plant or Feedlot in Northern Michigan.** This assessment determines the validity of a small scale processing operation as well as the feasibility of a feedlot in the same locale and examines economic aspects, technological aspects, and more.

19. **Mendocino County Meat Plant Study.** This small-scale multispecies facility assesses the potential for cattle, hogs, sheep, goats, and bison. It includes surveys of local producers as well as several different facility options.

20. **One Montana Meat Processing Facility Feasibility Study.** Th potential for a large scale facility, processing up to 250 head per day, is studied in this report. It includes examinations of beef and/or bison.

21. **Feasibility of a Tennessee Cull-Cow Processing Facility.** This study was created with the intention of serving an economically distressed county in Tennessee to assist the local community and provide a positive economic impact.

22. **Feasibility of a Local Processing Facility in Carroll County, Georgia.** The University of Georgia considers the feasibility of a multispecies multi-state facility to fill certain underrepresented processing needs.

23. **Local Meat and Poultry Processing - The Importance of Business Commitments for Long-Term Viability.** This document, published by the USDA, takes an in-depth look at the challenges faced by producers and processors for local meat and poultry. Case studies are examined as well as other key issues that must be addressed to have a successful local meat processing operation.

Study Dates and Inflation

To provide a more accurate comparison between the studies used in this analysis, all costs have been converted to 2020-dollar values to account for inflation. These studies have been adjusted for time but not for location. Local and regional construction values would play a part in the development of a plant but are not examined here. Construction costs were calculated using the Construction Analytics Building Cost Index, employment costs utilized the U.S. Bureau of Labor Statistics Employment Cost Index, equipment costs used the BLS Producer Price Index: Machinery and Equipment, and revenue costs used the BLS Consumer Price Index.

The Construction Analytics Building Cost Index tracks inflation within the overall construction industry through Residential, Nonresidential, and Non-building infrastructure composite indices. These three indices represent whole building final cost within a given year. For this study, we utilized the Nonresidential Building Index as shown on the blue line in the following image. This index allowed us to compare construction values over time and adjust to current values.

Figure 37: Construction Analytics Building Cost Index[40]



The Employment Cost Index from the U.S Bureau of Labor Statistics was used to adjust labor costs from each of the studies to current dollar values to better compare the cost of labor over time. The BLS keeps a regularly updated running record of Employment Cost Indices that date back to 1976. These allowed us to track the changes in the cost of labor and account for them when discussing labor costs at various points in time. The following figure provides an example of a 2006 Employment Cost Index, with an overall number of 102.5 for all workers in that year.

[40] Ed Zarenski. Construction Inflation Index Tables. *Construction Analytics.* https://edzarenski.com/2016/10/24/construction-inflation-index-tables-e08-19/

Table 20: Employment Cost Index Example 2006[41]

Table 2. Employment Cost Index for wages and salaries, by occupational group and industry

(Seasonally adjusted)

Occupational group and industry	Indexes (Dec. 2005 = 100)		Percent changes for 3-months ended–							
	Sep. 2006	Dec. 2006	Mar. 2005	June 2005	Sep. 2005	Dec. 2005	Mar. 2006	June 2006	Sep. 2006	Dec. 2006
Civilian workers										
All workers[1]	102.5	103.3	0.7	0.6	0.6	0.7	0.7	0.9	0.9	0.8
Private industry workers										
All workers	102.5	103.2	.7	.5	.6	.6	.7	.9	.8	.7
Occupational group										
White-collar occupations[2]	102.7	103.5	.7	.6	.6	.6	.7	1.0	.9	.8
Blue-collar occupations[3]	102.2	102.8	.5	.6	.6	.6	.7	.7	.8	.6
Industry										
Goods-producing industries[4]	102.1	103.0	.6	.7	.8	.8	.6	.9	.4	.9
Construction	102.6	103.8	.5	.8	.8	1.0	.7	1.2	.6	1.2
Manufacturing	101.8	102.5	.6	.6	.8	.6	.5	.8	.3	.7
Durable goods	101.8	102.4	.7	.5	.7	.6	.7	1.0	.0	.6
Nondurable goods	101.8	102.7	.4	.5	1.1	.6	.2	.5	.8	.9
Service-providing industries[5]	102.6	103.3	.7	.5	.6	.6	.8	.8	1.0	.7
Trade, transportation, and utilities[6]	102.0	102.8	.6	.4	1.0	.7	.3	.4	1.2	.8
Retail trade	101.8	102.9	.6	.6	.8	.6	.5	.2	1.0	1.1
Information[6]	102.6	102.5	.7	.8	.2	.8	.8	.7	1.0	-.1
Financial activities[6]	102.5	103.0	.9	.7	.2	.7	1.1	.6	.6	.5
Professional and business services[6]	102.9	103.5	.5	.2	.0	.3	.9	1.4	.6	.6
Education and health services[6]	103.0	103.9	.9	.7	.6	.8	.7	1.0	1.3	.9
Education services	102.7	104.0	1.0	.8	.9	.6	1.0	1.2	.7	1.3
Health care and social assistance[7]	103.0	103.9	.9	.7	.6	.8	.7	1.0	1.3	.9
Leisure and hospitality[6]	102.3	103.6	.5	.8	.9	.6	.6	1.0	.8	1.3
State and local government workers										
All workers	102.6	103.4	.7	.6	.7	1.0	.4	.9	1.4	.8

The following figure shows part of the June 2020 report for the Employment Cost Index with an overall number for all workers of 139.1, an increase of roughly 37 points from the 2006 example above.

[41] US Bureau of Labor Statistics. Employment Cost Index. https://www.bls.gov/bls/news-release/eci.htm#current

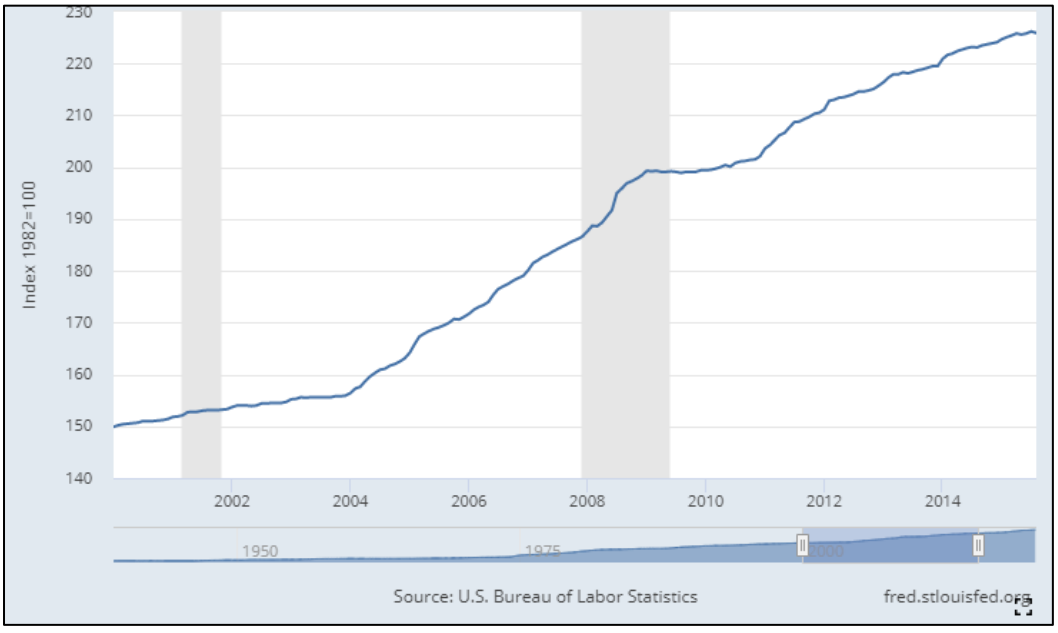
Table 21: Employment Cost Index Example 2020

Table 2. Employment Cost Index for wages and salaries, by occupational group and industry
[Seasonally adjusted]

Occupational group and industry	Indexes (Dec. 2005=100)		Percent changes for 3-months ended-								
	Mar. 2020	Jun. 2020	Jun. 2018	Sep. 2018	Dec. 2018	Mar. 2019	Jun. 2019	Sep. 2019	Dec. 2019	Mar. 2020	Jun. 2020
Civilian workers											
All workers[1]	139.1	139.6	0.5	0.8	0.8	0.7	0.7	0.8	0.7	0.9	0.4
Industry											
Goods-producing industries[2]	138.4	139.5	0.8	0.6	0.8	0.8	0.8	0.9	0.8	0.7	0.8
Manufacturing	138.3	139.1	0.7	0.6	0.8	0.8	0.7	0.8	0.8	0.7	0.6
Service-providing industries[3]	139.3	139.7	0.5	0.8	0.8	0.7	0.6	0.8	0.7	1.0	0.3
Education and health services	135.8	135.8	0.6	0.8	0.7	0.5	0.6	0.9	0.4	0.8	0.0
Educational services	133.0	133.8	0.6	0.7	0.6	0.5	0.5	1.1	0.5	0.6	0.6
Elementary and secondary schools	131.8	132.5	0.6	0.7	0.6	0.5	0.5	1.2	0.5	0.6	0.5
Junior colleges, colleges, universities, and professional schools	134.9	135.5	0.5	0.5	0.8	0.6	0.6	0.7	0.5	0.6	0.4
Health care and social assistance	138.8	138.2	0.5	0.9	0.7	0.5	0.5	0.7	0.6	0.9	-0.4
Hospitals	138.5	139.3	0.6	0.5	0.9	0.6	0.6	0.7	0.7	0.7	0.6
Public administration	135.0	135.8	0.6	0.6	0.7	0.7	0.7	0.6	0.6	0.7	0.6
Private industry workers											
All workers	140.3	140.8	0.6	0.8	0.7	0.7	0.7	0.8	0.7	1.0	0.4

The Producer Price Index from the U.S. Bureau of Labor Statistics measures the average change over time in the selling prices for a variety of product and service categories. This allows for the tracking over time of the change in value of these items due to inflation and other factors. For this section, we have used the PPI by Commodity: Machinery and Equipment to compare equipment costs reported for each of the facilities. The following figure shows the overview of the PPI Index for Machinery for the years of the facility studies used in this section.

