From Barley to Beer:

A Guide for On Farm Brewing

Virginia FAIRS
Foundation for Agriculture Innovation & Rural Sustainability

Prepared by
Matson Consulting
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Acknowledgment
Amongst the many contributors that helped us successfully complete this study, we would like especially to thank Loudoun County Farm Bureau for their foresight and input that led to the development of this study. They also guided us with thoughtful discussions regarding the numerous different businesses entities that a viable malting barley market might support.

INTRODUCTION

In partnership with the Virginia Foundation for Agriculture Innovation & Rural Sustainability (VA FAIRS), Matson Consulting has conducted an in-depth analysis of expanding a Virginia farm brewery to include malt production. After thorough examination of current malting and brewing industries and analysis of successful existing businesses, this study presents a prototypical facility composed using research from a broad range of industry factors and components.

This document provides basic directions and thought processes that can better increase chances of success when expanding a brewery's operations to include a malting facility in Virginia. Using a feasibility study format to assess components affecting the viability of this type of expansion presents an objective exploration of the business and provides valuable lessons for those interested in such a venture.

This study is intended to present information that can be adapted to as many similar ventures as possible. The consultants attempted to create a realistic and approachable document in terms of interpretation and application. While there are a wide variety of unique malting and brewing businesses in existence, all with their own distinctive business models and methods of operation, they still share a number of similar costs in inputs and production. This study has been organized into three main sections:

General Business & Industry Information
Thinking Through Your Business
Financial Study & Scenario Analysis

The United States is in the midst of a craft brewing revolution as shown by the increasing number of entrepreneurs and consumers becoming invested in the alcohol industry. According to an article published by Fortune.com in March 2015, "American craft brewers now produce about one out of every 10 beers sold in the United States." 2014 saw an 18 percent increase in volume to 22.2 million barrels produced, with craft brewers (each producing less than six million barrels annually) claiming 11 percent of the total beer market.[1] While major commercial brands continue to face challenges in increasing their business, craft brewers are capturing an increasing segment of the market with their smaller batches of high-quality, artisan beer. For the owners of an existing brewery, expanding operations to include malt processing can help improve the quality of their products and differentiate their offerings from the competition.

It is imperative to note that while every effort was made to reflect reality in the description of a typical brewery and malting venture, the study and model do not reflect any specific existing business, but is a reflection of the industry and is meant to be purely prototypical in nature.

[1] http://fortune.com/2015/03/16/craft-beers-volume-rising/

Tasks & Activities

Over the course of the document's creation, the consultants conducted many tasks, including research and data collection, interviews, and financial modeling. To make the study as realistic as possible, Matson Consulting worked with VA FAIRS on the following tasks:

- Determining critical factors for success
- Assessing management and operation options
- Estimating operating costs for a malting and brewing facility
- Estimating equipment levels to equate with production as the business expands
- Estimating scale of labor and other activities necessary to maintain efficient operations
- Developing financial model for sensitivity studies
- Determining at what level the prototypical facility would need to operate to be profitable
- Creating an objective study report

Research and Data Collection
To conduct an analysis of the venture, current market and industry standards for malting and brewing operations were researched. The study relies on public data and other resources possessed by the consultants, as well as information gathered through a literature and database search. Additional data has been has been used to support different claims, including market structures, government statistics, market information, and the knowledge of the consultants.

Financial Model
The consultants developed a financial model for the prototypical business, including sensitivity scenario assessments for the business decision process. The model reports monthly data for the first year of operation and quarterly thereafter and contains a detailed sales breakdown, labor, profit and loss statement, depreciation schedule, cash flows, and balance sheet.

As a prototype, the study represents a craft malting and brewing operation with moderate financial resources. This consultancy's goal is to create a study that is adaptable to as many similar ventures as possible. Year one of the study is not considered to be the startup of the project; the three year segment is intended to represent a snapshot of operations for a typical period during the early development of a prototypical facility located in Virginia.

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Terminology

The following are definitions of some industry related terms used throughout the document. The definitions accompanying these terms have been excerpted from the Beer Advocate's "Beer & Brewing Terminology" article. [2]

Barley: a cereal grain used for breads and soups, animal feed, or malted for production of beer and distilled products.

Barrel: a general unit of measurement used by most breweries. In the United States, a barrel is equivalent to about 31.5 gallons.

Conditioning: a process that naturally carbonates beer. For more complex flavors, the brewer uses warm conditioning; for cleaner, rounder flavor, cold conditioning is ideal.

Fermentation: a process by which yeast consumes and processes sugars into alcohol and carbon dioxide.

Hops: the flowers of the plant Humulus lupulus used in the boiling and fermentation stages of beer brewing to impart a bitter flavor and aroma.

Malt: the partially sprouted cereal grains that are dried before completing the germination process, through the malting process. The resulting malt contains specific enzymes that break down proteins in the grain during the fermenting process.

Mash: the process in which the barley grains are soaked in water to promote germination.

Microbrewery: a brewery that produces less than 15,000 barrels per year. These types of facilities typically conduct their sales off premises.

Pitch: adding yeast to wort to begin fermentation.

Priming: adding sugar to promote secondary fermentation.

Secondary Fermentation: the secondary stage of fermentation that occurs in a closed container, which can last from a few weeks to several months.

Units of Bitterness: also known as **International Bitterness Units**. A system of measurement for hop bitterness in finished beer.

Wort: the mixture of grain sugars strained from the mash container. It is first considered "sweet wort," then brewed wort, then fermenting wort, and upon completion—beer.

[2] http://www.beeradvocate.com/beer/101/terms/

INDUSTRY OVERVIEW

While entrepreneurs considering expanding a farm brewing business to include malting operations may have anecdotal knowledge gained from experience and input from peers, it is often best to seek out industry information from regulatory agencies and manufacturing associations to provide a more thorough understanding of what it will take to initiate and grow such a business.

Examination of all aspects of the industry provides a more comprehensive view of the business, whether it includes both a malting and a brewing facility, or whether it chooses to grow its own inputs or source them from another local producer. Taking the time to think critically about how to best organize a business and determine how it will function over the long-term can prevent later issues as a successful business attempts to grow.

MALTING BARLEY PRODUCTION REPORT

The following article was written by Julia Schlosser of the Virginia Foundation for Agriculture, Innovation and Rural Sustainability (VAFAIRS). Using information from industry experts and select resources, the article looks at the processes involved in growing malting barley in Virginia, as well as the risks and rewards which growers should take into consideration.

The process of growing and malting grain dates back for millennia. In as early as 4000 BC, Egyptians have been documented brewing beer and experimenting with different techniques. Today, malting has evolved into a highly sophisticated industry using advanced technology, as local breweries and distilleries serve increasingly discerning customers who expect excellent products.

Image courtesy of Cooperative Living

Barley intended for malting must meet strict quality criterion to be safe and useful for malting, brewing, and distilling. Breweries, distilleries, and malt houses must be selective and follow strict specifications for barley to produce a safe, quality end product for their customers.

These stringent quality standards make producing malting quality barley a challenge in the eastern United States, especially in Virginia, where crops are subject to changeable weather, high humidity, and susceptibility to certain diseases.

Growing malting barley requires a considerable amount of work and attention to detail, according to Virginia producer William "Billy" Dawson. Having grown grain on 1,200 acres on Virginia's Northern Neck for several years, Dawson is a much sought after resource on growing the product in the state. As one of Virginia's leading producers of quality malting barley, his customers include distilleries, breweries, and malt houses along the East Coast and beyond.

The following report is a compilation of what Dawson has learned as he perfected his malting barley production process in Virginia, supplemented with information from industry organizations and educational institutions.

The Forrest Gump Crop

Dawson is the first to admit that malting quality barley is a finicky crop to grow in Virginia, especially in comparison to its cousin, feed barley. Traditionally, Virginia farmers grow barley for animal consumption, where quality is not as critical. This feed barley is generally produced with minimal attention, inputs, and costs, with the goal of merely producing a good yield over product quality. Conversely, as a specialty crop, malting barley should be grown for quality, not quantity; yield is secondary.

According to Dawson, producing malting barley involves "work, diligence, time, and headaches…. It's the Forrest Gump crop: you never know what you're gonna get!" A week of rain at the wrong time can cause the entire crop to sprout, making it useless for malting, and rendering it as a low value feed product. Failing to scout the crop properly for disease and pests can result in a similar fate. Dawson emphasizes that it is a gamble to grow malting barley due to the risk of crop failure; "you have to plan and work carefully."

For beginning farmers and those who have never grown malting quality barley before, starting small and working with knowledgable individuals is key. For example, it would be beneficial to experiment with just a few acres af first, and partner with knowledgable individuals, such as other farmers growing similar crops, agronomists and crop specialists, the Virginia Cooperative Extension, researchers at Virginia Tech, and associations like the Virginia Grain Producers Association and the American Malting Barley Association. Aligning with these types of individuals and businesses can connect new growers to a wealth of production information and experience.

Understanding the area's climate and soil is critical to producting a quality crop, as is selecting an appropriate barley variety, scouting and treating for pests and disease, harvesting, cleaning, and storing appropriately.

Fusarium Head Blight (Head Scab)

Fusarium head blight (FHB), also called head scab, is caused mainly by the fungus Fusarium graminearum (also known as Gibberella zeae). This disease periodically causes significant yield loss and reduced grain quality. F. graminearum also produces mycotoxins, which are chemicals toxic to humans and livestock in certain concentrations. Fusarium can damage grain components and impact malt quality. Increased FAN and soluble protein are common with scab.
Fusarium can also cause gushing in bottled beer. Barley DON levels are not good predictors of the level on malt, so **barley should be tested before and after malting**, because fusarium (and DON) levels can increase during malting.

Mycotoxin Testing

Only a chemical analysis can verify the presence and amount of mycotoxins in infected grain.

A variety of commercial laboratories and quick-test kits exist for mycotoxin analysis.

For more information visit https://www.extension.purdue.edu/extmedia/BP/BP-33-W.pdf

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Preparing fields for planting

Barley prefers well-drained soil and has specific fertility preferences. Fertility issues can be determined by a soil test; work with a local extension agent or a crop adviser to find a fall fertilizer for raising a barley crop. For example, barley does not grow well in soil with a low pH, instead flourishing in a pH of 6.2 or higher. Dawson advises applying a reasonable amount of nitrogen in the spring. Caution is advised, however, as too much nitrogen can high protein levels in the barley, an undesirable trait for brewing.

Little information on nitrogen rates for malting barley in Virginia has been established, although research centers like Virginia Tech are testing different application rates to determine the best practices for the state. Dawson, whose farm is located on the Northern Neck, finds applying 40 pounds of nitrogen an acre in February and 40 pounds in March works well for his area, for example. Local extension agents can provide valuable information to help with appropriate nitrogen rates for particular regions and tissue testing for nitrogen management.

Additonally, experts at the Purdue University Cooperative Extension recommend that in any crop rotation, producers should avoid planting barley after corn or another small grain, especially no-till varieties, to prevent deoxynivalenol (DON).[3] It is optimal to rotate with wheat or soybeans, vegetables, or hay.

Variety, Seed, and Planting

Choosing the best malting barley variety starts with identifying the desired end product. Barley varieties differ greatly in their ability to be stored, flavor, brewing characteristics, quality, yield, winter hardiness, lodging resistance, and disease and insect resistance.