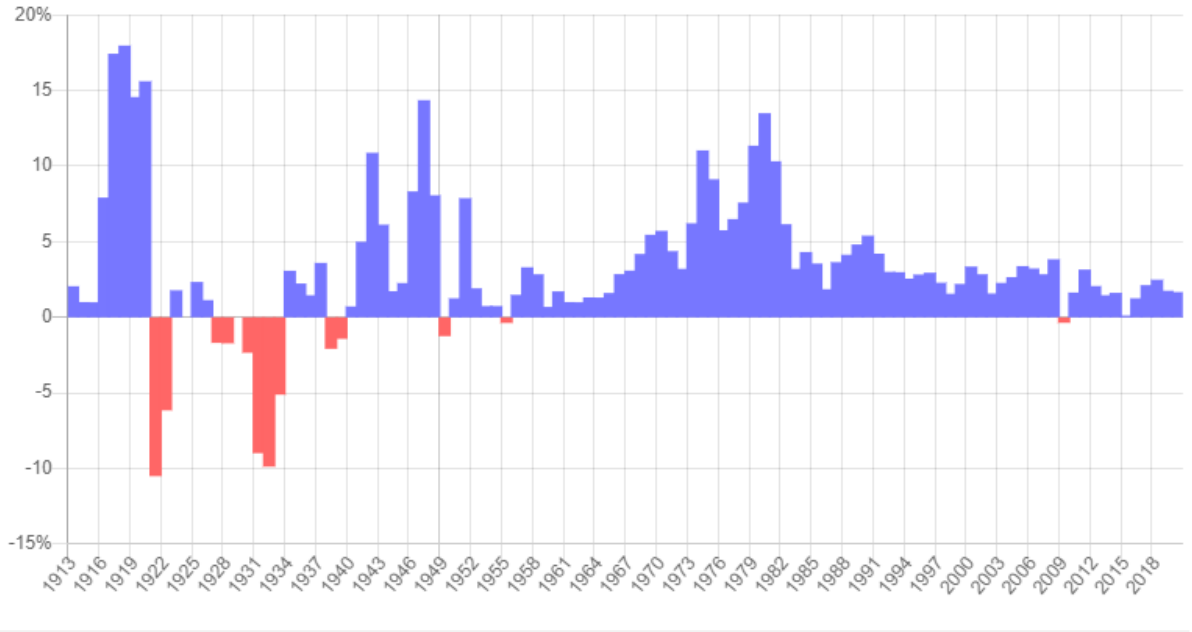
Figure 38: Producer Price Index-Machinery and Equipment[42]



[42] Federal Reserve Bank of St. Louis. Producer Price index by Commodity: Machinery and Equipment. *UU.BLS.* https://fred.stlouisfed.org/series/WPU114

The U.S. Bureau of Labor Statistics also publishes a Consumer Price Index, which was used to compare revenue costs over time for each of the studies. This allowed us to account for inflation and present each revenue value in its current dollar value. The following figure presents the annual inflation of the US dollar utilizing the Consumer Price Index.

Figure 39: Consumer Price Index Annual Inflation[43]



Facility Comparison Summary

The studies compared in this section are taken at face value. Attempts have been made to normalize all their numbers to 2020, however, each study was written at a different point in time with different economic climates, locations, and more and should thus be examined in terms of comparison and not as a roadmap. This data is meant to be illustrative and to help interested parties determine what questions and roadblocks there are to beginning meat processing.

The following table provides a summary of each of the studies and the proposed facilities examined in this section. It should be noted that these studies represent potential facilities and may not include actual operations of existing facilities. The studies documenting these facilities range from 2000 to 2014, with five of them being completed between 2005 and 2007. The facilities include both beef only and multispecies processors. Annual revenue for the operations examined range from $245,935 for the second Del Norte study, to nearly $4.2 million for the Beaverhead, Montana study.

[43] Consumer Price Index Inflation Calculator. Accessed September 2020. https://www.officialdata.org/us/inflation/2006?amount=2118350

Table 22: Facility Summary

Study	Date	Beef Head	Other Head	Other Head Species	Total Capital Investment	Yearly Revenue	Jobs Created
Central Virginia Study	2003	4,000	1,100	Sheep/Goats/Hogs	$2,480,272	$1,765,747	7
Pride of Vermont Processing Study	2005	400	1,900	Sheep/Hogs	$865,488	$318,968	7
Hudson Valley Meat Processing Study	2000	1,575	2,250	Hogs	$1,073,100	$774,782	11
Private Study A	2007	1,200	N/A		$2,070,000	$577,000	6
Del Norte Meat Processing Feasibility Scenario A	2011	2,100	N/A		$595,477	$396,338	4
Western Massachusetts Processing Study	2013	150	600	Sheep/Hogs	$114,998	$245,935	4
Private Study B	2014	1,450	N/A		$2,214,000	$640,000	9
Averages- Small Facility		**1,554**	**1,463**		**$1,344,778**	**$674,072**	**7**
Del Norte Meat Processing Feasibility Scenario B	2011	6,000	N/A		$2,142,979	$607,795	4
Southern Maryland Meat Processing Study Scenario A	2006	5,200	4,160	Sheep/Hogs	$3,517,511	$2,731,137	29
Southern Maryland Study Scenario B	2006	5,200	4,160	Sheep/Hogs	$1,073,100	$3,436,574	34
Beaverhead County, Montana Processing Study	2006	10,400	N/A		$2,070,233	$4,190,146	7
Averages- Medium Facility		**6,700**	**4,160**		**$2,200,956**	**$2,741,413**	**19**

A beef head equivalency has been created by the consultants to provide a consistent way to measure variables by the number of head processed across multiple species. The weights and equivalencies have been derived from industry averages and are intended as live weight values. These head equivalencies are provided below. It should be noted that the goat live weight is expected to be dairy-size goats and not Boer goats.

Table 23: Multispecies Equivalency- Live Weight

Species	Beef Head Equivalents	Pounds
Beef	1.00	1200
Hogs	4.71	255
Sheep/Lamb	21.82	55
Goats	8.28	145

Additionally, the following Table provides an overview of the cost comparisons between each of the facilities examined.

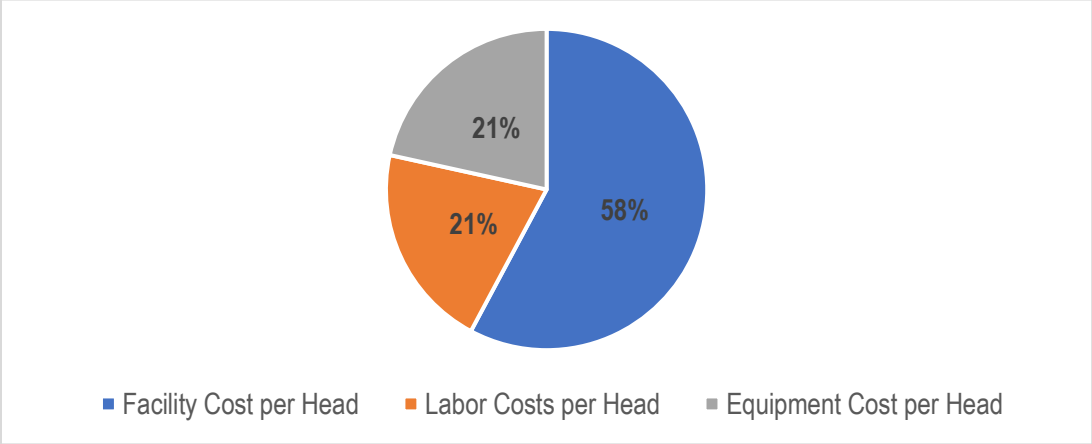
Table 24: Facility Cost Comparison Overview

Study	Date	Labor Costs ($)	Equipment Costs ($)	Facility Costs ($)	Facility Size (Sq. Ft)
Central Virginia Study	2003	467,997	201,652	2,278,621	8,280
Pride of Vermont Processing Study	2005	159,597	286,178	579,310	3,000
Hudson Valley Meat Processing Study	2000	615,784	207,645	865,455	5,000
Private Study A	2007	154,000	398,000	1,673,000	6,680
Del Norte Meat Processing Feasibility Scenario A	2011	158,650	119,477	476,000	2,600
Western Massachusetts Processing Study	2013	136,516	114,998	-	2,500
Private Study B	2014	194,000	245,880	1,968,000	6,200
Averages- Small Facility		**269,473**	**224,776**	**1,306,670**	**4,894**
Del Norte Meat Processing Feasibility Scenario B	2011	196,279	119,477	1,946,700	5,250
Southern Maryland Meat Processing Study Scenario A	2006	1,080,526	110,243	1,530,968	4,000
Southern Maryland Meat Processing Study Scenario B	2006	1,253,511	210,754	2,264,000	5,000
Beaverhead County, Montana Processing Study	2006	339,461	421,508	5,888,000	16,000
Averages- Medium Facility		**717,444**	**215,496**	**2,907,417**	**7,563**

Cost Per Head Evaluation

The cost per head for small and medium facilities was calculated from the studies above and examined below. Smaller facilities tend to have higher costs on a per unit basis, but lower total costs, while medium facilities tend to have smaller costs on a per unit basis, but higher total costs. It should be noted that these are meant for illustrative and comparative purposes only. Labor is an annual expense, while the facility and equipment costs in this context are one-time expenses.

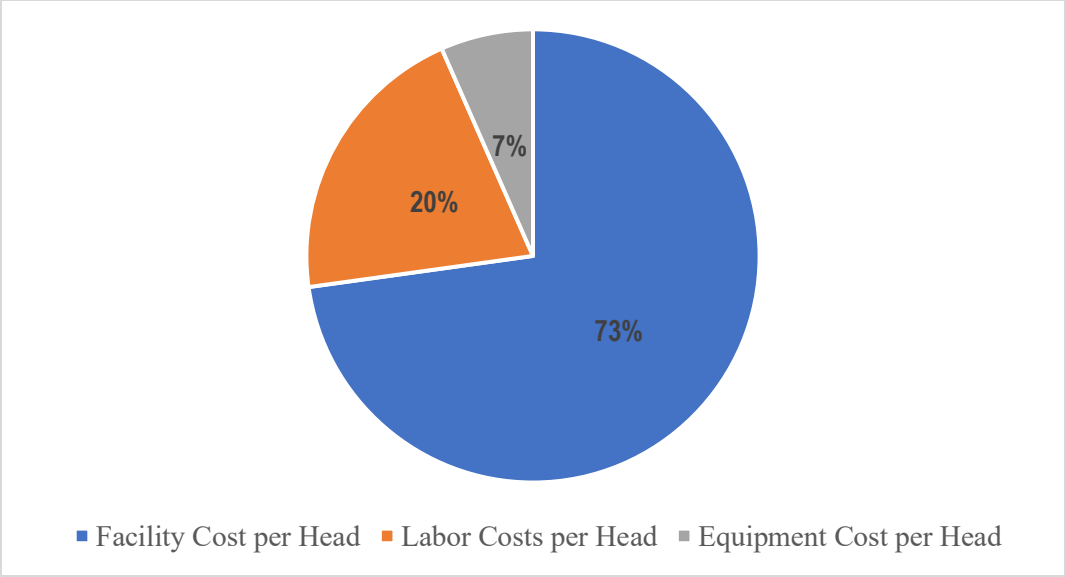
Figure 40: Cost per Head Comparison- Small Facility



As shown in the chart above, the largest cost per head faced by small facilities is in the facility itself. Labor and equipment combined do not, on average, cost as much as the facility does. Facilities costs per head in the studies examined range from $289 to $946, with an average of $555 per head in small facility costs. Labor costs per head and equipment costs per head are roughly the same. Equipment costs per head ranges from $31 per head in a 2003 study up to $460 from a 2005 study, with an average of $207. Labor costs per head range from $76 in a 2011 study up to $523 in a 2013 study, for an average of $198.

Overall, the facility and its subsequent costs are significant on a per head basis when compared to the other two categories. This industry is initially capitally intensive and new entrants in the small facility category may want to focus efforts on keeping facility costs low to help ease the initial capital strain.

Figure 41: Cost per Head Comparison- Medium Facility



Medium facilities tend to face different cost structures than smaller ones as demonstrated here and the facility costs per head account for a larger portion of expenses than facility costs for a small operation. While facility costs, on a per head basis, are nearly two-thirds of total costs per head, it is much lower total cost than the small facility.

Facility costs on a per head basis for a medium facility range from $149 to $566, with an average of $322. This is significantly less than the smaller facility costs per head. Labor costs and equipment costs are similarly much smaller. Equipment costs per head range from $19 to $41, with an average of $29. Labor costs per head range from $33 to $162, with an average of $91.

While these costs are lower **on average on a per head basis,** that does not mean that the total costs are always lower for each study. Medium facilities tend to be bigger and all that is demonstrated here is that buying in "bulk" lowers cost per unit.

Job Creation and Labor Costs

The job numbers among the selected studies range from as low as 4, to as high as 34. As shown in Facility Summary table, the small facilities examined average 7 jobs created, while the medium facilities average 19. The labor costs, on average, correspond with the number of jobs created, with medium facilities averaging $717,444 and small facilities nearly $269,473. This results in an average of around $39,298 per employee at small facilities and $38,706 per employee at medium size facilities. These costs are comparable, and the costs within each category vary.

The jobs figures examined in this section are direct labor only and do not account for positions outside of those directly involved with the processing of meat. Several of the studies listed did include an administrative position but many did not. It is highly likely that these facilities will also employ or contract drivers, inspectors, and more.

Economic Impact and Jobs Created

Jobs created like the ones examined here would have further reaching impacts than just direct and indirect labor. These types of facilities do impact their local and regional economies and this impact can be measured in what is usually referred to as an "economic multiplier." These multipliers examine the overall economic impact that money spent on processing would have in the local and regional economy. For example, the existence of a beef processing facility would cause local producers to increase their supply and to fill this need they would need to hire additional staff. Restaurants may swap from a meat supplier that is farther away to this new local facility, recirculating more local dollars into the economy.

Employment multipliers designate how many local jobs are created by the creation of one job in the processing plant. A multiplier of 3.33 means that for every direct processing position, 2.33 more jobs are created through a ripple effect in the local or regional sector. More information on multipliers can be found in this 2020 article from IMPLAN "Understanding Multipliers." Additionally, Two studies; Economic Contributions & Multiplier Effects of the Beef Industry in Pennsylvania and The Economic Impact of Illinois's Livestock Industry take in-depth looks at how facilities can have far reaching impacts in their respective locations.

The following tables examines the jobs created and labor costs from the studies for the small- and medium-sized facilities. Additionally, the table presents the number of head needed to create one job, as well as the labor cost per head.

Table 25: Jobs Figures

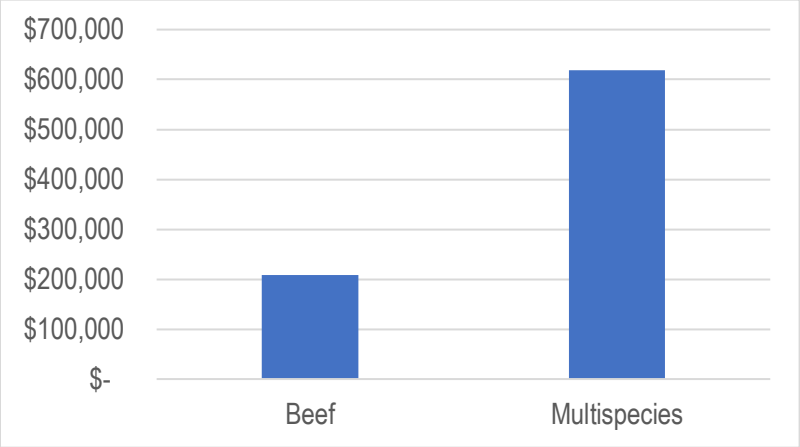
Study	Date	Jobs Created	Labor Costs ($)	Jobs per X head	Labor Costs per Head ($)
Central Virginia Study	2003	7	467,997	583	115
Pride of Vermont Processing Study	2005	7	159,597	79	288
Hudson Valley Meat Processing Study	2000	11	615,784	187	158
Private Study A	2007	6	154,000	200	128
Del Norte Meat Processing Feasibility Scenario A	2011	4	158,650	525	76
Western Massachusetts Processing Study	2013	4	136,516	65	523
Private Study B	2014	9	194,000	161	99
Averages- Small Facility		**7**	**269,473**	**257**	**198**
Del Norte Meat Processing Feasibility Scenario B	2011	4	196,279	1,500	33
Southern Maryland Meat Processing Study Scenario A	2006	29	1,080,526	197	137
Southern Maryland Meat Processing Study Scenario B	2006	34	1,253,511	168	162
Beaverhead County, Montana Processing Study	2006	7	339,461	1,456	33
Averages- Medium Facility		**19**	**717,444**	**830**	**91**

There are outliers that can be observed when looking at each facility individually. Among the medium size facilities, the difference between labor costs is extremely noticeable, with two facilities with over $1 million and two with less than $400,000. Despite the differences in labor numbers, each of these facilities processes 6,000 or more head. The differences among job numbers and labor costs may indicate differences in operating practices such as automation.

When broken down by jobs per head, the facilities differ greatly between small and medium. The small facilities on average created one job for every 257 head of cattle processed. The medium facilities on the other hand, created one job for every 830 head processed. The average for the medium facilities is driven up by the Del Norte scenario B and Beaverhead County study, both of which processed medium facility levels of head with small facility levels of jobs.

The labor costs can also be examined along the lines of product type. Some of the facilities included are beef only, while others are multispecies. When breaking down the average labor costs along product lines, we see that multispecies plants are on average seeing labor costs of nearly three times those of beef only. When looking at all facilities, multispecies processing plants are seeing an average labor cost of nearly $620,000 compared to an average of over $208,000 for single species beef plants. In general, the single species plants require fewer laborers than multispecies plants, with the beef plants creating 6 jobs on average compared to the 15 of multispecies plants. The high averages for multispecies facilities are driven up by the two medium size multispecies facilities, both of which have the highest labor costs overall. This information is represented in the following figure.

Figure 42: Average Total Labor Cost by Species



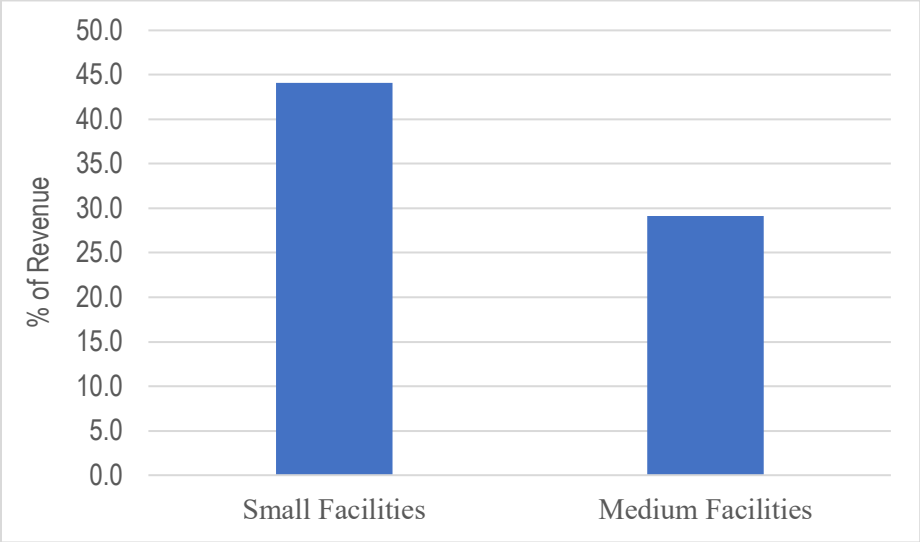
When looking at labor costs in relation to revenue, we see a large variation among the facilities. Labor as a percentage of revenue varies from as low as 8 percent of annual revenue for Beaverhead County, to as high as 79.5 percent for Hudson Valley. For all the facilities except Beaverhead, labor accounts for over one fourth of total annual revenue, and for three of the facilities it accounts for at least half of all revenue.

Table 26: Labor Costs as a Percentage of Yearly Revenue

Source	Date	Labor Costs ($)	Yearly Revenue ($)	Labor as a % of Revenue
Central Virginia Study	2003	467,997	1,765,747	26.5
Pride of Vermont Processing Study	2005	159,597	318,968	50.0
Hudson Valley Meat Processing Study	2000	615,784	774,782	79.5
Private Study A	2007	154,000	577,000	26.6
Del Norte Meat Processing Feasibility Scenario A	2011	158,650	396,338	40.0
Western Massachusetts Processing Study	2013	136,516	245,935	55.5
Private Study B	2014	194,000	640,000	30.3
Del Norte Meat Processing Feasibility Scenario B	2011	196,279	607,795	32.3
Southern Maryland Meat Processing Study Scenario A	2006	1,080,526	2,731,137	39.6
Southern Maryland Meat Processing Study Scenario B	2006	1,253,511	3,436,574	36.5
Beaverhead County, Montana Processing Study	2006	339,461	4,190,146	8.1

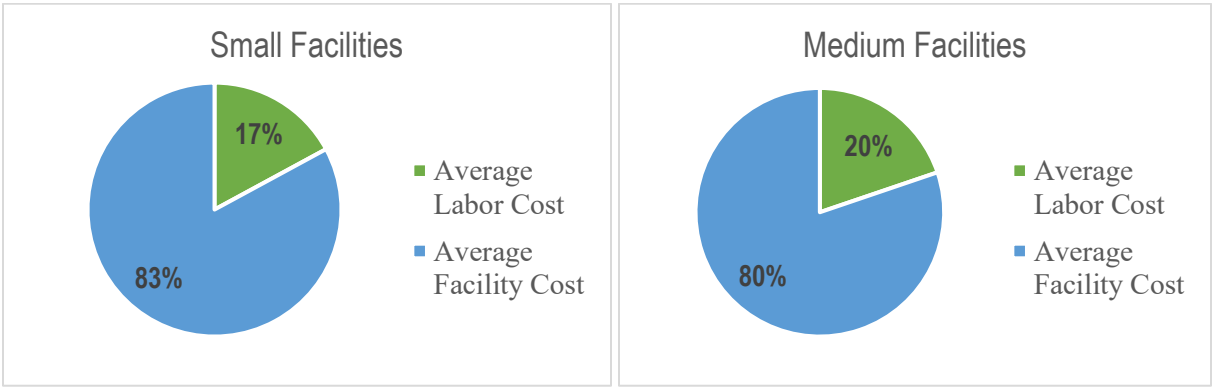
When breaking these figures down between small and medium facilities, as shown in the figure below, we see that on average, the small facilities labor accounts for about 44 percent of overall revenue, as opposed to the nearly 29 percent of revenue accounted for by labor in the medium facilities. The smaller facilities, with their lower revenue levels, see labor costs accounting for a higher amount of revenue than medium facilities. This is compounded by the low labor levels of two of the medium size facilities.