Cornell University lists the end characteristics desired for brewing as "grain that is bright gold in color, along with kernels and husks that are both intact…germination rate, protein level, plumpness and uniformity of the kernels. Typically, high quality barley has less than five percent broken kernels, a protein content of 9-12 percent, and a germination rate of 95 percent or higher. Finally, grain should be free from mold, blight and other diseases."[4]

In addition, Dawson recommends, "Start with good, clean seed, either certified or registered. Treat with both insecticide for aphids and fungicide to prevent seed borne diseases and insect attack." High quality seed helps minimize seedling blight. Cornell also recommends growing a locally tested variety resistant to disease—and do not save any seed.[5]

In the eastern US, winter barley has greater yield, quality, and agronomic efficiency than spring barley. According to USDA Agricultural Research Service's David Marshall, "the main differences between 2-row and 6-row are kernel size, extract, protein, and enzyme levels. Irregular kernel size and shape in 6-row can be physically sorted out,

Common Malting barley varieties grown in Virginia:	
Thoroughbred	6-row
Endeavor	2-row
Violetta	2-row
Charles	2-row

[3] Diseases of Wheat: Fusarium Head Blight (Head Scab). Purdue Extension
[4] Harvest and Storage of Malting Barley: Cornell University Cooperative Extension
[5] Growing Organic Malting Barley. Cornell University Cooperative Extension

with thinner kernels sold as distillers malt or feed. 2-row does not require the same amount of sorting. Kernel plumpness relates somewhat to malt extract yield: plump kernels may have higher starch content, which is the principal contributor to extract." [6]

Will the malting barley need to be stored for long periods of time? Some varieties, like Thoroughbred, have dormancy built into the seed and can possibly be stored for years if maintained properly. In contrast, the 2-row varieties available do not have those dormancy traits and may lose quality quickly when stored. Anyone experimenting with 2-row varieties should grow small quantities to start, because the quality is so volatile. Thoroughbred (6-row) is much more reliable.

In eastern Virginia, barley can be planted during the first two weeks of October. Dawson finds planting 100 pounds per acre of seed (adjust for germination) helps with keeping plump seed; crowding makes smaller seed. "You want germination levels of 95% or better." he advises.

Key Analytics of 2-Row and 6-Row Barley		
	Six-Row	Two-Row
Plump kernels (%)*	> 80.0	> 90.0
Germination (%)*	≥ 98	≥ 98
Extract (% dry basis)	> 79.0	> 81.0
Total protein (% dry basis) *	9.0-12.5	9.0-11.5
Diastatic power (degrees lintner)	160	120
ß-glucan (ppm) *	< 120	< 100

Typical two- and six-row malt quality parameters for barley produced in the United States. Malt quality data represent approximate averages. It must be remembered that considerable variation due to changes in growing conditions, barley quality, or malt processing can occur, even within the same cultivar.
* = determined in-house.

Image courtesy of MBAA.com

During Growing Season

Later in the year, disease control is critical to ensure high yields and good end use quality. The crop must be scouted frequently for any foliar and head diseases. If any are found, they must be treated immediately.

Dawson stresses that fungicide application is necessary to help stay under the threshold for vomitoxin of one part per million (PPM) for food-grade products. A fungicide's effectiveness is dependent on application timing, spray coverage, and disease pressure.[7] A growth regulator may be needed to prevent the plant from lodging to facilitate harvest, protect yields, and ensure grain quality.[8]

[6] Breeding Malt-Quality Winter Barley for the Mid-Atlantic, USDA Agricultural Research Service. D. Marshall.
[7] Diseases of Wheat: Fusarium Head Blight (Head Scab). Purdue Extension
[8] Specialty Small Grain Crops: Potential Markets, Challenges, Varieties and Management, Virginia Tech

Deoxynivalenol (vomitoxin)

Deoxynivalenol (DON), or vomitoxin, is a mycotix produced by certain strains of fungus and environmental conditions. Found on wheat, corn, and barley in the US, DON is extremely undesirable in malting barley.
The FDA does not have a guideline for malt or beer, but finished wheat product guideline is 1 part per million of DON. DON is transferred from barley to malt to beer, raising safety and public health concerns if levels are too high.

- Barley DON is not an accurate predictor of malt DON
- Much of the DON present on malt will be extracted into beer
- DON is heat stable and survives kilning and wort boiling

For more information, visit

- http://msue.anr.msu.edu/uploads/234/78941/Managing_DON_from_Field_to_Glass_-_Paul_Schwarz_and_Gary_Bergstrom.pdf
- scabusa.org
- Gipsa.usda.gov

Mildew is the most prevalent disease in the East, due to the humid climate. Some barley varieties have more resistance to mildew, but Dawson points out that it is not that expensive to treat with a labeled fungicide product compared to the cost of a crop failure from not spraying. The main treatment is during heading and flowering to control scab (fusarium head blight). It is critical that the application is timely to preserve crop quality. Timing has to be perfect for planting, treatment, and harvest.

Harvest

The timing for harvest is greatly dependent upon a combination of factors, including weather, barley variety, and maturity. Barley should be harvested when the grain is 16-18 percent moisture. Although there are several methods for harvesting barley, Cornell University advises straight (direct) combining for harvesting malting barley to reduce the risk of harvest losses. More detailed information on harvesting and grain storage are available in the Cornell publication linked in the footnotes,[9] as well as the report from the American Malting Barley Association.[10]

Researchers at Cornell have several suggestions to control DON levels: a timely harvest at acceptable moisture level, proper combine adjustment (high fan), grain drying, and custom cleaning.

During harvest and storage, Dawson segregates his barley by both variety and quality; if one part of a field has noticeable scab, is sprouting, or looks otherwise diseased, he will avoid harvesting and storing the damaged portions with any higher quality barley. Segregating in this manner preserves the higher quality barley from contamination from diseased or high-moisture barley that is unsuitable for malting.

Drying, Cleaning, Testing, and Storage

Growing and harvesting a quality barley crop is only half the battle: management of malting barley after harvest is also critical to preserving its quality. The barley must be dried, cleaned, and stored carefully to maintain its usefulness for malting purposes.

[9] Harvest and Storage of Malting Barley: Cornell University Cooperative Extension.
[10] Harvesting, Drying, and Storing Malting Barley American Malting Barley Association.

As needed, malting barley can be dried with indirect heat, either through aeration or with a dryer to 100-125 F. Drying preserves the barley's quality and lowers moisture to acceptable levels for storage—12 percent or lower.

Malting barley must be cleaned and sized (debearded, air screened, and aspirated) to remove dust and trash. As much as 20% of the barley volume can be lost to sizing. The cleaner removes waste products (called screenings) like rootlings, weeds, dust, and small or misshapen kernels. Cleaning improves the barley's quality, including test weight, by removing these types of foreign material. Additionally, cleaning can reduce mycotoxin levels.

Can malting barley be grown organically?

In today's marketplace, many consumers are searching for organic products. Due to Virginia's warm, humid climate, growing a high-quality organic barley crop would be difficult.
A Cornell publication cites the biggest challenge is producing disease free grain. The report emphasizes attention to detail is critical to growing malting quality barley.
For more information on organic barley production, reference Cornell Cooperative Extension's Growing Organic Malting Barley.

Can malting barley be insured?

USDA Risk Management Agency (RMA) may provide insurance coverage for growers whose malting barley meets certain criteria.
More detail is available at http://www.rma.usda.gov/help/faq/maltingbarley.html

After cleaning, there are several outlets for the resulting waste product. Those screenings can be ground and fed to cattle if mycotoxin levels are not too high, possibly bringing a few additional cents per bushel. Screenings can also be used as a cover crop.

Before and after cleaning, Dawson recommends taking multiple grain samples for testing. He tests samples for germination with a rapid visco analysis (RVA) and for vomitoxin (DON) levels. These tests help identify if the barley is sprouting from rain, humidity, and dews, and give pre-germ information—or how well the product will store.

This type of testing can be done at educational research institutions like Virginia Tech, Hartwick College, and Harvard College. Some types of testing can also be conducted on-farm with specialized equipment. Barley should be tested before and after cleaning, after storage, and after malting to ensure DON levels are safe for brewing (less than 1ppm).

Barley can be stored in small bins, totes, or bulk bags such as super sacks. Most malt houses do not have storage on-site, and buy malting barley in relatively small quantities. [11]

Barley stores best when it is clean, free from pests, cool, and dry. Barley with high moisture, and/or temperature levels will facilitate the growth of molds and other toxins, rendering it useless for malting.

[11] Growing Organic Malting Barley. Cornell University Cooperative Extension

The goal of storage is to maintain the barley's quality and protect it from pests. Any grain in storage needs to be closely monitored, as pest infestation can quickly destroy barley's integrity for malting. Insects are more easily managed with proper aeration and storage from 20°F to 70°F. Cornell Cooperative Extension recommends pretreating the grain with an insecticide before putting it into storage, to further guard it from insect damage. Dawson recommends that any barley storage bins be fumigated, as well as any trucks that have carried other grains, to eliminate any insect problems.

Sustainability

Finally, sustainability is rising in importance to consumers, especially those purchasing local and specialty products. A farm or farm brewery can explain their conservation initiatives to customers and the marketplace through a farm sustainability statement. This statement helps customers understand the farm's commitment to environmental stewardship. A well written statement creates a positive product image for the consumer, and can influence customers to choose sustainably produced products over competitors'.

Local Natural Resources Conservation Service (NRCS) conservationists can assist with developing, implementing, and documenting a farm's sustainable growing methods and conservation practices, like cover crops, integrated pest management, crop rotations.

Ultimately, a producer focused on attention to detail and quality over yield has the best chance of producing malting quality barley suitable for producing beer or spirits.

MALTING AND BREWING

A farm brewery's success hinges on multiple components of the malting and/or brewing industry working together, ranging from maintaining adequate supply arrangements to meeting state and local level regulatory requirements throughout the process. The following section presents a few of these components and their influence on the overall market.

In response to the dramatically increasing craft brewing industry, which is projected to represent almost 15 percent of the overall beer industry by 2020 with growth rates of 10 percent annually,[12] many small-scale malting operations are beginning to establish operations throughout the country. Demand for quality, local malts and hops is growing as craft brewers and distillers answer customer demand for locally produced products, from local inputs to sales.

Supply Inputs

A key factor in the production of any product utilizing agricultural inputs is securing a consistent supply. The venture may choose from several diverse arrangements to secure a supply of inputs for production, such as growing its own inputs, purchasing them from another local producer, or a mix of the two. For this study, the malting facility may or may not be located on the farm, so supply arrangements for both types of operations will be examined. It is recommended that ventures choosing to grow their own inputs still consider a plan of alternative supply in the event of crop failure or extenuating circumstances. As demand grows for the venture's products, it may also begin purchasing inputs from additional producers to help increase its supply of extra grains.

Ventures growing their own inputs may establish a plan of alternative supply in case of crop failure or extenuating circumstances.

Malted barley is one of the most critical components of crafted beer. There is a wide variety of barley types, many of which can influence and determine the taste of the beer. Brewers may choose to use only one variety, or strive for a more complex profile with multiple types. Base malts are typically used for their high extract potential, while other varieties provide specific characteristics, including the following general types:[13]

- *Caramel Malts* are made by drying germinated barley and heating at controlled temperatures, causing the sugars to caramelize. This variety comes in a range of colors, from light to dark, with flavors ranging from mildly sweet caramel to a more intense caramel with a burnt sugar taste profile.

- *Dark Malts* are characterized by little to no enzyme activity as a result of higher-temperature roasting. This type of malt cannot be used alone in a mash and is typically mixed with light malts to produce stouts or Bocks.