Figure 43: Average Labor as a Percentage of Revenue



When looking at the labor and facility costs, we can see similarities in their spending breakdowns. The small facilities, on average, spent around 5 times more on facility costs than labor costs, at $1.3 million and around $270,000, respectively. The medium facilities follow a similar breakdown, spending four times on facility costs than on labor, at $2.9 million and over $717,000 respectively. Despite the differences in total costs, the similar percentages indicate that the labor and facility needs scale up with one another relatively evenly as a facility grows.

Figure 44: Labor and Facility Cost Comparison



Equipment Costs

Equipment costs, as with labor costs, varied among each study, ranging from $110,243 to $421,508, both of which are categorized as medium facilities. The small facilities saw an average equipment cost of $224,776, while the medium facilities saw a smaller average equipment cost of $215,496, indicating that equipment costs do not correspond exactly with number of head processed. Equipment costs also vary due to the nature of the equipment being purchased. Some studies examined were purchasing brand new equipment, resulting in higher costs, while others were purchasing only used equipment, resulting in lower costs. Several studies were purchasing a mix of new and used, further changing the average results.

Table 27: Equipment Costs

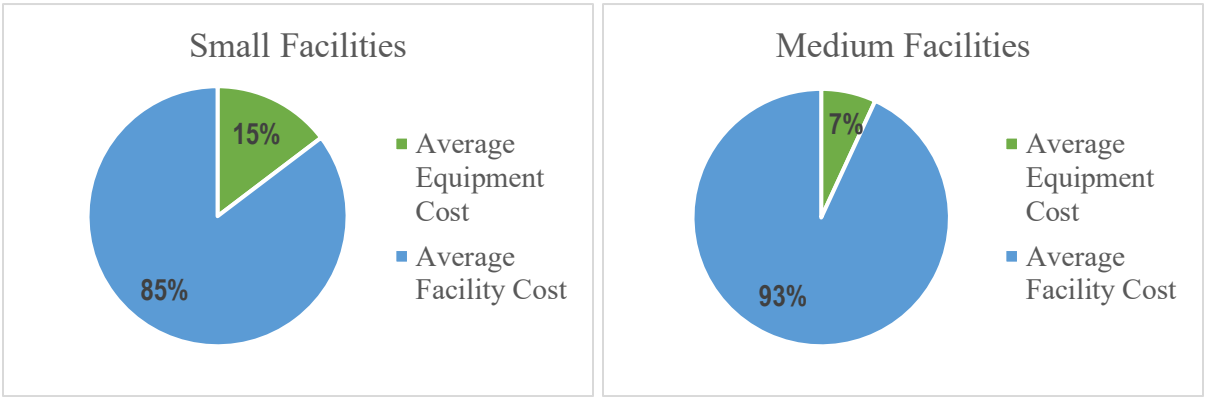
Source	Date	Equipment Costs ($)	Equipment Cost per Head ($)
Central Virginia Study	2003	201,652	31
Pride of Vermont Processing Study	2005	286,178	460
Hudson Valley Meat Processing Study	2000	207,645	101
Private Study A	2007	398,000	246
Del Norte Meat Processing Feasibility Scenario A	2011	119,477	57
Western Massachusetts Processing Study	2013	114,998	383
Private Study B	2014	246,000	170
Averages- Small Facility		**224,776**	**207**
Del Norte Meat Processing Feasibility Scenario B	2011	119,477	20
Southern Maryland Meat Processing Study Scenario A	2006	110,243	19
Southern Maryland Meat Processing Study Scenario B	2006	210,754	37
Beaverhead County, Montana Processing Study	2006	421,508	41
Averages- Medium Facility		**215,496**	**29**

The equipment costs per head vary widely between small and medium on average, with medium facilities seeing a lower cost per head than smaller facilities, as was seen with labor, due to economies of scale. The high average cost of the small facilities can be attributed in part to the large range of equipment costs per head in the studies, with costs ranging from $31 per head to $460.

We do not see the same similarities between the small and medium facilities when comparing facility and equipment costs as was seen with labor in terms of overall percentages. Despite the average equipment expenditures for small and medium facilities being within $10,000 of one another, the facility costs for small facilities are on average less than half of those of the medium facilities. Small facilities spend on average over 5 times more on facility than equipment. Medium facilities, meanwhile, spend on average over 13 times more on facility costs than equipment. The larger head processing number require larger facilities, however, their equipment needs are lower overall due to economies of scale, efficiencies, and other operational factors.

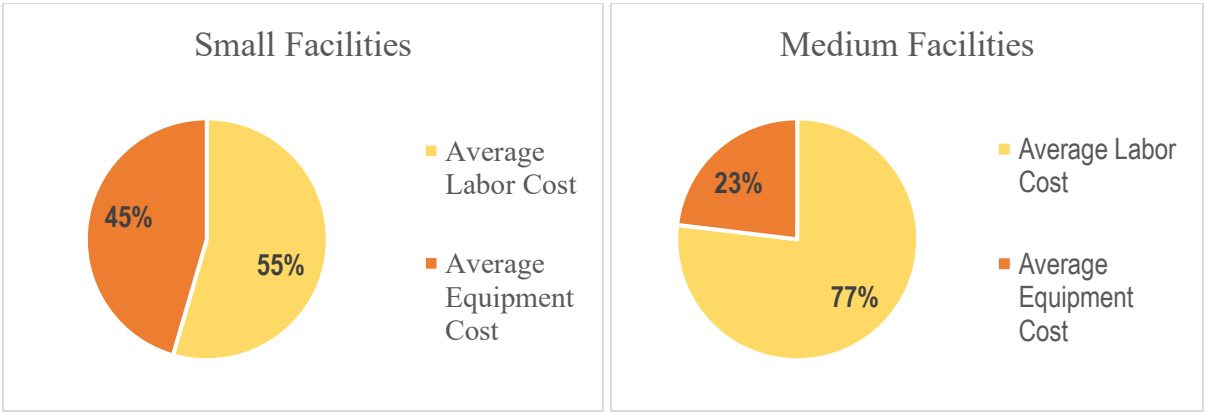
The following figures show the comparison between small and medium facilities in terms of percentage of equipment and facility costs.

Figure 45: Equipment and Facility Cost Comparison



When comparing the labor and equipment costs, there are noticeable differences between the small and medium facilities. The medium facilities are labor heavy, while the small facilities are more equipment heavy. This can be seen when directly comparing labor and equipment expenditures. For small facilities, the labor and equipment expenses are relatively close on average, at $269,473 and $224,776 respectively. The medium facilities, however, spend over 3 times as much on labor as equipment on average, at $717,444 and $215,496 respectively. This could be based in part on the higher average number of head processed at the larger facilities requiring a larger labor force. The following figures represent the comparison for small and medium facilities based on percentage of labor and equipment costs.

Figure 46: Labor and Equipment Cost Comparison



Head Comparisons

The number of head processed within each facility varies among individual studies, with combined numbers ranging from 750 to 5,100 for the small facilities, and from 6,000 to 10,400 for the medium facilities. The ensuing table shows the head numbers by facility category, including the species breakdown, revenue, and revenue per head.

Table 28: Head Numbers

Source	Date	Beef Head (Yearly)	Other Head (Yearly)	Labor Costs ($)	Yearly Revenue ($)	Income per Head ($)
Central Virginia Study	2003	4,000	1,100	467,997	1,765,747	433
Pride of Vermont Processing Study	2005	400	1,900	159,597	318,968	576
Hudson Valley Meat Processing Study	2000	1,575	2,250	615,784	774,782	203
Private Study A	2007	1,200	N/A	154,000	577,000	481
Del Norte Meat Processing Feasibility Scenario A	2011	2,100	N/A	158,650	396,338	189
Western Massachusetts Processing Study	2013	150	600	136,516	245,935	943
Private Study B	2014	1,450	N/A	194,000	640,000	441
Averages- Small Facility		**1,554**	**1,463**	**269,473**	**674,072**	**466**
Del Norte Meat Processing Feasibility Scenario B	2011	6,000	N/A	196,279	607,795	101
Southern Maryland Meat Processing Study Scenario A	2006	5,200	4,160	1,080,526	2,731,137	292
Southern Maryland Meat Processing Study Scenario B	2006	5,200	4,160	1,253,511	3,436,574	367
Beaverhead County, Montana Processing Study	2006	10,400	N/A	339,461	4,190,146	403
Averages- Medium Facility		**6,700**	**4,160**	**717,444**	**2,741,413**	**291**

On average, we see that the medium facilities process 260 percent more total head each year than the small facilities. They process 331 percent more beef, and 184 percent more other head (sheep, goats, and hogs). The medium facilities also have noticeably higher labor costs, and yearly revenue, corresponding with the much higher production of these facilities.

When looking at the revenue per head, we see that the small facilities are receiving a higher revenue per head than the medium facilities. The total revenue generated for these medium facilities, however, is over $2.7 million, or more than four times the average revenue of the small facilities. Higher overall head processed can make up for the lower revenue per head.

Facility Averages

The following table displays average facility size and expenses among the small and medium facilities. Not surprisingly, the averages show that the medium facilities are physically larger, and cost more, than the small facilities, as is expected by plants processing a higher number of head.

Table 29: Facility Size and Expenses

Source	Date	Facility Size (Sq. Ft)	Facility Costs ($)	Facility Cost per sq. ft. ($)	Facility Cost per Head ($)	Head per sq. ft.
Central Virginia Study	2003	8,280	2,278,621	275	289	0.49
Pride of Vermont Processing Study	2005	3,000	579,310	193	813	0.18
Hudson Valley Meat Processing Study	2000	5,000	865,455	173	207	0.41
Private Study A	2007	6,680	1,673,000	250	946	0.18
Del Norte Meat Processing Feasibility Scenario A	2011	2,600	476,000	183	227	0.81
Western Massachusetts Processing Study	2013	2,500	-	-	-	0.10
Private Study B	2014	6,200	1,968,000	317	848	0.23
Averages- Small Facility		**4,894**	**1,306,670**	**232**	**555**	**0.34**
Del Norte Meat Processing Feasibility Scenario B	2011	5,250	1,946,700	371	324	1.14
Southern Maryland Meat Processing Study Scenario A	2006	4,000	1,530,968	383	149	1.43
Southern Maryland Meat Processing Study Scenario B	2006	5,000	2,264,000	453	248	1.14
Beaverhead County, Montana Processing Study	2006	16,000	5,888,000	368	566	0.65
Averages- Medium Facility		**7,563**	**2,907,417**	**394**	**322**	**1.09**

As we saw with head numbers, these medium facilities are processing 260 percent more head, while only spending 122 percent more on facility costs. This results in lower facility costs per head for the medium facilities. Another noticeable factor is the head per square foot. The medium facilities process over one head per square foot of facility space, compared to a third of a head per square foot for small facilities. The medium facilities, with their larger operations, are also more efficient when it comes to space compared to head processed.

Budget and Financial Model Examples

For the development of this section, the consultants used the metrics and averages described in the previous section for each of the studies examined. From this data, the consultants created a financial model for six different processing facilities to highlight the various financial outcomes and financing options that could occur in and slaughter and processing operation. The results of these models are presented here and are only intended for informational purposes only; actual financial results will vary for a facility.

The six financial models examined here are split into two sections; the first contains three different sized beef-only facilities while the second examines three different sized multispecies facilities. Multispecies processing tends to be more expensive from a capital and labor standpoint but does have additional revenue benefits that would be expected.

The sections below for the beef-only facilities and the multispecies facilities provide a pro forma analysis that discusses the projected revenues, costs, and total net income for three different sized facilities. The three beef-head only facilities assume head counts of 1,000, 2,500, and 5,000, respectively. The multispecies facilities assume the same head numbers, with 75% of total head being beef and the remaining 25% being some combination of hogs, lambs, and goats.

Revenue figures represented in this section were created using the average revenue per head from each of the studies. Similarly, facility sizes and costs, as well equipment cost estimates were created by studying the averages and metrics to form these six financial models. Expected other costs, such as equipment expenses, marketing expenses, and more were estimated by examining the income statements from each of the examined studies. The details of the income statements were then used to estimate similar expense numbers for the different sized operations.

The expense categories examined in each pro forma are further described below:

- **Direct Labor Costs**- Butchers, cutters, packers, general labor, production manager
- **Other Variable Costs**- Animal purchase, packaging, electricity, water, waste disposal
- **Equipment Costs**- Tools, fixtures, repairs, general maintenance
- **Equipment Loan Interest Payment**- The interest portion of loan payments is considered an expense, while the principal payment is considered a financing activity on a cash flow statement
- **Facilities Costs**- Facility insurance, pest control, facility supplies like cleaning or processing
- **Facilities Loan Interest Payment**- See above
- **Selling and Marketing Expenses**- Some marketing such as flyers, website creation and maintenance, and more
- **Indirect Labor Costs**- Bookkeeper/Admin
- **General and Administrative Expenses**- Telecommunications, professional fees, office supplies, business insurance
- **Unforeseen and Contingency Expenses**- Most ventures have unexpected expenses or bad debt of sales come up every year. This is built into the model to help try and account for these expenses. In practice, it will be highly unlikely to match the exact total shown in these statements but should be accounted for in some way, nonetheless.

- **Deprecation-** As the building and equipment age, their value must be decreased for time and to account for wear and tear. Depreciation for these ventures is significant due to the high capital cost associated with the facility and equipment

The expense list above is not meant to be exhaustive. There are likely to be other expense categories, however, the list does capture the majority of what would be required for an operation to function.

Beef-Only Financial Model

The following pro forma represents the financial models for beef-only facilities that process 1,000, 2,500, and 5,000 head. As described above, the numbers used for this pro forma are based on studies of facilities also processing only beef.

Table 30: Beef Only Pro Forma Operating Statement

Beef-Only Facility	Head Count		
	1,000	2,500	5,000
Revenue	$466,390	$1,165,975	$2,331,951
Direct Labor Costs	$(172,564)	$(431,411)	$(862,822)
Other Variable Costs	$(163,237)	$(408,091)	$(816,183)
Variable Margin	$130,589	$326,473	$652,946
Equipment Costs	$(3,964)	$(8,745)	$(15,158)
Equipment Loan Interest Payment	$(6,483)	$(6,864)	$(7,627)
Facilities Costs	$(9,328)	$(23,320)	$(51,303)
Facilities Loan Interest Payment	$(26,880)	$(40,320)	$(53,760)
Selling and Marketing Expenses	$(9,328)	$(23,320)	$(46,639)
Indirect Labor Costs	$(15,000)	$(30,000)	$(45,000)
General and Administrative Expenses	$(34,979)	$(87,448)	$(174,896)
Unforeseen and Contingency Expenses	$(18,656)	$(46,639)	$(93,278)
EBITDA	$5,971	$59,818	$165,285
Depreciation	$(41,506)	$(56,301)	$(71,890)
Project Net Income	$(35,535)	$3,517	$93,395

These models for these facilities show that these operations could be successful, but only under the right conditions. These types of facilities are high capital investment operations which could prove problematic for many would-be entrepreneurs. Additionally, just because the facility has the capacity to process a specific number of head does not mean the local or regional market can provide the correct supply. Producers may already have processor connections or be unwilling to become involved with a newer venture with no history. There are many outside factors that have little to do with the numbers presented herein that would have a significant impact on the success or failure of the operation. However, should all the required supply and capital be available, these operations can be financially successful, and relatively quickly generate positive cash flow.

The following sections further describe the information presented in the pro forma table.

Revenue
The table above highlights what operations may look like for one year should a facility be able to receive, process, and sell the anticipated head amounts. A facility processing 1,000 head of beef is modeled to generate revenue of about $446,000. A 2,500-head facility would see revenue of about $1.16 million while a 5,000-head facility would generate revenue of about $2.33 million.

For the revenue included in the financial model, the consultants used the average revenue per head for each study examined. For example, the Del Norte Study anticipated processing 2,100 head per year with an estimated revenue of nearly $400,000. On a per-head basis, this equates to about $189 in revenue per head of beef processed. Similarly, the Central Virginia study anticipated total head equivalent of roughly 4,000, with estimated revenue of about $1.76 million. This equates to revenue per head of $433. Combining the revenue per head figures from all seven small facilities and averaging them results in revenue of $466 per head. Thus, a 1,000 head facility could reasonably anticipate revenue of about $466,000. This $466 per head estimate was used for all three head counts in this beef-only model.

Direct Labor and Variable Costs
Direct labor is the largest expense with other variable costs coming in a close second. Processing labor is essential to the operation of the facility along with a competent manager. Animal purchase is the second largest expense. These two categories alone account for about 73% of sales for one year of operations of each of the three facilities. Variable margin for all three facilities is positive in year one, leaving roughly 27% of sales to account for fixed and non-cash expenses.

Fixed Costs
Fixed costs are then accounted for and subtracted from the variable margin. Equipment costs are expected to be about 1% of sales each year, with most of the expense being used in maintenance and repairs. Interest payments on the equipment required about 1.5% of sales (falling in total sales percentage to .35% of sales as head count increases) while interest payments on the facility are about 6% of sales for the 1,000 head facility. The percentage of sales it uses up falls as revenue increases for the other two facilities, with the 5,000 head facility spending about 2.4% of sales on interest payments. Facilities costs such as facility insurance and supplies total about 2% of sale each year.

It is highly recommended that a facility employs a bookkeeper or administrative position to help answer phones, manage employees' schedules, general accounting duties, and more. The 1,000 head facility is likely to only require an employee part-time while the other two facilities will need at least one FTE to fill the position.

General and administrative expenses will likely stay static year over year for the modeled facilities. The business will require relationships with several professionals such as a lawyer and an accountant. The lawyer will help the operation maneuver through any legal or regulatory issues while the accountant will be useful for year-end taxes and other accounting questions. Office supplies, telecommunications, and other small expenses are likely to be a part of this category for these operations as well.

Most ventures have unexpected expenses or bad debt of sales come up every year. This is built into the model to help try and account for these expenses. It is estimated 4% of sales each year will go towards these unforeseen and contingency expenses.

EBITDA and Non-cash Expenses

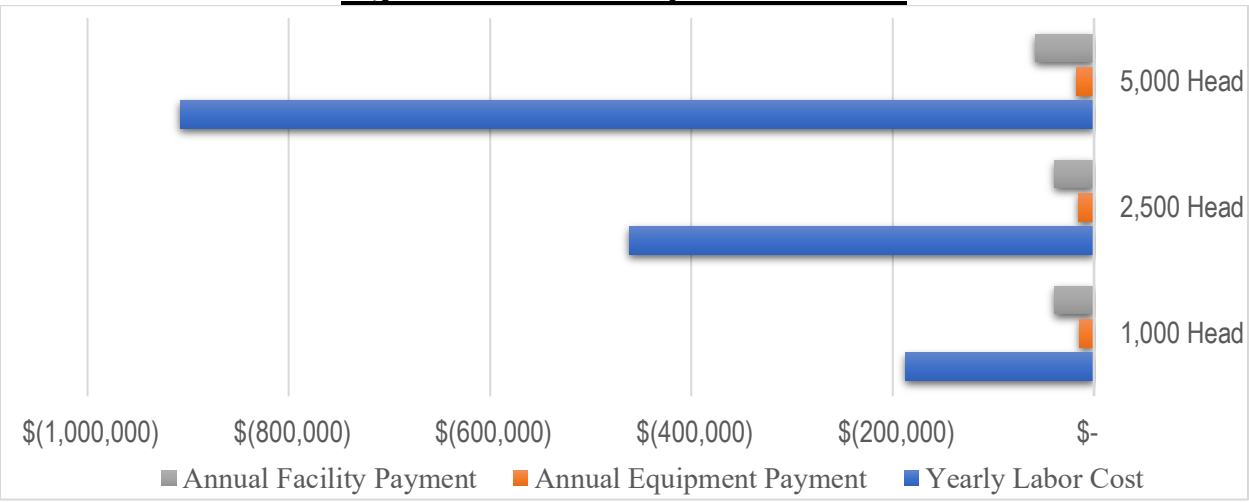
Once all fixed costs are accounted for, they are then subtracted from the variable margin, resulting in the operation's EBITDA, or earnings before interest, taxes, depreciation, and amortization. EBITDA for each of the modeled facilities is positive, however, the 1,000 head operation is just above breakeven. On average, 4.5% of sales dollars remains to cover non-cash expenses for these facilities.

Depreciation is a significant non-cash expense for these operations due to the high capital cost of the equipment and facility. Depreciation for the 1,000 head facility is anticipated to be about $41,500 yearly while the 5,000 head facility will see yearly deprecation of just under $72,000. The 1,000 head facility will see a net loss in their year one. The total loss for the 1,000 head facility on a percentage basis is about 7.6%. The one year loss is not extreme and should be viewed as a good sign for the medium-long term outlook. It is likely that the 1,000 head facility could potentially be at breakeven within several years as it increases efficiencies, better understands its market, etc. The 2,500 head facility is estimated to be just over breakeven in year one and move into a more positive net income in year two of operations barring some unforeseen setback. The 5,000 head facility would see a positive net income in year one about $93,000, equaling just over 4% of sales.