- *Light Malts* are kilned at higher temperatures, but not as high as dark malts. Consequently they have less enzyme activity than base malts, but enough to be used on their own. Pale

[12] http://demetergroup.net/sites/default/files/news/attachment/State-of-the-Craft-Beer-Industry-2013.pdf
[13] www.beeradvocate.com/beer/101/malts/

Ale malt is usually used for British-style ales, adding a characteristic of "full maltiness" to the beer. Lager malt, which has higher protein content, is used for lagers.

- *Roasted Malts* range from chocolate malt, which adds a nutty, roasted flavor to stouts and porters, to black malt, which imparts dry, burnt flavors when used to excess.

In 2012, approximately 37,000 acres in Virginia were dedicated to growth of barley for grain, resulting in over 2.9 million bushels harvested. Data indicates that the state had almost 600 farms growing barley, with the vast majority growing less than 100 acres.[14] Approximately 500 acres of this total was grown specifically for malting in 2014, although new legislation is encouraging smaller on-farm breweries to use products grown on their own farms through a new limited license that limits regulation on some property requirements.[15]

Hops are added during the fermentation process and fulfill a few critical functions, such as balancing sweetness of malts with their characteristic bitterness and acting as a natural filter to the beer. They also come in a wide variety of types, which impart specific flavors and characteristics to the resulting beer. A few main varieties are described below:[16]

- *Cascade* are the most common American hop, introduced to the country in 1972. This variety lends fragrant, flowery notes to beer and is typically used in West Coast ales with a citrusy hop character. This hop was created by crossing the English Fuggle variety with a Russian Serebrianka.
- *Chinook* is a high acid hop with herbal, smoky flavors, especially when used during the last few minutes of the boiling process. This variety is well-suited to American-style Pale Ales, especially high gravity types
- *Galena* are more mellow than most hop varieties and are one of the nation's most widely grown crops. They have a clean, well-balanced bitterness, and are excellent as a more general bittering hop for most types of beers.

The USDA's National Agricultural Statistics Service (NASS) reports that 2013 hops production increased 13 percent over 2012 harvests, and 7 percent over 2011 production. Not only did production increase in 2013, but the value of U.S. hops also increased. The 2013 crop value was $249 million, a 28 percent increase over 2012 value of 195 million. There is also a significant global demand for U.S. hops; approximately 60 percent of U.S.-grown hops exported in 2013. The Beer Institute reports U.S. brewers purchase more than 15 million pounds of hops yearly.

When analyzing the hops industry in Virginia, there are a few factors to consider. The USDA's NASS reports that the most of the United States' hops production takes place in Washington, Idaho, and Oregon, with the vast majority (79 percent) grown in Washington state.[17] Few hops are produced in Virginia, and only a minute portion of the industry is located in the mid-Atlantic. A smaller brewery growing hops intended for direct use in its own products, however, does not necessarily need to be concerned with national competition in this market.

[14] www.agcensus.usda.gov (Complete address available in Reference List)
[15] http://www.americanfarm.com (Complete address available in Reference List)
[16] www.beeradvocate.com/beer/101/hops/
[17] www.outsideonline.com (Complete address available in Reference List)

The Malting Process

Barley is a key ingredient of beer, providing the necessary carbohydrates and sugars for the fermentation process and adding characteristic flavors and color to the brew. "Malting" barley refers to the process of soaking, germinating, and drying grains to develop enzymes, making the grains beneficial for brewing and distilling. According to Briess Malt & Ingredients Company, a leading national grain and starch processor, the malting process consists of three main steps:

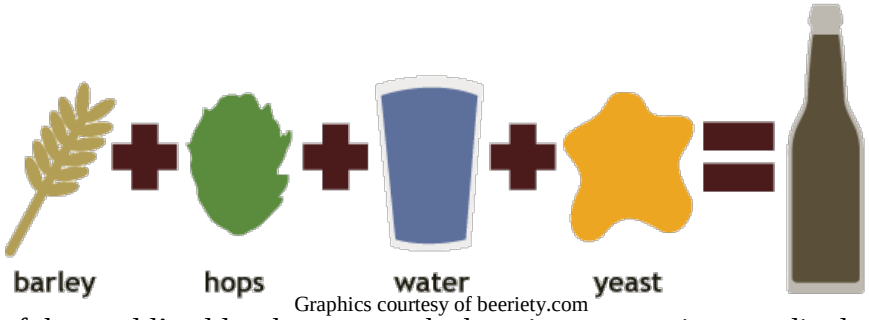
1. **Steeping:** after the barley has been graded and cleaned, the raw kernels are repeatedly submerged in water and drained until their moisture content increases from about 12 percent to 44. When the water is absorbed, enzymes in the barley activate, breaking down the protein and carbohydrate matrix that surrounds the starch granules and initiating the sprouting process. Once the kernels show their "chit," the beginning sprout rootlets, steeping is complete.

2. **Germinating:** the sprouting barley is transferred from the steep tank to a germination compartment, where sprouting continues and the kernel is modified. In this case, modification means the protein and carbohydrates are broken down and the seed's starch reserves open. This process typically takes four to five days and is controlled by circulating temperature-adjusted, humidified air throughout the kernels. The compartment also has turners, which prevent the barley from compacting or felting.

3. **Drying:** before the kernel's starch reserves are exhausted, germination must be halted through a drying process. Base/standard malts are dried with a kiln, which develops a range of flavors in the malt. Specialty malts are typically kiln-dried for a longer period of time, roasted, or both. Once it is thoroughly dried and cleaned, the malt is ready for use.[18]

[18] www.briess.com/food/Processes/malttmp.php

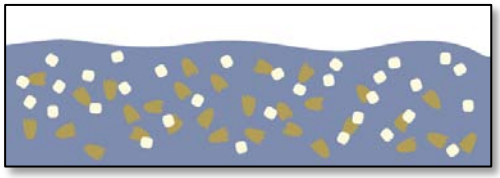
The Brewing Process



Graphics courtesy of beeriety.com

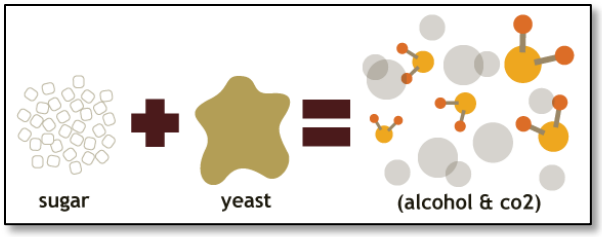
As beer is one of the world's oldest beverages, the brewing process is exceedingly simple. The process incorporates four key ingredients: water, malted barley, yeast, and hops. The following is adapted from an article from *beeriety.com*, describing the major steps:

1. **Mashing:** the malt and other grains are steeped in hot, not quite boiling, water for about an hour. This process activates enzymes in the grains, causing them to break down and release sugar molecules. The liquid is then drained from the mixture, resulting in a sticky, sweet mixture called wort.



2. **Boiling:** the wort is then boiled for another hour while hops and other flavoring agents are added. Hops balance the sugary sweetness that results from the mashing process and act as a natural preservative.

3. **Fermenting:** after it has adequately boiled, the mixture is quickly cooled, strained, and filtered. It is critical that the blend is cooled as rapidly as possible to prevent bacteria from taking hold and ruining the entire batch. Then, it is poured into a fermentation vessel and yeast is introduced. The batch is stored for a period of time ranging from a few weeks at room temperature for ales to several weeks at cold temperatures for lagers. During this time, the yeast breaks down the sugar molecules and releases alcohol and carbon dioxide as byproducts.



4. **Bottling and Aging:** finally, the mixture can be called alcoholic beer, although it is still flat and uncarbonated. It is poured into bottles and either artificially carbonated or "bottle conditioned," by naturally carbonating in the bottle through the carbon dioxide from continuing yeast production.[19]

Graphics courtesy of beeriety.com

[19] http://blog.beeriety.com/2009/07/06/how-beer-is-made/

Significant Industry Entities

USDA

The United States Department of Agriculture (USDA) is responsible for overseeing federal policy regarding farming, agriculture, and food. Distribution, labeling and packaging, quality, recalls, safety, and security are all functions governed by the USDA. Regulations and requirements of the USDA must be met in order to comply with applicable laws.

Because of the current world climate, especially with concerns of terrorism, a food defense plan may be required to prevent intentional contamination of the products produced by the facility.

Alcohol and Tobacco Tax and Trade Bureau (TTB)

The TTB is a Federal bureau that collects excise taxes on alcohol and regulates labeling and marketing requirements to protect consumers. Any business producing or selling alcohol will have to coordinate operations with the TTB. More information is located in the Legal considerations section of this study.

Virginia Department of Alcoholic Beverage Control (VABC)

The VABC was created under the provisions of the Alcoholic Beverage Control Act, Chapter 94 of Acts of Assembly, Session of 1934, and subject to amendments thereto. Their mission is to control the distribution of alcoholic beverages; operate efficient, conveniently located retail outlets; enforce the laws of the Commonwealth pertaining to alcoholic beverages and youth access to tobacco products; and provide excellent customer service, a reliable source of revenue, and effective public safety.[20]

Virginia Department of Agriculture and Consumer Services (VDACS)

Production of malt beverages as a food product, falls under the authority of VDACS, specifically the mandate to "Administer regulatory programs to ensure that safe, wholesome, unadulterated and truthfully labeled food and agricultural products are offered for sale to consumers."

According to their site, VDACS' Food Safety and Security Office is responsible for the enforcement of food related laws, including "related regulations within retail food establishments (except restaurants), food processing and manufacturing establishments, and food warehouse establishments." In order to ensure compliance with applicable food laws and regulations, breweries are subject to a mandatory inspection by VDACS prior to beginning operations.

VDACS has divided the state into territories and assigned Food Safety Specialists to each territory responsible for conducting the necessary activities within their region. Activities include "unannounced sanitary inspections of facilities, sampling of food products, investigation of consumer complaints, consultations with consumers and the food industry, and cooperative working relationships with other food safety agencies such as state and local health departments, the U.S. Food and Drug Administration and the U.S. Department of Agriculture."

[20] www.abc.virginia.gov/admin/aboutabc.html

National Alcohol Beverage Control Association (NABCA) is a national association formed to represent Control State Systems, or those entities in direct control of the distribution and sale of alcoholic beverages. They conduct many valuable functions, such as providing research and other information, and acting as a link between all levels of government and any organization with the ability to affect alcohol policy. Members of this association have access to a number of statistical reporting systems, surveys, and additional resources. *www.nabca.org*

The **American Malting Barley Association (AMBA)** encourages and supports production of high-quality barley for the malting and brewing industry. Their main objectives "are to enhance the national public sector barley research infrastructure; develop malting barley varieties with improved agronomic and quality characters; help implement programs to benefit producers and increase production; and represent the malting and brewing industry regarding public and regulatory issues that impact barley." Members can use a wealth of exclusive publications and research, along with many other resources. *http://ambainc.org*

Hop Growers of America (HGA) provides news and research for members, ranging from growers to related businesses. They host a yearly convention at the beginning of each year, uniting hops growers with other critical industry members, provides new and relevant material from the Hop Research Council, along with several other topics. *www.usahops.org*

The **Brewer's Association** is a trade group organized for brewers by brewers and concerned primarily with craft beer and home-brewing. Established in 2005 "to promote and protect American craft brewers, their beers and the community of brewing enthusiasts," the association actively educates brewers and consumers, collaborates with industry partners, and fosters transparency, unity, and economic integrity within the brewing industry. *www.brewersassociation.org*

The **Beer Institute** was organized in 1986 to represent the beer industry in dealings with Congress, state legislatures and other public forums across the country. Recognized as an authoritative source on industry information, the Beer Institute's goal is to develop public policies related to the industry with special emphasis on community involvement and personal responsibility; this goal is implemented through representation before both federal and state government. *www.beerinstitute.org*

Virginia Craft Brewers Guild is a group of independent microbreweries that is dedicated to growth of the craft beer industry in Virginia. As an affiliate of the Virginia Manufacturers Association, the guild strives to create a support network of established and/or beginning brewers in the state and further partnership between those invested in the industry. Many members of the leadership committee are involved in successful Virginia breweries, making them uniquely qualified to answer challenges of the local area. *http://virginiacraftbrewers.org*

INDUSTRY FACTORS

To fully understand the industry, there are a number of factors that owners of a farm malting and/or brewing facility can examine to increase chances of success for the business. Even though beer is the end product and the business may or may not decide to establish a malting facility along with brewing operations, all factors play a role in the industry as a whole. The following presents the three segments on both national and state levels.

Market Context: United States Beer Industry

According to a 2014 Gallup poll,[21] 64 percent of Americans consume alcohol, with almost half (41 percent) favoring beer. Most Americans polled indicated they had consumed at least one drink within the last week, at 67 percent. Weekend drinking was also on the rise, with 44 percent of adults polled on a Sunday reporting having had a drink within the last 24 hours. Beer consumption continues to be overwhelmingly male-dominated, with men accounting for more than 67 percent of men reporting beer preference.

In response to this market, craft brewery growth has exploded to over 4,144 breweries nationwide as of the end of 2015.[22] The Brewer's Association reports that in 2014, the overall U.S. beer market was up by only 0.5 percent, while the craft beer industry had increased 18 percent by volume and 22 percent by retail dollars for that year. In 2014, the craft market had reached 11 percent volume of the total U.S. beer market, with retail dollar value estimated at $19.6 billion, up from $14.3 billion the year before.[23]

Courtesy of BrewersAssociation.org

Virginia Beer Industry

The Beer Institute reports that the general beer industry's economic contribution to Virginia (including brewing, distributing, and retail) totaled nearly $4.9 billion and was responsible for over 26,000 jobs in 2014.[24] The report also cites another 18,000 industry-related jobs for the state, with over 1,000 directly connected to agricultural operations and a grand total of nearly 45,000 jobs for the state alone.

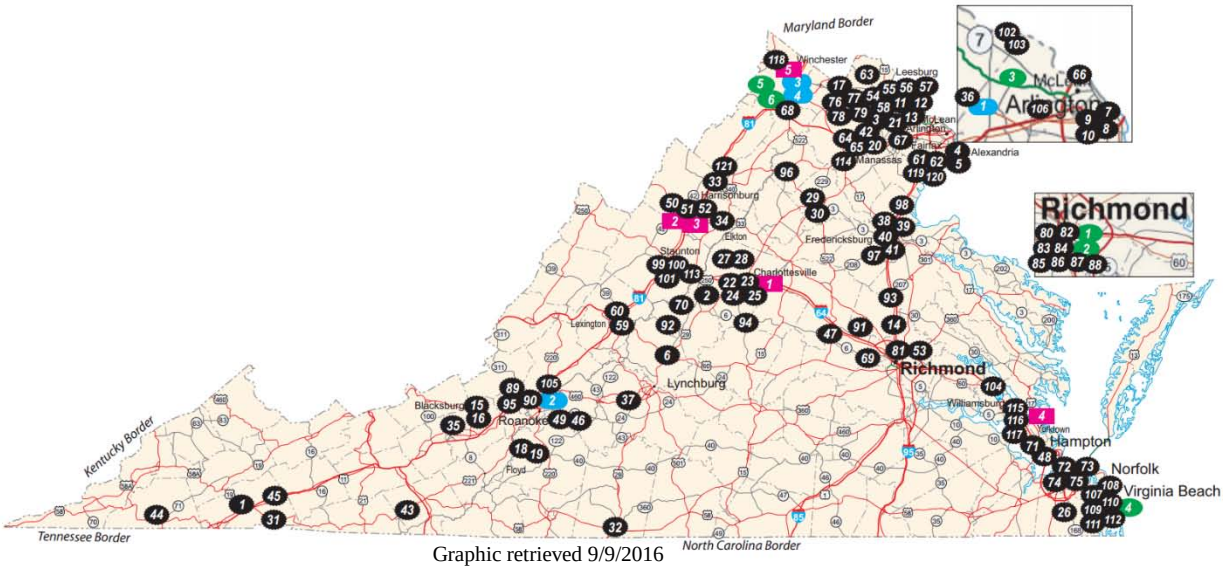
Nearly 196,000 barrels of craft beer were produced in 2014, averaging a gallon consumed per legal adult a year.

Craft beer is also quickly growing in Virginia, creating a huge economic impact for the state at $1.6 billion in 2014 and rating 19th in the country for sales. The Brewer's Association reports nearly 196,000 barrels of beer produced for the year, averaging a gallon consumed per 21+ adult annually.[25] The state reported 78 craft breweries for the year, although more recent reports cite over 100 in 2015.[26] The following figure, excerpted from The Mid-Atlantic Brewing News Craft Brewing Guide, shows many of

[21] www.gallup.com (Complete address available in Reference List)
[22] www.brewersassociation.org/press-releases/the-year-in-beer-u-s-brewery-count-reaches-all-time-high-of-4144/
[23] www.brewersassociation.org (Complete address available in Reference List)
[24] www.beerinstitute.org/assets/map-pdfs/Beer_Economic_Impact_VA.pdf
[25] www.brewersassociation.org/statistics/by-state/
[26] www.virginia.org/craftbeer/

Virginia's craft breweries, as indicated by numbered black circles. There are also a number of restaurants and stores specializing in craft beer, indicated by pink, blue, and green icons.[27]

Figure 1: Craft Breweries in Virginia



Graphic retrieved 9/9/2016

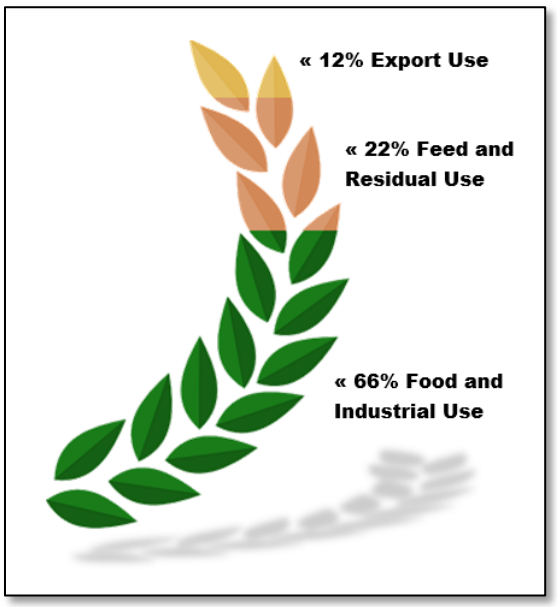
Caroline Gibson, director of corporate communications for the Virginia Tourism Corporation, comments, "Virginia is fast becoming the prime East Coast destination for travelers looking for local flavor. The craft beer movement is providing good jobs for Virginians, an authentic sense of place for visitors and exciting marketplace for emerging entrepreneurs and tastemakers."[28]

United States Malt Industry

According to the National Barley Growers Association, the United States is the eighth-largest producer of barley in the world. U.S. grain producers planted 4 million acres of barley from 2004 to 2008, representing a contribution of over $750 million to the nation's economy. Barley has generally been grown for animal feed, human consumption, and malting. While livestock have traditionally been the largest consumers of U.S. barley, use of barley as feed has declined while food and industrial uses have seen continued growth. Presently, most barley grown is intended for malting, thanks to the high premium malts command. As demonstrated in the following figure, U.S. barley use is currently divided between three main categories, with malting use representing the largest portion at 66 percent, feed and residual use at 22 percent, and the remaining 12 percent representing exports. [29]

[27] www.brewingnews.com/webpdfs/MABN/MABN_Virginia.pdf
[28] http://www.fredericksburg.com (Complete address available in Reference List)
[29] http://nationalbarley.com/

Figure 2: Current U.S. Barley Distribution



Recent demand for malts in the beer industry has remained fairly even as the source of demand has shifted, thanks to a decrease in consumption of domestic lagers and an increase in craft beer consumption. According to industry analysis conducted in 2014 by the Montana Department of Commerce,[30] craft breweries now consume nearly 20 percent of total malting barley production. This large percentage is concurrent with the recent explosion in growth of the craft beer industry. This venture will take advantage of this demand for quality malts, and expects to see sustained growth into the future as the industry continues to expand.

According to the National Agricultural Statistics Services, barley sold before malting receives an average price of 10 cents per pound as of April 2015.[31] In favorable conditions, malting barley can be a substantially profitable venture, as the process adds exponentially increased value per pound. Malted barley sold online generally fetches between $1.50 and $2.30 per pound, representing a significant markup of over 100-200 percent.

Malting barley presents a significant markup of 100-200 percent over the unprocessed grains, providing ample opportunity for profit.

Virginia Malt Industry

Virginia saw over 2.21 million bushels of barley produced in 2014, placing it 12th in the nation for barley production. The state reported 28,000 acres of barley harvested and planted, yielding approximately 79 bushels per acre. [32] This production has established the state as an important center for bringing together barley growers with the growing craft brewing industry. Virginia Tech is currently conducting a barley-breeding program to develop hearty, high-yield varieties for use in a variety of applications including craft brewing. They have released two varieties for production and hope to have an additional type available this year.[33] In early 2016, the school also announced the opening of a new, state-of-the-art malting and brewing facility that will allow

[30] https://businessresources.mt.gov/Portals/94/shared/IDP/docs/MaltingIndustryAnalysis.pdf
[31] www.nass.usda.gov/Publications/Todays_Reports/reports/agpr0515.pdf
[32] www.usda.gov/nass/PUBS/TODAYRPT/cropan15.pdf
[33] www.craftmalting.com/cereal-4-of-6-southeast-winter-barley-at-virginia-tech/

further research and development in beermaking techniques, especially with varieties more suitable for growing and processing in Virginia.[34]

Cedarvale Wood Mill Malts

The Virginia Grain Producers Association is also looking to connect their barley production with craft brewers in the region. With the majority of barley production going to animal feed, growers see the rapidly growing brewery industry as a potential outlet for their grain.[35] Malting facilities are also springing up throughout the commonwealth, growing and supplying other breweries with their locally grown and processed malts and hops. Despite the unique challenges that growing such a humidity-sensitive crop can present, many farmers who currently grow barley for animal feed are exploring converting some of their crop sales to malting for beer.

Production Issues and Challenges

While this document does not specifically focus on the production of malting barley, it is important to note that barley is considered a high risk crop. Virginia's unique climate can pose a variety of challenges for a newly established malting venture. In growth and production, Virginia's variable weather can cause crop failures and unreliable growing seasons. Damaging weather can render barley useless for malting or possibly even feed.

Producing barley for malting can be more expensive and time consuming than growing barley for feed.

Production become much more expensive when growing barley for malting since the crop requires additional inputs. Barley grown for malting also requires more attention than other varieties, which may result in more labor invested into the crop.

Once harvested, producers must carefully consider how the barley will be stored, as high humidity and wet weather (common to the state) can result in insect infestation and vomitoxin growth, a mycotoxin that commonly results in reduced input quality and gushing in beer bottles. Most producers either choose to use sprays and fumigation (which can result in fewer sales and customers, due to the trend towards more natural products) and cold storage (which can be costly in terms of equipment, but more natural). However, there are many resources available to producers on how to manage these factors, and the industry is still growing within the state.