Yearly Cost Comparison

The following figure compares the annual costs for each beef-only facility. The yearly costs for labor heavily exceed the costs for facility payments and equipment payments. Once financing has been secured, labor outpaces the annual payments multiplicatively across the board regardless of head size. Finding quality labor at an affordable wage will be a top priority for all facility sizes. It is worth noting that labor costs stay steady across all head processed ranges. The efficiencies that come with increased scale are less tangible at the processing levels accomplished here than may be accomplished with much larger processing plants.

Figure 47: Beef-Only Annual Costs



Multispecies Financial Model

The following section examines the financial models for multispecies facilities that are processing 1,000 head, 2,500 head, and 5,000 head of a combination of beef, hog, lamb, and goats. Beef is still expected to represent the most processed species for these facilities and the other species represent about 25% of the total head processed.

While the multispecies operations do perform better from an expense and revenue perspective, they are initially more financially precarious when compared to the beef-only facilities. Initial capital investment for the 1,000 head multispecies facility is $280,000 and that would not guarantee year one, or potentially even year three positive gains. The 2,500 head facility initial capital investment would be nearly $400,000. This is a significant amount of initial investment and any negative deviations from the model presented here would be potentially financially catastrophic. Any entrant into the multispecies market must recognize the increased risk, and the increased reward that multispecies can provide.

The financial pro forma modeled for the three multispecies facilities is provided below.

Table 31: Multispecies Pro Forma Operating Statement

Multispecies Facility	Head Count		
Beef	750	1,875	3,750
Other (hog, Lamb, Goats)	250	625	1,250
Total Head Count	**1,000**	**2,500**	**5,000**
Revenue	$582,988	$1,457,469	$2,914,938
Direct Labor Costs	$(198,449)	$(496,122)	$(992,245)
Other Variable Costs	$(204,046)	$(510,114)	$(1,020,228)
Variable Margin	$180,493	$451,232	$902,465
Equipment Costs	$(5,830)	$(14,575)	$(29,149)
Equipment Loan Interest Payment	$(8,676)	$(9,187)	$(10,207)
Facilities Costs	$(14,575)	$(36,437)	$(72,873)
Facilities Loan Interest Payment	$(36,019)	$(54,029)	$(72,038)
Selling and Marketing Expenses	$(11,660)	$(29,149)	$(58,299)
Indirect Labor Costs	$(17,500)	$(32,500)	$(47,500)
General and Administrative Expenses	$(43,724)	$(109,310)	$(218,620)
Unforeseen and Contingency Expenses	$(29,149)	$(72,873)	$(145,747)
EBITDA	$13,360	$93,173	$248,030
Depreciation	$(55,596)	$(75,419)	$(96,305)
Project Net Income	$(42,236)	$17,754	$151,725

Revenue

Revenue for the multispecies facilities was calculated using the same process as the beef-only facilities described above. On average, the studies for the small facilities examined (seven total) expected about $466 per head in revenue for beef. Year one operations for a multispecies facility is expected to generate more revenue when compared to the beef-only operations above. Beef-head would account for 75% of total head processed, with the remaining 25% being hogs, lamb, goats, or some amalgamation of the three. The head presented in the table are denoted as beef head equivalent. The ability to have a wider range of products and cuts from multispecies

processing is anticipated to result in 25% increased revenues. There are expense drawbacks, however, to this change. Year one revenues for a 1,000 head facility would be about $583,000, increasing to $1.45 million for a 2,500 head facility, and again to $2.91 million for 5,000 head.

Direct Labor and Variable Costs
The facility labor costs will increase for a multispecies facility. This model estimates the increase to be about 15% increased wages. While in a beef-only facility, cutters would only need to know one animal and their cuts, these cutters for the multispecies facility would need to know several animals and their various cuts **or** the facility must hire different employees for different animals.

Direct labor is still the largest expense with other variable costs coming in a close second. Animal purchase is again the second largest expense. These two categories alone account for about 69% of sales for year one operations of each of the three facilities. Variable margin for all three facilities is positive in year one, leaving roughly 31% of sales each year to account for fixed and non-cash expenses.

Fixed Costs
This cost is slightly higher when compared to the beef-only facility as the additional equipment required for processing multispecies will likely need repairs and maintenance as well. Fixed costs are then accounted for and subtracted from the variable margin. Equipment costs are expected to be about 1% of sales each year, with most of the expense being used in maintenance and repairs.

The interest payment for both equipment and facilities are more expensive in the multispecies model. However, these are more than offset by the anticipated increase in revenue that results from the sales of multispecies products.

Interest payments on the equipment required about 1.5% of sales (falling in total sales percentage to .35% of sales as head count increases) while interest payments on the facility are about 6.2% of sales for the 1,000 head facility. The percentage of sales it uses up falls as revenue increases for the other two facilities, with the 5,000 head facility spending about 2.5% of sales on interest payments.

Facilities costs such as facility insurance and supplies total about 2.5% of sale each year. This is a slight increase when compared to the beef-only facility.

Multispecies facilities will also need a bookkeeper/administrative position. This position will have roughly the same duties as the beef-only facility; however, the workload of the employee will likely be higher. The addition of multispecies will naturally add additional steps and information to be gathered, sorted, and processed. This means that the multispecies facility bookkeeper should be paid a slightly higher wage to compensate for this increase in responsibilities.

General and administrative expenses will likely stay static year over year for these facilities regardless of beef-only or multispecies. The business will require relationships with several professionals such as a lawyer and an accountant. The lawyer will help the operation maneuver

through any legal or regulatory issues while the accountant will be useful for year-end taxes and other accounting questions. Office supplies, telecommunications, and other small expenses are likely to be a part of this category for these operations as well.

The addition of multispecies is likely to increase bad debt and unforeseen expense variance and should be accounted for by the operation's management. It is estimated 5% of sales each year will go towards these unforeseen and contingency expenses, a 1% increase compared to the beef-only model.

EBITDA and Non-cash Expenses

Once all fixed costs are accounted for, they are then subtracted from the variable margin, resulting in the operation's EBITDA. EBITDA for each of the facilities is positive, however, the 1,000 head operation is just above breakeven. On average, 5.4% of sales dollars remains to cover non-cash expenses for these facilities.

Depreciation increases somewhat dramatically for the multispecies model due to the increase in costs for both capital expenses. Depreciation for the 1,000 head facility is anticipated to be about $56,500 yearly while the 5,000 head facility will see yearly deprecation of just under $96,000. Despite the increases in most costs across the board, the multispecies facility performs better on a net income basis compared to beef-only in two out of the three scenarios. The 1,000 head facility would struggle under the increased capital costs and increased expenses associated with multispecies processing. Therefore, potential entrants should be wary of a very small multispecies facility. As the head count increases, the multispecies facility begins to outperform the beef-only facility. The 2,500 head facility and the 5,000 head facility have positive net incomes in year one operations. As time goes on, these gains would be expected to rise due to an increase in efficiencies, better understanding of the market, and potential increases in producer participation.

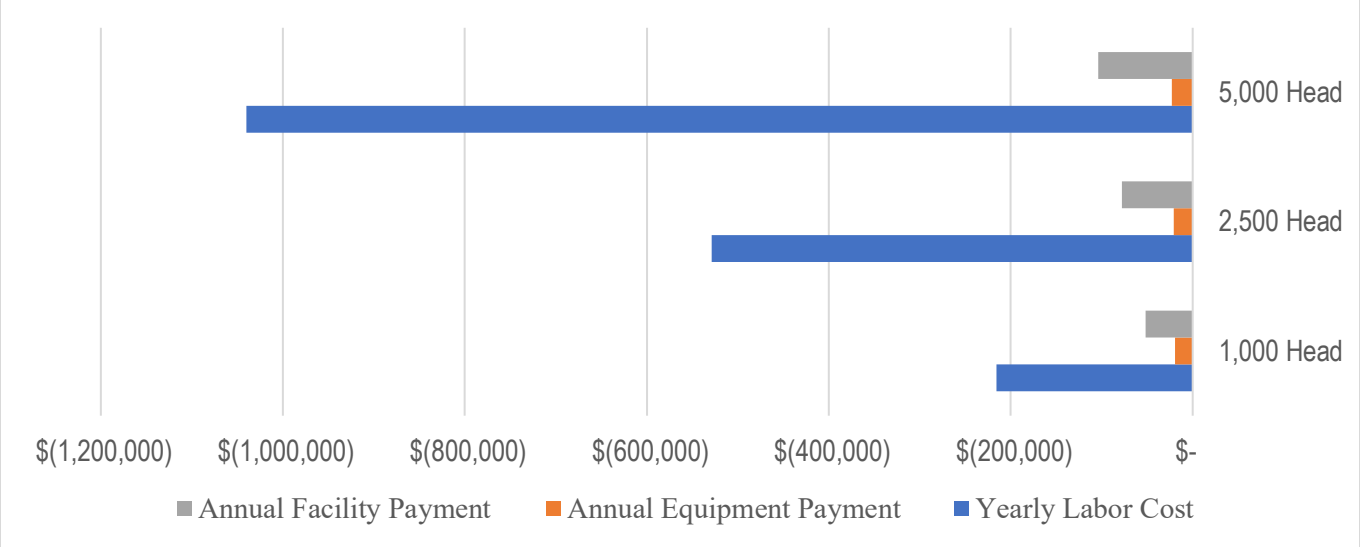
Year one net loss for the 1,000 head multispecies facility would be about $42,000. While not backbreaking, it is higher than the beef-only facility. It may take several years or more for the facility to reach breakeven territory, at which point the continual losses may have done too much financial damage.

Net gains for the 2,500 head and the 5,000 head facility would be about $17,000 and $152,000, respectively. On a percentage basis, this is about 1% of sales and 5% of sales each. While not significant, this does mean the businesses can likely be cash-flow positive and generate enough earnings for reinvestment and growth.

Multispecies Annual Costs

The following figure compares the annual costs for each of the multispecies facilities that were modeled. Even with the increase of nearly 34% for facility and equipment costs when opening a multispecies facility, labor is still the largest annual expense for these operations. In some cases, annual labor costs are upwards of eight times more costly on an annual basis. As stated previously, quality labor at an affordable is paramount for any size facility to operate and achieve financial success. This labor can be found and trained but the cost will always need to be closely monitored in comparison with output to ensure maximum efficiency for the facility.

Figure 48: Multispecies Annual Costs



Facility and Equipment Financing

Financing for a meat slaughter and processing facility is extremely important to the long-term success and viability of the operation. With this in mind, the consultants provided an analysis below of the financing included for the beef-only and multispecies financial models. It is assumed that each facility will require different facility sizes and equipment costs, but the financing terms remain the same for ease of comparison.

All facility and equipment costs are assumed to be 80% financed with a 4% interest rate. Loan terms for the equipment are assumed to be 15 years with a salvage value of 15%. Loan terms for the building are assumed to be 30 years with a salvage value of 10%.

Based on the project finance discussion provided below, the overall takeaway is that regardless of what product is chosen to be processed, the capital needs for these processing operations are high. Even when financed at 80%, each choice represents hundreds of thousands of dollars of capital for equipment and facilities alone. The smallest estimated minimum capital investment by ownership would be the 1,000 head beef-only operation with about $209,000. Working capital would likely also be required for these facilities to get off the ground. Should interest rates increase or the down payment required be higher, this would only multiplicatively increase the required initial capital investment.

Those wishing to begin one of these processing facilities must make significant strides in understanding their local and regional market and whether supply could fill these head requirements.

Project Finance for Beef-Only Facilities

The table below examines specific financing outcomes for the beef head only facilities and equipment.

Table 32: Project Finance for Beef Only Equipment

Equipment Finance	Head Count		
	1,000	2,500	5,000
Equipment	$ 202,595	$ 214,512	$ 238,347
Percentage Financed	80%	80%	80%
Loan Amount	$ 162,076	$ 171,610	$ 190,677
Term Years	15	15	15
Rate	4%	4%	4%
Annual Payment	$ 14,577	$ 15,435	$ 17,150
Interest Payment	$ 6,483	$ 6,864	$ 7,627
Principal Payment	$ 8,094	$ 8,570	$ 9,523
Depreciation	$ 13,506	$ 14,301	$ 15,890

Beef-only equipment at a facility processing about 1,000 head per year is expected to cost about $202,500, with an annual payment of about $14,500. As these prototypical facilities increase in head processed, equipment costs are also expected to increase. A 2,500-head facility may require about $214,500 of equipment with an annual payment of about $15,000 while a 5,000-head facility may require about $238,000 in equipment and an annual payment of $17,000. The baseline processing equipment required would be the same regardless of head count, however, some equipment is variable and that is ideally accounted for with the increase in costs. Examples of some baseline equipment can be found in the facilities considerations section of this manual.

Table 33: Project Finance for Beef Only Facility

Facility Finance	Head Count		
	1,000	2,500	5,000
Facility Size	3,000 sq. ft.	4,500 sq. ft.	6,000 sq. ft.
Facility	$ 840,000	$ 1,260,000	$ 1,680,000
Percentage Financed	80%	80%	80%
Loan Amount	$ 672,000	$ 1,008,000	$ 1,344,000
Term Years	30	30	30
Rate	4%	4%	4%
Annual Payment	$ 38,862	$ 58,293	$ 77,724
Interest Payment	$ 26,880	$ 40,320	$ 53,760
Principal Payment	$ 11,982	$ 17,973	$ 24,922
Depreciation	$ 28,000	$ 42,000	$ 56,000

Using the facility sizes estimated from publicly available studies, these facilities were estimated for each of the three head counts shown above. A 1,000-head per year operation would need a facility of about 3,000 square feet and would cost roughly $840,000 ($280 per sq. ft.). Financed at 80%, the annual payment would be about $39,000 ($3,250 per month). As the head count increases, the facility size does as well. A 2,500-head facility is estimated to need about 4,500 sq.

ft. and would cost $1.26 million. The annual payment on this facility would be about $58,000 ($4,800 per month). Lastly, a 5,000-head facility would require about 6,000 sq. ft. of space with a building cost of $1.68 million. The annual payment equation results in a yearly cost of nearly $78,000.

Multispecies Project Finance

Multispecies processing requires additional equipment and space when compared to a beef only operation. Different rails, additional square footage to account for cross-contamination prevention, animal storage, and more are all a necessary part of processing multiple types of animals. The table below examines the changes that would occur to the equipment costs of the three multispecies facilities.

Table 34: Project Finance for Multispecies Processing Equipment

Multispecies Equipment Finance	Beef Head Count		
	750	1,875	3,750
	Other Species Head Count		
	250	625	1,250
Total Head Count	**1,000**	**2,500**	**5000**
Equipment	$ 271,135	$ 287,084	$ 318,982
Percentage Financed	80%	80%	80%
Loan Amount	$ 216,908	$ 229,667	$ 255,186
Term Years	15	15	15
Rate	4%	4%	4%
Annual Payment	$ 19,509	$ 20,657	$ 22,952
Interest Payment	$ 8,676	$ 9,187	$ 10,207
Principal Payment	$ 10,833	$ 11,470	$ 12,744
Depreciation	$ 18,076	$ 19,139	$ 21,265

When examining other studies, the estimated cost increase for multispecies processing when compared to beef only processing was estimated at roughly 34%. A 1,000-head multispecies facilities should expect costs of about $271,000, with an annual payment of $19,500 ($1,625 per month). A 2,500-head multispecies facility would see equipment costs of about $287,000, while a 5,000-head multispecies operation would realize costs of about $319,000 with an annual payment of nearly $23,000. It is up to each operation to decide the merits of these increases in costs compared to the potential change in revenue from adding multispecies. As economic climates change so do supply and demand and meat products are no different.

In addition to the increase in the needed equipment, the average size of a multispecies facility is larger than that of a beef-only facility, thus increasing the finance needs for this facility. Using the estimated multiplier above, the three facilities would increase to 4,020 sq. ft., 6,030 sq. ft, and 8,040 sq. ft, respectively. This results in increased overall costs, increased annual payments, and an increase in depreciation. The 1,000 total head facility would cost about $1.1 million with an annual payment of $52,000. The 2,500 head facility would cost about $1.68 million with an annual payment of $78,000 while the 5,000 head facility would cost about $2.2 million with an annual payment of $104,000. This information is presented in the following table.

Table 35: Project Finance for Multispecies Facility

Multispecies Facility Finance	Head Count		
	1,000	2,500	5,000
Facility Size	4,020 sq. ft.	6,030 sq. ft.	8,040 sq. ft.
Facility	$ 1,125,600	$ 1,688,400	$ 2,251,200
Percentage Financed	80%	80%	80%
Loan Amount	$ 900,480	$ 1,350,720	$ 1,800,960
Term Years	30	30	30
Rate	4%	4%	4%
Annual Payment	$ 52,075	$ 78,112	$ 104,150
Interest Payment	$ 36,019	$ 54,029	$ 72,038
Principal Payment	$ 16,056	$ 24,083	$ 32,111
Depreciation	$ 37,520	$ 56,280	$ 75,040

Beef-Only and Multispecies Conclusions

Beef-only facilities and multispecies facilities can be successful if certain conditions are met. Smaller facilities (1,000 head and 2,500 head) are in financially distressing positions from the outset. These facilities must overcome financial challenges and hurdles to reach breakeven. However, with increases in efficiency, growth in the market, and proper strategic planning, these could reach financial viability in time.

Medium facilities (5,000 head) are potentially money-making ventures early on. Reaching better than breakeven in year one, with the ability to grow will likely see these succeed in the right market(s). The 5,000 head facility for beef-only and multispecies has the most potential out of the six scenarios examined.

Resources

Resources

The following resources were utilized in the creation of this document or provide further insights and expertise for the development and implementation of a processing facility. To access the resource, click on the name of the resource to follow the link.

General Meat Processing Resources

Meat Processing 101: New Plant Checklist: This checklist provides some basic questions to ask when planning a new processing facility. This resource is provided by the Niche Meat Processor Assistance Network.

Meat Processing 101: What is Local Meat Processing?: This resource provides further information about what defines meat processing and examples of the types of facilities that may process meat. This resource is provided by the Niche Meat Processor Assistance Network.

Virginia Inspected Slaughter Plants: This list is provided by VDACS and include information about existing inspected slaughter plants in Virginia. This list only includes those that responded to a March 2020 survey and will be continually updated.

VDACS How to Obtain a State Meat and Poultry Inspection: This resource details the steps for obtaining an inspections and licensing from the Virginia Department of Agriculture and Consumer Services.

Local Meat and Poultry Processing: The Importance of Business Commitments for Long-Term Viability: This document provides lessons learned and case studies for various meat processing plants.

Business and Marketing Models for Small Scale Meat Processing and Slaughterhouse Facilities: This document was conducted by Food and Livestock Planning, Inc. and provides examples and highlights from what has been successful for other small meat facilities or what has contributed to their failure.

Summary of "Lessons Learned from Public Investment in Local and Regional Meat and Poultry Processing Activities": This resource is provided by the Agriculture Marketing Service and provides a summary of their full publication. This document highlights the lessons learned and recommendations for local meat and poultry processing.

Slaughter and Processing Options and Issues for Locally Sourced Meat: This document is provided by USDA ERS and discusses the availability of slaughter and processing plants across the nation and how these facilities may support or constrain access to locally sourced meats.

Initial Considerations for Starting a Small-Scale Livestock Harvest and Processing Facility: This document is provided by the University of Tennessee's Institute of Agriculture and provides insight into some of the issues and steps to consider before investing in a livestock harvesting and processing facility.

Profitability and Financial Planning Resources

Cash Flow Template for Small-Scale Slaughterhouse: This webpage provides a link to an excel spreadsheet to help determine the financial feasibility of a small-scale, low-tech, mixed species slaughterhouse and processing facility. This resource is provided by the Community Involved in Sustaining Agriculture.

NMPAN Business Planning Guide for Small Meat Processors: This business plan guide provides information on planning for a meat processing facility, including detailed financial projections and cash flow templates. This guide is provided by the Niche Meat Processor Assistance Network.

Cost Analysis: Are you Making Money?: This webpage from the Niche Meat Processor Assistance Network provides information on how to determine which activities are most profitable for meat processors and analyzing all costs and revenues from each portion of the business.

Meat Processing 101: Small Plant Economics: This resource provides a very general and basic discussion on what it takes to sustain a processing facility and highlights some of the challenges. This resource is provided by the Niche Meat Processor Assistance Network.

Improving Profitability for Small and Very Small Meat Processors in Iowa: This resource discussions the outcomes of curriculum classes offered to meat processors in Iowa. The results provide insights into strategies to increase the profitability of a meat processing plant. This resource is provided by Iowa State University.

Facility Design Resources

Establishment Design and Construction Guidebook: This guidebook provides considerations and recommendations for designing and constructing a meat and poultry processing facility. This resource is provided by the Virginia Department of Agriculture and Consumer Services.

Guide to Designing a Small Red Meat Plant: This resource is provided by Iowa State University Extension and contains information and plans for the development of a small red meat processing plant. These plans are not intended to be used for construction, but for information purposes of what may be needed for a plant.

Design and Equipment Recommendations for Small- to Medium-Sized Abattoirs: This resource outlines more considerations and recommendations for designing and equipping a small or medium-sized slaughter and processing facility. This resource is provided by the Food and Agriculture Organization of the United States.

Co-location of Industries with Small Livestock Slaughter Facilities: This document discusses the operations of a small processing plant and the potential to co-locate with other related businesses. This resources also provides insights into waste disposal for small plants. This resource is provided by Iowa State University Extension.

Standard Plans for a Small Abattoir and Meat Market: Section 2: This online document provides an outline of the specifications for a small slaughter and processing facility, including an equipment list. This resource is provided by the Food and Agriculture Organization of the United States.