Packaging and delivery of malted barley will also increase the cost of production and should be carefully considered. Feed barely is typically transported freely in a large truck or 18-wheeler, but most malters and brewers prefer to purchase the barley as a packaged product (such as a one ton bag) and cannot accept barley in bulk from a truck.

Multiple sources are available for assistance with barley production. The Appendix includes the American Malting Barley Association, Inc.'s chart titled "Malting Barley Breeding Guidelines Ideal for Commercial Malt Criteria." Additional sources include Virginia Tech's Corn and Small Grain Management (http://www.grains.cses.vt.edu/), Virginia Grain Producers Association (http://www.virginiagrains.com/), and Michigan State University's publication on barley production ("Malting Barley Production in Michigan." July 2014).

[34] https://vtnews.vt.edu/articles/2016/02/021816-cals-brewhouse.html
[35] http://americanfarm.com (Complete address available in Reference List)

Along with challenges farmers may face in terms of production costs, famers may also be constrained to the specific variety of barley they can produce. Many brewers only seek local or higher priced product for their specialty malt. Not all barley varietals, including specialty varieties, are available for public purchase and may be owned by a company or group. Grower groups may have access to more barley breeds that individuals could not access on their own.

United States Hops Industry

The U.S. hops industry as a whole seems to be growing. The USDA's National Agricultural Statistics Service (NASS) reports that 2013 hops production increased 13 percent over 2012 harvests, and 7 percent over 2011 production. Not only did production increase in 2013; the value of U.S. hops also increased. The 2013 crop value was $249 million, a 28 percent increase over the 2012 value of 195 million. Interestingly, there is significant global demand for U.S. hops; approximately 60 percent of U.S. hops were exported in 2013. The Beer Institute reports U.S. brewers purchase more than 15 million pounds of hops every year.

Craft breweries and microbreweries are among those spurring the demand for hops; this positive trend will likely continue along with the focus on local sustainable products and local foods interest. The Brewer's Association reports that in 2012, the overall U.S. beer market was up 1 percent, while the craft beer industry increased 15 percent by volume and 17 percent by retail dollars for that year. The beer industry in the state of Virginia has a total economic impact of more than $7.4 billion, according to the Beer Institute. The economic report also cites more than 50,000 industry-related jobs (including agriculture) in the state of Virginia alone.

As the demand for locally produced hops has increased, U.S. growers in many areas are not yet producing an adequate supply.[36] The AP reports on the shortage of locally produced hops in Milwaukee, especially in areas where craft breweries are springing up: "Craft brewers eager to capitalize on the local food movement have created a strong demand for hops to flavor their all-local beers, but farms in most states have grown slowly."

Growing demand for US hops also extends outside of the nation, as American craft beer popularity has inspired brewers in other countries to import hops and craft their own unique blends. The United Kingdom, for example, is now become the second-largest consumer of American hops, more than doubling their imports from 3.63 million pounds in 2007 to 7.84 million pounds in 2015, according to a recent article in *The Wall Street Journal*.[37]

Virginia Hops Industry

There are some considerations to keep in mind when analyzing the hops industry, and in particular, the hops industry in Virginia. The USDA's NASS reports that Washington, Idaho, and Oregon produce most of the United States' hops, with Washington State producing the majority, up to 79 percent.[38] Few hops are produced in Virginia, and only a minute portion of the industry

[36] www.craftbrewingbusiness.com (Complete address available in Reference List)
[37] www.wsj.com/articles/american-craft-beers-hop-across-the-atlantic-to-meet-growing-british-demand-1472231485
[38] www.outsideonline.com (Complete address available in Reference List)

is located in the mid-Atlantic. Despite current low levels of production, Virginia has historically been instrumental in hop production, earning the nickname "Hops Capital of the New World."

Courtesy Old Dominion Hops

According to the Virginia Hops Grower Survey, over 8,100 pounds of hops were harvested in Virginia in 2014. Because so many growers are using less than an acre to grow their hops, however, it can be difficult to quantify the amount grown by land. The report states that approximately 65 percent was sold wet, which can affect the total weight. Overall, the majority of farmers surveyed stated that they had been growing for less than three years, showing the recent growth of farmers investing in hops.[39] "Most major hop production in the U.S. takes place in Washington, Oregon, and Idaho. However, in recent years, the number of craft breweries in Virginia has increased, and interest in local hop production has grown. The number of requests from current and potential growers seeking information and resources from Virginia Cooperative Extension has also increased steadily." [40]

As interest in malting barley production has grown within the state, several businesses and groups have been established to fulfill some farmers' needs. The following is a brief list of some notable Virginia hops enterprises:

- **Old Dominion Hops Cooperative** works with farmers throughout Virginia, Maryland, and North Carolina to share resources and assistance in hops production and sales. The co-op has seen significant growth over the last two years, growing from 50 members in 2014 to over 185 in 2016. This group has partnered with Virginia Tech, the Virginia Department of Agriculture, and the University of North Carolina in order to develop the state's growing hops industry.

- **Lucketts Mill & Hopworks** has recently partnered with **Black Hops Farm** to establish a large hops growing and processing facility in the state, which will allow brewers to produce 100 percent Virginia beers.
- The annual **South Atlantic Hops Conference** is also a resource for newer hops farmers, connecting them with resources in the region and providing valuable roundtable discussions, tours, and talks on industry issues.

Market Conclusions

The U.S. beverage alcohol industry has a favorable outlook. Year to year trends tend to be more gradual rather than experiencing major variations, and recent years' sales across categories have held steady or slightly increased, indicating continuing growth for the near future. Due to the longevity and significant sales of the beverage alcohol industry, there are existing and well-established multi-national commercial brewing companies which control the vast majority of the beer market; however, consumer trends indicate increasing interest in locally produced alcoholic beverages, including beer.

[39] www.agriculture.vsu.edu/files/docs/2014-virginia-hops-grower-survey-summary-final.pdf
[40] 2014 Virginia Cooperative Extension. "Hops in Virginia-2014 Grower Survey."

"Micro" and "craft" brewing has shown substantial growth in recent years, reflecting increased interest in locally produced malt beverages.

Because of rising consumer interest, "micro" and "craft" brewing has experienced significant growth in recent years, similar to the growth of the Virginia wine industry and local distilling operations, as well as success of the local foods movement. Small business owners see this new demand as an opportunity to cater to a new group of diverse consumers open to experimentation.

This interest has led to a significant increase in small-scale and artisan brewing operations in Virginia, including during the last year. The Virginia ABC reports the addition of 40 new licensees during 2014, two in 2015, and four currently pending. While these new entrants point to the increased popularity and market opportunity, they also represent significant levels of competition for additional entrants.

Barley grown for malting has been a growing industry on both a national and state-wide scale in Virginia. With continued support from the state as it attempts to build its craft brewing industry and increased demand from other brewers, growing and harvesting barley appears to be a viable operation for a farm malting and brewing facility. As of the end of 2015, two new malt houses have been announced for the state, including a Michigan-based venture that specializes in sourcing locally grown barley and selling malt to craft and home brewers. Due to the growth of the local brewing industry, local hops production has also seen an increase; however, supply has not kept pace with demand. Exact production levels of hops within the state of Virginia are difficult to ascertain due to the vertical growth methods for hops plants, but demand seems to be sufficient to allow for additional entrants into hops production.

Examining the Consumer Marketplace & Market Potential

According to a presentation given by the Brewers Association, the primary demographics for craft beer have drastically changed over the last 15 years. In 2001, median craft beer lovers consisted of men around the age of 39 with higher levels of education and more disposable income. This market has changed since, with the emergence of Millennials and younger female craft beer fans. Now, almost 75 percent of adults of legal drinking age live within 10 miles of a brewery, which can make brewery tourism a more lucrative industry.[41]

Almost 75 percent of legal-drinking-age adults now live within 10 miles of a brewery, which can contribute to the growth of brewery tourism as an industry.

The Commonwealth of Virginia has demonstrated much interest in developing the malt industry within the state. In 2015, two malting businesses announced plans to establish operations, fueled by the 2014 limited license for on-farm breweries using inputs from their own farms. While the malting expansion with the sole intention of selling barley and malt directly to customers may not be advantageous for a brewery, growing and/or malting the brewery's own inputs can be a helpful marketing tool for the brewery's target customer.

The region surrounding Virginia has become extremely receptive to craft breweries, ranging from larger operations such as Sierra Nevada and New Belgium to smaller ones like the facility

[41] www.brewersassociation.org/wp-content/uploads/2014/10/Demographics-of-craft-beer.pdf

proposed in this study. For example, Asheville, North Carolina has become a haven for the craft brewing scene, with more breweries per capita than any other city in the US. The city is home to multiple brewery tours, annual beer festivals, and many collaborations between breweries and other establishments, benefitting numerous aspects of the local economy.[42]

According to an article from *Entrepreneur* magazine, the demographics of craft beer drinkers has drastically shifted over the last 10 years. As Millennials (those born between the early 1980s to the early 2000s) reach legal drinking age, they seek products that fit within the malting and brewing facility's product listing—beers that are locally produced in an environmentally sustainable manner. The demographic within the Millennial group has also shifted, with women occupying an ever-increasing segment of the craft beer drinking population.[43] The following figure illustrates some of the key characteristics of this target market, as described by The Brewers Association:[44]

Figure 3: Millennial Characteristics

The most recent national census data shows that approximately 34.5 percent, or 2.7 million of Virginia's overall population fits within this bracket.[45] Similarly, the surrounding states—West Virginia, Maryland, North Carolina, Tennessee, Kentucky, and Washington D.C.—have a combined Millennial population of approximately 10 million people.

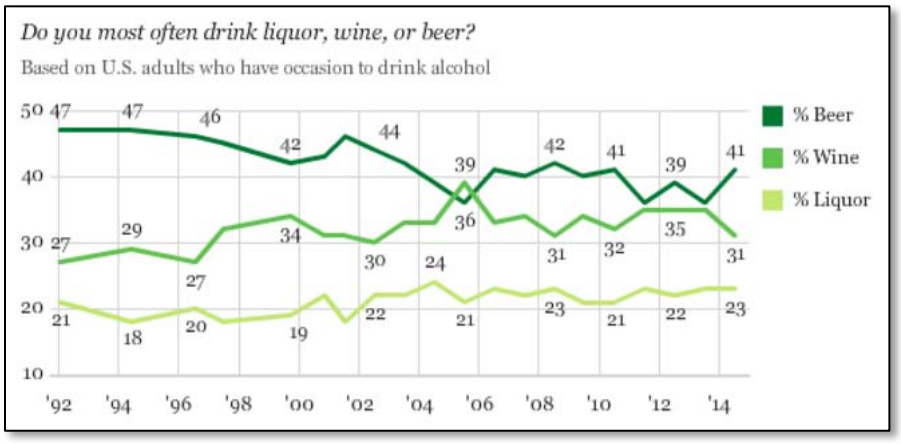
Current and Potential Market

The agricultural production sector in Virginia is diverse and varied. Non-traditional operations, such as farm malting and brewing operations, are becoming more commonplace as shown by the increasing number of applications to Virginia ABC authorities.

[42] www.exploreasheville.com/foodtopia/beer-scene/
[43] www.entrepreneur.com/article/246092
[44] www.brewersassociation.org (Complete address available in Reference List)
[45] http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

According to a 2014 Gallup poll,[46] 64 percent of Americans consume alcohol, a figure that has remained largely the same on average over the long term. Demographics information indicates that among women, wine is the top alcoholic drink at 46 percent, while the ranking for men is beer at 57 percent, followed by liquor at 20 percent and wine at 17 percent.