Inspection, Regulation, and Food Safety Resources

Meat Processing 101: What are the Rules?: This document provides general descriptions and information about the types of inspections for a meat processing plant. It does not provide information on state-specific inspection requirements. This resource is provided by the Niche Meat Processor Assistance Network.

USDA Food Safety and Inspection Service Regulatory Compliance: This web page provides links to FSIS guidelines and information for regulatory compliance for different establishments and facilities. They also provide specific information for Small and Very Small Plants.

VDACS A Guide to Red Meat Custom Exemptions: This document is provided by the VDACS Office of Meat and Poultry Services and details information about custom exempt facility operators in Virginia. The document can help facility owners determine if a Custom Permit of Exemption is needed for the facility.

Virginia Meat and Poultry Handlers Permit: This document provides guidance on who needs a meat and poultry product handlers permit and how to obtain one. This resource is provided by the VDACS Office of Meat and Poultry Services.

A Guide to Selling Meat and Poultry Products in Virginia: This guide is provided by the VDACS Office of Meat and Poultry Services and provides information on what products needs to be inspected and how to tell if products have been inspected.

Recommended Animal Handling Guidelines & Audit Guide: Updated in September 2019, this guide provides official guidelines and audits for handling pigs, cattle, and sheep for slaughter. This resource is published by the North American Meat Institute.

Mobile Slaughter Unit Compliance Guide: The USDA FSIS provides full regulations and recommendations for how to meet regulatory requirements for operating a mobile slaughter unit within and across regions.

SSOP and GMP Practices and Programs: This document is provided by Purdue University Extension and provides an overview of the Sanitation Standard Operating Procedures and Good Manufacturing Practices for small processing plants.

COVID-19 Resources

The following resources are directly related to impacts from the COVID-19 pandemic on agricultural businesses as well as guidance on how these businesses should respond and plan.

Considerations on Novel Coronavirus (COVID-19) for Farm Operations: Published on March 16, 2020, this document provides overall information about COVID-19 and highlights strategies and best practices to reduce the potential for COVID-19 to affect farm operations. This resource is provided by Colorado State University Extension.

Interim Guidance for Businesses and Employers Responding to Coronavirus Disease 2019: The Center for Disease Control and Prevention provides updated information on how to prevent outbreaks of the virus, as well as how to respond if employees are exposed.

Guidance for Small/Medium Meat Processors Related to COVID-19: This document was published May 28, 2020 and provides information about COVID-19, how to identify the symptoms, and specific considerations and recommendations for preventing COVID-19 outbreaks in meat processing facilities.

Temperature Screening Guidelines: This short guide provides information on how to effectively check employee temperatures to screen for potential COVID-19 exposure. This resource is provided by the American Association for Meat Processors.

Essential Strategies for Food Safety During the COVID-19 Crisis: This slideshow presentation provided by the American Association for Meat Processors provides general information on how to maintain food safety for manufacturing and food sales businesses.

Potential Funding Sources

Finding the right funding source for a project is important as it can provide the start-up capital needed or working capital for growth and expansion. Funding sources include grants, loans, and investors. This section outlines some potential federal and state grant and loan programs. This section does not provide an exhaustive list. Local and regional grant and loan sources may be available for projects located in specific locales. The USDA Food Safety Inspection Service hosted the webinar "USDA Assistance for Small Scale Meat Processing—An overview of Rural Development and Food Safety Inspection Service Program Opportunities and Assistance," which covers information about many of the programs presented here.

Value-Added Producer Grant Program (VAPG)
The nationwide USDA program is designed to assist producers and associations that engage in value-added activities to develop strategies and create marketing opportunities for their value-added agriculture products, and/or for marketing or processing activities that add value to the commodities they raise, or for on-farm renewable energy generation projects. The goal of the program is to expand market opportunities for producers and increase the producer's share of revenue from their commodities.

Local Food Promotion Program

The LFPP is designed to assist in the planning, development, and growth of new food businesses that promote local food access and consumption. The Implementation Grant is focused on establishing local food businesses or expanding the activities of an existing business. Grant amounts range from $100,000 to $500,000 for implementation projects. Activities that can be funded under the Local Food Promotion Program's implementation grants can include non-construction infrastructure improvements to facilities or information technology systems

Entities eligible for implementation grants through the LFPP include any operation that processes, distributes, aggregates, or stores locally produced food, including:

- Agricultural business
- Producer Networks
- CSAs
- Non-profits
- Economic Development Corporations
- Regional Farmers' Market Authorities
- Local Governments

Community Facilities Direct Loan & Grant

Available through USDA Rural Development, the Community Facilities Direct Loan & Grant program provides affordable funding options for the development of essential communities in rural areas. Funds can be used to purchase, construct, and/or improve essential community facilities, along with paying for other project-related expenses. Community facilities include local food systems such as community gardens, food pantries, community kitchens, food banks, food hubs, or greenhouses. The program provides low interest direct loans, grants, or a combination of the two. Applicants for a loan must have legal authority to borrow money and must be unable to finance the project from their own resources or through commercial credit at reasonable rates.

The program's focus is to provide funds for the sustainability and improvement of community facilities. Eligible applicants are public bodies, community-based nonprofit corporations, and federally recognized tribes. Projects must be located in rural areas such as cities, villages, and towns with no more than 20,000 residents and show substantial community support.

The grant funding amount is between 15% and 75% of project costs depending on location and median household income, while the loan amount is typically $300,000 at a state level. Applications are accepted on an on-going basis throughout the year.

Community Food Projects Competitive Grant Program

The CFPCGP is intended to fund projects that tackle food insecurity through community food initiatives. This grant program is administered by the USDA National Institute of Food and Agriculture. Awarded funding can range from $10,000 to $400,000 over the course of one to four years. The primary goals of the CFP grant program are to:

- Meet the food needs of low-income individuals through food distribution, community outreach to assist in participation in Federally assisted nutrition programs, or improving access to food as part of a comprehensive service;
- Increase the self-reliance of communities in providing for the food needs of the communities;
- Promote comprehensive responses to local food access, farm, and nutrition issues; and
- Meet specific state, local or neighborhood food and agricultural needs including needs relating to infrastructure;
- Planning for long-term solutions; or
- The creation of innovative marketing activities that mutually benefit agricultural producers and low-income consumers.

The grant is intended for private nonprofit entities that are seeking to create linkages across different sectors of the food system and build capacity for communities to address local food system needs long-term.

EDA Economic Development Assistance Program (EDAP)

EDAP opportunities are provided to support economic development, foster job creation, and attract investment in economically distressed areas. Funds from the program can be used for working capital, construction, planning, technical assistance, and revolving loan funds. Individuals and for-profit entities are not eligible for this program.

The program is divided into two sub-programs: Public Works and Economic Adjustment Assistance (EAA). Projects proposed under either program must be consistent with objectives identified in a region's Comprehensive Economic Development Strategy (CEDS). Strategy Grants are also available to develop or update a CEDS.

Projects under this program are intended to help build community resiliency and further develop local communities. Funding can range from $100,000 to $3 million and the typical match amount required is 50% of the total project costs. Match may be lowered based on the level of economic distress in the project area. Applications are accepted on an on-going basis for this program.

EDA Disaster Recovery

The goal of this program is to help communities and regions devise and implement long-term economic recovery strategies to address economic challenges in areas where a Presidential declaration of a major disaster was issued. Individuals and for-profit entities are not eligible for this program.

The EDA encourages applications for this program based on long-term, regionally oriented coordinated and collaborative economic development and redevelopment strategies that foster economic growth and resilience. The program offers both implementation and strategy grants. Implementation grants can be used for infrastructure and construction. Strategy grants provide funds to develop, update, or refine a Comprehensive Economic Development Strategy (CEDS) that alleviates long-term economic deterioration or a severe economic dislocation.

This program is competed similarly to grants, but the funding instrument is a cooperative agreement. Available funding varies by region and projects typically required a dollar-for-dollar match to requested funds. Match requirements may be lowered if projects are in areas of high economic distress. Applications are accepted on an on-going basis depending on the availability of funding.

Rural Economic Development Loan and Grant (REDLG)
The REDLG program provides funding to rural projects through local utility organizations. Under the REDLG program, the USDA Rural Development provides zero interest loans to local utilities, which they, in turn, pass through to local businesses (ultimate recipients) for projects that will create and retain employment in rural areas. The ultimate recipients repay the lending utility directly. The utility is responsible for repayment to the Agency.

Business and Industry Guarantee Loan Program (B&I)
The purpose of the B&I Guaranteed Loan Program of the USDA Rural Development is to improve, develop, or finance business, industry, and employment and improve the economic and environmental climate in rural communities. This purpose is achieved by bolstering the existing private credit structure through the guarantee of quality loans, which will provide lasting community benefits. It is not intended that the guarantee authority will be used for marginal or substandard loans or for relief of lenders having such loans.

Rural Microentrepreneur Assistance Program (RMAP)
The purpose of the USDA's RMAP program is to support the development and ongoing success of rural micro-entrepreneurs and microenterprises. Direct loans and grants are made to select Microenterprise Development Organizations (MDOs) for the benefit of rural micro-entrepreneurs and micro-enterprises.

RMAP funding may be used to provide fixed interest rate microloans or to provide eligible MDOs with micro-lender technical assistance grants to provide technical assistance and training to micro-entrepreneurs that have received or are seeking a microloan under RMAP.

Individual citizens, micro-entrepreneurs, or micro-enterprises, as defined by the program and who need business based technical assistance and training, are generally eligible to apply for loans from MDOs, provided they owe no delinquent debt to the Federal Government.

Small Business Administration Loan Program (SBA)
The Small Business Administration offers multiple loans for a variety of different business needs. SBA's most common loan is the 7(a) Loan Program which is a general small business loan. There are many eligibility requirements for this loan program, some requirements include operating as a for profit business and fitting the SBA's definition of small business. Some basic uses of SBA 7(a) loans include paying operational expenses, purchase inventory, seasonal financing, purchase equipment and supplies, and to purchase land and buildings.

Agriculture and Forestry Industries Development Fund (AFID) Planning Grant
The Governor's Agriculture and Forestry Industries Development Fund (AFID) Planning Grant program is to support Virginia agriculture and forestry by:

- Funding innovative local efforts to assist agriculture- and forestry-based businesses, and
- Encouraging local governments and the ag/forestry community to work together on better integrating these industries their community's overall economic development efforts.

Planning Grant awards may also promote or support agriculture and forestry through one or more of the following activities:

- Develop strategic plans, feasibility studies, business or marketing plans, or local ordinances
- Generate policies or programs for the preservation of working lands.
- Create local plans or initiatives supporting agriculture and/or forestry-based businesses
- Fund innovative entrepreneurship and business development efforts
- Invest in the development of local agricultural development boards

AFID Facility Grant

The Governor's Agriculture and Forestry Industries Development (AFID) facility grant is a discretionary, performance-based economic development incentive specifically for agriculture and forestry value-added or processing projects. An AFID facility grant is awarded to a political subdivision for the benefit of the company, with the expectation that the grant is critical to the success of the new or expanding facility.