Figure 4: 2014 Gallup Poll Results



As a whole, beer is the most commonly consumed alcoholic beverage, followed closely by wine. Liquor products are the least commonly consumed. In general, slight declines in beer consumption, coupled with slight increases in wine consumption show these two products converging, while liquor percentages have remained relatively stable.

Within the beer segment, however, craft beer is growing. According to Brewers Association sales numbers, U.S. craft beer sales increased by 17.6 percent in 2014, capturing an 11 percent share of the market. Overall, craft beer sales totaled $19.6 billion, almost a quarter of the overall beer market sales.[47]

[46] http://www.gallup.com (Complete address available in Reference List)
[47] www.brewersassociation.org/statistics/national-beer-sales-production-data/

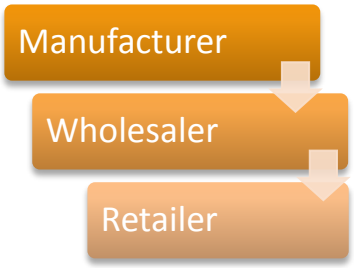
THINKING THROUGH YOUR BUSINESS

In order to consider the various factors that would affect the establishment and successful operation of a malting facility and brewery, using a “castle in the air” approach to thinking through the various operations and production segments can reveal areas for improvement. This approach often results in a deeper understanding of how the business will operate on a yearly, monthly, and even daily basis.

Constructing a narrative from this thought process could serve several functions. It allows the owners to have a record of their vision from the beginning, as well as more effectively communicate that vision to potential investors or financiers. It also provides source material for possible marketing and promotions. Once the story of the “castle” is complete, owners can use the written thought process they have constructed to make the business real as they implement the various stages of startup and operations, and record their overall idea in a business plan.

Legal Considerations

Virginia operates its alcohol industry with a three-tier system separating the manufacturers of alcoholic products (including breweries, wineries, and distilleries) from wholesalers and retailers. The three main categories of alcoholic products, beer, liquor, and wine, have specific rules that apply to the wholesaler and retailer tiers. Those planning on starting a business that makes or sells alcoholic products may consider the following:



- From 1919 to 1932, the U.S. did not allow commercial production and sale of alcohol. The 21st Amendment repealed Prohibition in 1933, but allowed each state to make its own laws governing the sale and production of alcoholic beverages.
- The Alcohol and Tobacco Tax and Trade Bureau (TTB) works at the Federal level and the Virginia Department of Alcoholic Beverage Control (VABC) works at the state level. The owners will have to conform to both organizations' regulations.
- The TTB institutes the rules governing the regulation of alcoholic beverages. Details are available at the TTB website www.ttb.gov.
- The Bioterrorism Act of 2002 requires anyone who manufactures, processes, packs, or holds food (including alcoholic beverages) for consumption in the United States to register with the Food and Drug Administration.
- Virginia has recently passed legislation, including SB 596, which "reduces the cost of an ABC license for those breweries producing 500 barrels or less of beer per year from $2,150 to $350 to assist the growth of micro breweries." By making this type of license more affordable, the state hopes to harness the massive growth in craft breweries across the nation to create more jobs and economic impact for the state.
- In 2012, SB 604 gave brewery license holders permission to sell their beer for on premise consumption where it is made. Before the bill passed, Virginia breweries that did not have a full service restaurant (brewpubs) were limited to offering free samples, and selling beer to go.[48]
- Unlike farm-based wineries, there is no specific licensure for "farm malting" or "farm breweries." The VABC lists three divisions under the brewery license category based on the volume of production:
  - Less than or equal to 500 barrels annually
  - 501 to 10,000 barrels annually
  - Greater than or equal to 10,001 barrels annually[49]

[48] www.hardywood.com/content/sb-604-has-passed-what-means-virginia-beer
[49] www.abc.virginia.gov/licenses/get-a-license/industry

- Also monumental in the Virginia craft beer movement is SB 430, which creates a new limited brewery license for breweries manufacturing less than 15,000 barrels of beer per year. The bill limits local regulation of limited brewery licensees:

§ 15.2-2288.3:1. Limited brewery license; local regulation of certain activities.
B. No locality shall regulate any of the following activities of a brewery licensed under subdivision 2 of § 4.1-208:

1. *The production and harvesting of barley, other grains, hops, fruit, or other agricultural products and the manufacturing of beer;*
2. *The on-premises sale, tasting, or consumption of beer during regular business hours within the normal course of business of such licensed brewery;*
3. *The direct sale and shipment of beer in accordance with Title 4.1 and regulations of the Alcoholic Beverage Control Board;*
4. *The sale and shipment of beer to licensed wholesalers and out-of-state purchasers in accordance with Title 4.1, regulations of the Alcoholic Beverage Control Board, and federal law;*
5. *The storage and warehousing of beer in accordance with Title 4.1, regulations of the Alcoholic Beverage Control Board, and federal law; or*
6. *The sale of beer-related items that are incidental to the sale of beer.*

- Should the business focus solely on production and sales of malts and/or hops, there are also a number of considerations pertaining to grain and crop production:

2VAC10-10-150 Small Grain Certification Standards includes the following:

A. Land Requirements. A crop of small grain will not be eligible for certification if planted on land in which a small grain crop was grown the year previous except a crop of the same variety grown from certified seed.

In fields double-cropped, neither or the two crops grown in the previous calendar year shall have been the same kind as the crop being inspected, unless they were grown from a class of certified seed of the same variety.

B. Field Standards.
1. *Field Inspection. At least one field inspection shall be made after the crop is fully headed when varietal or crop mixtures can best be determined.*
2. *Isolation.*
   a. *Wheat, oats, barley, triticale. A field shall be separated by a strip of ground adequate to prevent mechanical mixtures. The strip may either be mowed, uncropped, or planted to some crop than the kind being certified.*[50]

Potential business owners may contact their local Virginia Department of Alcoholic Beverage Control Regional, Satellite Office, or their local compliance agent for more information. Contact information can be found at www.abc.virginia.gov.

[50] http://law.lis.virginia.gov/admincode/title2/agency10/chapter10/section150/

Organizing Steps

Organizing and starting a farm brewery is an exceedingly involved process with multiple steps and procedures to ensure compliance with laws and regulations. The TTB has outlined various points to consider when beginning a new business. In their "Thinking of Starting a Business" section, the TTB outlines four key questions for those looking to establish a business:[51]

- **What business structure is advantageous to the venture?**
- **What makes an effective business?**
- **Where will the financing come from?**
- **What licenses, permits, and registrations do the state and federal governments require?**

Every venture will have its own unique needs and requirements, depending on a number of independent variables, such as inputs, product, location, and others. Considering the following factors will allow the owners to make the most educated decisions regarding the business.

Brand Registration and Trademark

It is recommended that the brewery's brand name be trademarked to protect the business. Federal registration of a trademark is not mandatory, however the time and effort invested into the establishment of a brand and its connected story cannot be well protected without this step.

Federal registration serves notice to the public of the registrant's claim of ownership of the mark, legal presumption of ownership nationwide, and exclusive right to use the mark on or in connection with the goods/services listed in the registration. Although these activities may incur a cost, the name and design chosen by the owner of a brewery should be trademarked and registered at the federal and state levels.

[51] www.ttb.gov/main_pages/start-a-business.shtml.

BUSINESS STRUCTURE

When analyzing any type of expansion to a business, it is crucial to examine legal business structures and ensure the venture's developing needs will continue to be met. The type of structure selected for the business may influence the amount of paperwork and other requirements for obtaining federal and state licenses, as well as the general operations of the company. More information about legal business structures is located in the Appendix.

Regardless of the brewery's specific arrangement, all businesses share certain basic functions. The following descriptions of duties are generic and intended as a guide over an explicit plan of organization. For the purposes of this study, the brewery will add a dedicated Maltster who oversees and implements malting operations. The other minimum role requirements for the venture are typically Owner/Director, Master Brewer, Assistant Brewer, Retail & Tasting Room/Store Manager, Tasting Room/Store Associates, and General Labor/Delivery Personnel. The business may also require outside expertise, including brewing consultants, accountants, and attorney or compliance services.

One individual may fill multiple roles or several may fill one role, depending on the venture's needs.

While the following hierarchy presented uses specific personnel titles, they represent a role within the venture along with its associated functions. As previously noted, one individual may often fill multiple roles, and where possible, some individuals may take responsibility for several roles within the brewery based on availability.

Figure 5: Prototypical Brewery Human Resources

Owners

In the initial and beginning stages of the venture, the owners will have a more hands-on part in the business, typically fulfilling multiple roles at once. The owners are responsible for leading sales, marketing, operations, and retail activities at the farm brewery. They will supervise all sales events such as brew release parties, satellite tastings, festivals, and expos, working closely with the Retail & Tasting Manager as the business grows. This role also includes driving sales growth and effectively managing expenses and profitability issues.

Development of the business plan, customer relations, and sales documentation will be under the purview of the owners as well.

Maltster
Depending on the brewery's supply arrangement, the maltster may either oversee barley growing operations as well as processing, or supervise barley purchasing decisions and processing operations. This individual will work in cooperation with the Owners and the Master Brewer in selection of barley varieties and processing operations. The Maltster is employed full-time and reports directly to the Owners.

Assistant Maltster
This person provides assistance to the Malster in all production and processing activities, also managing other limited tasks as needed. This role requires at least an adequate working knowledge of the industry and can be considered a "Maltster in Traning" position. The Assistant Malster will be intimately involved with producing the facility's products.

Master Brewer
The Master Brewer's foremost responsibilities are production, safety management, and quality control of malting and/or brewing operations. Once the venture has determined the consumers' taste preferences for beer varieties, the Master Brewer will apply his/her scientific and technological knowledge to meet the demand. The Master Brewer is a full-time employee who reports to the Owners.

Assistant Brewer
This individual assists the Master Brewer in all production activities, supervising some tasks so the Master Brewer can take on other responsibilities related to general business management and operations. This role will require significant knowledge and can be thought of as a "Master Brewer in Training" or apprentice role with significant involvement in producing the brewery's products.

Retail & Tasting Manager
This manager provides leadership of the retail store at the brewery. This is a full time position and he/she reports to the Master Brewer. This person works to develop and implement retail store operating policies and principles. He/she is accountable for executing an operating plan consistent with the Owners' direction and monitoring retail store operations against goals. This person is responsible for store profit and loss, which includes driving revenue growth and market growth/market share, and effectively manages expenses and profitability. This employee is responsible for organization and function of tasting room activities.

Tasting Room Associates
These associates work part-time under the supervision of the Retail &Tasting Manager. They help in beer and non-alcohol items sales, help promote the brewery's products, greet visitors, guide people through the facility, give presentations, and recruit/organize groups of visitors to the brewery for tours.

General Labor
General Labor positions represent other roles and duties that need to be filled on an as-needed basis, and may or may not include skilled labor positions related to marketing,

giving tours, production, or general maintenance and clean-up. These positions may be full or part time depending on the needs of the business.

Additional Future Roles

As the business grows and recognizes the need for additional roles and outside personnel to supplement efforts, it will need to adjust to other organizational needs. Modifications can be made to the distribution of tasks and responsibilities among the brewery's employees through periodic assessments of the business and its needs.

Once the business achieves a particular size or scale of operations, the owners may need to hire outside personnel or agencies to perform various functions for the business, such as accounting, legal, and IT functions. It is essential for the owners to carefully weigh costs and benefits of additional human resource expenses in order to determine the best strategy for addressing the brewery's needs.

BUSINESS FACTORS

Expanding an effective business requires cooperation among many factors, such as selecting the product, creating marketing and business plans, choosing an appropriate location for the facility, and creating a cohesive persona for the business. Of the 4,144 craft breweries in existence as of 2015,[52] there are probably hundreds if not thousands of individual business models that work well for each operation. The following section will cover general information about establishing an effective business model.

Company Persona

As the owners begin expanding the business, they will need to create or modify an overall company personality or presentation for customers. No matter the style, a consistent narrative across mediums is key—from storefront to advertising to product labels. For example, if a business decides to adopt a more traditional or old-fashioned style for its products and marketing, using ultra-modern technology or marketing design may conflict with its overall message. A farm brewery will also have to consider its target market, as some demographics prefer specific styles of advertising and company types. With Millennials comprising the majority of craft beer drinkers, many farm breweries are choosing to focus their efforts on those aspects that will appeal most to them.

The following summarizes some of the key characteristics of connecting with Millennials:

Craft is defined as small, independent, high-quality, and local

Millennials typically seek craft beer from smaller, independent breweries with a variety of artisan and "hand-crafted" beers that include several seasonal offerings—especially those that incorporate inputs from local producers.

Adventure is encouraged

Millennials tend to seek diverse beer varieties and flavors that they may not be able to find in most stores. Many will experiment with unfamiliar flavors and styles, so it is imperative the brewery offer a diverse assortment of beers to keep their customers engaged.[53]

Strong value can be more important than cost

Millennials are more likely to spend slightly more on beer, citing flavor and freshness as the top deciding factors over price.

Millennials use digital mediums to connect with companies and brands

As technology becomes increasingly integrated into daily life, Millennials expect a business to have significant presence online. For example, it is now commonplace for a brewery to engage customers through a website and social media sites such as Facebook, Twitter, and Instagram.

[52] www.brewersassociation.org/press-releases/the-year-in-beer-u-s-brewery-count-reaches-all-time-high-of-4144/
[53] www.brewersassociation.org (Complete address available in Reference List)

Product Characteristics

The brewery will focus its marketing efforts on promoting the local and uniquely crafted aspects of its products to capture the increasing customer base who seeks these characteristics. For the purposes of this study, it would be beneficial for the venture to process more than one type of barley, and the brewery could offer two or three broad beer variations along with a few seasonal offerings, incorporating seasonal flavor profiles, flavorings, or infusions.

When considering what product varieties to offer, the owners of a malting and brewing facility may carefully consider the numerous aspects relating to their product, from both a product characteristic standpoint (type, flavor, quality, etc.) as well as from a marketing standpoint.

Most operations will eventually focus their year-round offerings on one product type, with more limited products offered seasonally to round out sales or provide variety to the line-up. This choice is typically due to factors such as:

- **Budget Constraints:** Many smaller breweries may lack necessary funds to focus on multiple separate and distinct product lines. Distinctive production techniques, specialized knowledge regarding the processes, and other factors can make it difficult to focus limited time and energy on widely diverse products.

- **Overhead Reduction:** The economy of scale and efficiency resulting from the production of a single product line can significantly affect overhead of a new brewery.

- **Avoiding Multiple Packaging Types:** Closely related to overhead, avoiding the need to purchase multiple types of bottles, caps, labels, and inputs can affect the overall efficiency and profitability of a venture.

- **Operational Inefficiencies:** Multiple package types necessitate different materials for packing, shipping, and transport. Splitting already valuable time and monetary resources between distinctly different product lines can sometimes add to the inefficiency of a venture and contribute to a lack of focus in marketing.

No matter the specific products the owners choose, it is best for the brewery to offer a degree of variety within the product line to capture the widest demographic range of customers, while still balancing production costs to limit overhead. While the brewery can take a number of different approaches in considering the products it intends to offer, it is often helpful for the owners to carefully examine the demands and needs of their target market when formulating the venture's product mix.

Based on the current U.S. malted beverages market, these categories provide an example of a way to divide and analyze the current beer market.

- **Classic**: These styles of beer have the widest target market and will often serve as the brewery's principal product lines. Most beer can be divided into ales and lagers, both of which have a wide range of variations. The brewery's goal is to attract customers through approachable offerings and transition them into trying seasonal and limited products.

- **Seasonal and Limited Offerings:** The products involved in this strategy can be aged to impart a higher-end, nuanced flavor profile for sale at higher-end tastings at the tasting room, as well as through wholesale and distribution channels. There is an increasing popularity for seasonal flavored beers, such as pumpkin ales during the fall and fruit-flavored variations during the spring and summer.

- **Other Items:** Besides spirits, the brewery can also plan to offer some souvenir items (such as hats, T-shirts, and glassware). Plans may include expanding non-alcoholic sales in the future by expanding souvenir/gift sales and offering educational training activities regarding small-scale malting and brewing.

Product Variations

Within the overall U.S. beer market, sales fragment into quite a few product categories. This fragmentation, due to the extreme variety of products available to consumers, can limit the potential for a small producer with more limited production capabilities. The owners' decisions on what types of malt to process will directly affect their ability to vary product; increased varieties of malt will allow for increased varieties of beer.

As stated previously, most beer styles can fit into two main categories: Ales and Lagers. According to the Beer Advocate website, ales are fermented by yeast at the "top" of the container at higher temperatures (around 60° to 75°F) which results in a fermentation period of about a week or less. Lagers, on the other hand, are fermented by yeast in the "bottom" of the container at lower temperatures (around 34°F), with a much longer fermentation period. The yeast used in lagers have less by-product characteristics, allowing more subtle flavors, such as hops, to have more presence in the beer's flavor profile.[54]

The following description of beer styles is excerpted from the Brookston Beer Bulletin,[55] which provides an idea of some popular beer style variations.

Figure 6: Sample List of Brewed Products

[54] www.beeradvocate.com/beer/style/
[55] http://brookstonbeerbulletin.com/types-of-beer/

Taste

Several well-known entities provide reviews and evaluations of beers in the U.S. Using a variety of methods, tasters and reviewers provide standardized reviews of products in competition-style formats that often result in some form of score or award based on aroma, taste, and other categories. Some of these beer rating and evaluation organizations include the Beverage Testing Institute, The North American Brewers Association, Beer Advocate, RateBeer, the World Beer Cup, and the Great American Beer Festival among others.

In a process similar to that used for fine wines, tasters utilize specific terms to describe beers, and published tasting notes are often used to distinguish higher-quality products. The accompanying text box contains a sample of the Beverage Testing Institute's tasting notes and scoring for Rogue Ales' Shakespeare Oatmeal Stout.[56]

Rogue Ales Shakespeare Oatmeal Stout

Black brown color. Aromas of chocolate covered nuts, mocha, and peppery greens with a supple, dryish medium body and tangy citrus, roasted nut, cocoa, and pepper driven finish. Excellent purity, flavor, and balance.

World Beer Championships Award: Gold Medal

Rating: 91 points (Exceptional)
Alcohol by Volume: 6.0%
Category: Oatmeal Stout, Ale
Tasting Location: In Our Chicago Tasting Room
Beer ID: 204896

The malted beverages market is diverse enough to promote a wide range of product characteristics, flavors, and qualities, but as the owners develop recipes for commercial production, they may need to consider the specific taste preferences of their target market in creating a flagship product. Engaging in preliminary tastings or attending events such as local and regional competitions can help a brewer refine and craft a product that consumers will accept enjoy.

Taste and overall product quality is affected by a number of factors throughout the brewing process, from type of malt used for inputs to the overall recipe. Brewers utilizing high end, premium inputs will find a corresponding increase in costs; sourcing premium ingredients with specific characteristics will likely be more difficult than if the brewery used more commercially available ingredients. Potential brewers can find numerous websites providing basic recipes for homebrewers and beginning commercial brewers, while more experienced brewers may choose to craft their own unique recipes. Regardless of the approach, it is recommended for the quality of inputs to be carefully considered and aligned with the desired product's overall flavor profile.

Tasting Room

Visitors to the tasting room will typically expect to be able to try the brewery's assortment of beers on tap, which can be encouraged through offering varying sizes of glasses. Beer flights, a set of sample-sized glasses are becoming increasingly popular among brewery patrons.

[56] www.tastings.com/scout_beer.lasso?id=204896.

Bottles and Labeling

There are no standard types or sizes for beer bottles for the industry as a whole. Unlike wine, which is typically packaged and sold in standard-sized 750ml bottles, beer bottle size and labeling are notable for their variety— from the style of the bottle to art on the label. Bottle sizes can range from 12 ounces (the most common size for commercial sales) to 24.5 ounces, with the 22 ounce bottle quickly gaining popularity in specialty beers. The labels typically contain information about the type of beer, alcohol content, location of the brewery, and tasting notes, and engaging art to draw in the customer. Besides what is required by the TTB, labels can contain as little or as much information as the brewery wishes.

Cans are also on the rebound in the craft beer industry. A recent article by MarketWatch reports that more than 520 of the country's craft breweries sell at least one of their beers in a can, with a total of over 2,000 craft brands available in a can. While cans are still associated with most budget commercial beers, many craft breweries are discovering the financial benefits of using lighter packaging. One brewery reported reducing their shipments by 30 percent and extending its life by keeping the beer's exposure to light to a bare minimum.[57]

Courtesy of www.kinnek.com

Some businesses have also begun selling beer in "growlers"—larger containers typically around 32 ounces that customers can fill at breweries, filling stations, or specialty bars. Growlers come in a variety of materials and sizes and can be reused indefinitely. Many of these locations offer growler sizes and designs specific to their location with discounts to encourage repeat customers. While it may not be typical for a new brewery to begin with these sizes, customers are increasingly expecting them to be offered by the businesses they frequent.

Although there are no standards on the bottling for beer products, the TTB does regulate the labels used to identify the product. All alcohol producers must apply for a Certification of Label Approval (COLA) and follow specific labeling and advertising regulations from the TTB. For more information about labeling regulations, visit the TTB website at www.ttb.gov.

Storage and Aging

Malt: Properly storing malt is critical to the venture's success. Whether it processes its own malt or purchases it from another producer, improper storage can result in lost flavor, quality, and ultimately loss of the product altogether. Briess Malt & Ingredients Co. recommends that once malt is dried, it is stored in a temperate environment with low humidity and minimal temperature fluctuation. Typically, it is best for basic whole kernel malts to be used within six months of manufacture before they begin to lose flavor, and roasted malts within 18 months.

Humidity and moisture is one of the most significant dangers in malt storage. If the building or storage area is too humid, the malt may continue to germinate, rendering it unusable for brewing purposes. If too dry, it can lose flavor and quality. Some processers choose to freeze their malts

[57] www.marketwatch.com/story/why-all-craft-beer-should-be-in-cans-2015-07-31

as a method to prolonging shelf life, but thawing can result in condensation on the kernels. If the malt goes through several freeze/dry cycles, its moisture content will decrease as well.[58]

Hops: since hops are a seasonal item, proper storage is critical to the venture's ability to produce beer year-round. Craft Beer & Brewing magazine covers key considerations to storing fresh hops, including the following:

- *Oxygen* must be effectively managed, as it can degrade the oils that provide flavors and aromas to the beer. If they are exposed to too much oxygen, the hops will assume an "aged cheese" aroma, indicating they are fully unusable. It also damages the alpha acids that are responsible for hops' iconic bitter quality, resulting in reduced ability to flavor the beer.

  The hops storage index (HSI) indicates how quickly specific hops varieties lose their bitter qualities over time—for example, a rating of 30 percent means that the hops retain 70 percent of its bittering quality six months after harvest.

- *Light* can prematurely age hops, so opaque storage containers or a dark facility are highly recommended.

- *Temperature* is another critical factor—heat causes hops to prematurely age as well. Most of the time, hops are kept in a cooler, and freezing prolongs life by up to four times. The higher concentration of oils present in the hops prevents damage from freezing.[59]

Beer: Once bottled, most beers have a reasonable shelf life. Normally, if the alcohol content of the beer is higher, its shelf life is longer—provided it is stored in the right conditions. The Beer Advocate recommends that beer bottles be stored in an area with a cool constant temperature

(around 50 degrees F, away from light sources. If the temperature fluctuates or is too warm, it can shorten the lifespan of the beer; if too cool it will be cloudy. The bottles can also be stored upright, as long term storage can result in the yeast settling. Storing the bottle upright ensures the settled yeast compacts at the bottom of the bottle and has less chance of breaking apart when the beer is poured.[60]

Some breweries store their barrels at the location, while others warehouse them in different locales for exposure to regional differences in climate. The combination and end results vary according to various brewers' proprietary formulas and often serve as a point of distinction from other similar types of alcohol.

Sales and Marketing Considerations

While the availability and popularity of craft and artisan malted beverages has recently increased, consideration of future trends is especially critical during the planning stages of the

[58] www.brewingwithbriess.com/blog/about/
[59] http://beerandbrewing.com/VJNTiCcAACYAmRfc/article/how-to-store-hops
[60] www.beeradvocate.com/beer/101/store/

brewery's expansion. Because this type of business requires a focus on branding and marketing as much as on the production of the product itself, there are several factors to consider:

Price Sensitivity
Marketing systems generating differentiated products in demand must be considered. To enter into a quality high-end market, products will need to meet standards expected by the customer. This fulfillment can take place through both production and processing. The brewery can utilize systems that address potential in both these areas with a focus on quality and sustainability.

Branded Products
Branded products are the 'gold standard' of products. Consumer confidence and trust are implicit in the brand name. Generally, brand loyalty goes well beyond the ingredients listed on the product label and is a large part of the intangible value of the brand. Companies with branded products traditionally go to great lengths to protect and cultivate their consumer loyalty.

It is not only important to focus on the brewery's target market, but also to identify a means of selling product in a larger volume market as well. All of the brewery's products do not necessarily have to be of high-dollar-market quality; it may choose to have separate strategies for the various lines it produces. In general, the higher the quality of the product, the more differentiated from competition and the less sensitive the pricing will be. Avoiding competition with high volume breweries allows the business to capture higher margins on sales.

The following table presents several standard marketing factors that may affect the ability of the venture to affect its price in the market. The more unique or differentiated the product, the greater the ability to charge a higher price.

Table 1: Factors Influencing Price Sensitivity

Unique Value Effect	Buyers are not as price-sensitive when the product possesses some type of unique or special feature not available in other products.
Substitute Awareness Effect	If there are no apparent substitutes, the buyer is less price-sensitive.
Difficult Comparison Effect	When the products are harder to compare, buyers are less price-sensitive.
Total Expenditure Effect	As the price of products increases in relation to the buyers' income, price-sensitivity also increases.
End Benefit Effect	If the buyers can identify that the benefit is greater than the price, there is less price-sensitivity.
Shared Cost Effect	When part of the cost is shared by another party, buyers are less price-sensitive.
Sunk Investment Effect	If the product is used in conjunction with assets purchased previously, the price-sensitivity is lower.
Price-Quality Effect	If the product is viewed as a top-quality leader, price-sensitivity is lower.
Inventory Effect	If the buyer has no storage capacity, they will be less price-sensitive.[61]

[61] Adapted from "The Strategy and Tactic of Pricing." – Thomas T. Nagle, Prentice Hall, 1987

To stand out in the marketplace, local products must create brand recognition and loyalty among their customers. The challenge is to create an engaging marketing "story" and brand identification that resonates with targeted consumers. Two important features include:

1. **Locally produced food/beverage:** The American consumer has compassion for producers, especially local ones. The locally produced connection is a valuable marketing tool. Most consumers support small and medium-sized producers who contribute to their rural communities. Expanding operations to include local malt will add to this story.

2. **Appeal to the connoisseur's palate:** Craft beer operations in the U.S. are responding to the increasingly demanding taste of the consumer who demands artisan and specialty beers. Finding and developing a taste that is trendy and appealing has to be in accord with the rest of what is in the bottle, because it is all part of the branding process. If a beer's label becomes recognized for quality and taste, sales will increase.

Selling Beer in Virginia

Any sale of alcoholic beverages in the state must take place through Virginia's ABC system. A brewery can choose to sell their products solely through their own tasting room, or they can elect to sell their products offsite through retail locations such as specialty locations, grocery stores, and restaurants/hotels, among others. No matter the venue, all breweries must apply for a permit through the VABC and comply with all national and statewide policies.

- To sell through the Virginia ABC system, the brewer must first obtain a federal license from the TTB (see the Business Regulation section for more information on obtaining a federal license). After applying for a federal license, the brewery can then apply for a state license through the Virginia ABC. A business can apply for a state license with a pending federal license, so the processes may overlap.

- When selling through an on-site store, the brewery receives the money from the customer for the full price of the product. The brewery then sends the whole amount to the ABC. After 30 days, the state sends back the business's percentage of the sale. When selling through an off-site location, the brewery receives its percentage of the money 30 days after the sale takes place.

- Sales to restaurants, bars, etc. also take place through the ABC. The producer transports the product to a centralized warehouse and after the restaurants place an order for their product, and the VABC distributes it.

On vs. Off Premise Sales

On-premise sales are sales of alcoholic products intended to be consumed "on-site." This includes establishments such as restaurants and any other entity selling alcoholic beverages that will be consumed at that same location.

In contrast, ***off-premise*** sales are sales of alcoholic products that are not intended to be consumed on-site, and include establishments such as specialty stores and other locations selling beer and wine.

Out of State Sales

Should the brewery choose to sell its products out of state, additional certificates or licensing may be required. When selling to a state where the alcoholic beverage industry is not controlled by the state, the brewery may only need to acquire a nonresident certificate for the state before selling to a wholesaler. Before attempting to sell to any surrounding or outside states, owners should contact the alcohol control board for each state in which the brewery will be conducting wholesaling operations.

Commercial Strategy

It would be beneficial for the owners to construct a commercial strategy encompassing the unique characteristics of the business and employing marketing methods effective for the brewery's target market. Often, the tasting room provides the main source for initial sales, but as the business continues to expand, the brewery will likely expand sales through other Virginia retailers and establishments. Expansion into other areas is possible because craft beer lovers enjoy experiencing products from different regions and states. In the future, the brewery may attempt to move product through other states.

The range of products offered by the prototypical brewery can cover the high end premium category as well as the entry-level customer. The marketing theme will be consistent in all aspects of the business—from brand identity, to the style of spirits, to decor of the on-site tasting room and retail space.

As is the case with most other breweries, the tasting room can also have non-alcoholic goods available for sale. Not only are these types of goods frequently expected by visitors, they also provide the brewery with additional sources of income. Depending on the marketing focus of the venture, and the owners' success in connecting and resonating with customers, non-alcoholic items can be a successful addition to the brewery's sales mix. The owners will need to evaluate a range of products for sale in the tasting room and at any on-site events such as tours.

Distribution Channels

Regardless of the distribution channel chosen, it is essential that agreements and arrangements be made that will facilitate the efficient movement of the product through all phases of the sales process. The brewery may consider the following sales distribution channels: Tasting Room and On-site Store, Virginia ABC Stores, and In/Out-of-State Brokers.

Conducting direct sales through the on-site ABC store would provide the brewery with a better understanding of the consumers' tastes. Visitors to the onsite ABC store are also more likely to buy non-alcoholic goods at the same time, increasing per-visit income. It is important to note that a distributor, including the Virginia ABC wholesale system, has limited time to spend on each individual product,

which forces the distributor to focus efforts on those products that give them the highest returns.

Interviews conducted with experts in compliance emphasized the importance of understanding licensing and permit regulations and permissions. Manufacturers in Virginia may not also hold a license for wholesale. Therefore, manufacturers wishing to sell product to retail venues or other business must proceed by distributing through using a licensed beer wholesaler. Brewers may sell kegs to individual patrons with a keg permit license.

While the brewery may focus initially on Virginia sales only, they may also consider accessing sales in other states through arrangements with brokers. Contracting with brokers can assist with the brokerage and sales of the brewery's products in other states, and work within a region to help the brewery's products gain wider distribution.

Broker services may also offer the ability to source the brewery's products into bars and other alcohol sales venues, so considering the range of services provided by an individual broker is an important aspect of choosing an arrangement. Additional services that brokers may offer include increasing sales through the ABC warehouse system, assisting with setting up pricing calendars and promotional discounting, couponing, rebates, or consumer contests and promotions, working to construct merchandising standards, and performing surveys and audits to ensure follow-through on program specifics

Marketing Strategy

It can take a long time for a business to establish a positive reputation through consistent production of quality product and superior service, among other factors. It would be beneficial for the owners to continue seeking new and unique marketing methods, avoiding intermediaries and increasing returns. As production and popularity increase, the brewery could expand sales into other states. The unusual characteristics of this project can help create a distinctive selling proposition for the brewery.

Like many businesses, the brewery can capitalize on the continually increasing local food and drink movement. The brewery is ideally suited to capitalize on growing interest in local and regional cuisine — and, of course, the beverages to enjoy with it. Since tasting rooms typically do not serve or sell food, they may choose to organize tastings with restaurants that feature local foods or participate in food festivals. The brewery can also cater food from local restaurants and chefs, or organize specific events with guest cooks.

Typically, the on-site tasting rooms work with wholesale distribution to constitute the leading points of sale for beer, therefore, much effort will be focused in those areas. The brewery's objective is to produce high-quality, innovative malted beverages. Products are focused on the current demand of the consumer who seeks new styles and flavors with seasonal varieties, produced in small quantities in a craft or artisan style. The brewery will offer a range of artisan beers with their own unique regional character. In this context, the brewery may plan to focus efforts on selling its products at its own tasting room, coupled with other retail locations through a wholesale distributer.

This business-marketing model focuses on opportunities for growth achieved through marketing strategies that target emerging high-end consumer market segments. The brewery's target audience is based on differentiation from the commercial malted beverage industry. The brewery will market a local product with multiple flavor varieties, with the potential of a day-trip destination by promoting tours and on-site visits for customers, tastings, and other related events.

The Product: As previously discussed, the product lines for the prototypical malting and brewing facility can include about three year-round classic varieties with three or four seasonal offerings using quality inputs such as fruits, spices, and other flavors. The product packaging typically includes 12 and 22 oz. bottles with a uniquely designed label that displays legally required information as well as the brewery's logo. Cans and/or growlers may also be used depending on owner preferences. At the tasting room, customers can typically purchase either 12 oz. glasses of one type of beer, or a "flight" consisting of smaller amounts (4-5 oz.) of a variety of beers. This option is becoming more popular as customers increasingly expect a variety of innovative offerings from a brewery.

Some beers, typically stouts and sour beers, can be barrel-aged to balance and mellow flavors. Often, brewers purchase used barrels from wineries and distilleries to infuse their beers with the unique flavor nuances of wine and spirits. In a web series on barrel aging, leading craft brewers at Stone Brewing explain the various aspects of their barrel-aging operations on their products:

Oak Flavors: using retired aging barrels lends a variety of flavors to the beer, ranging from vanilla and spice to fruity notes from wine. According to the brewery's Research & Small Batch Manager Steve Gonzalez, the wine barrels they purchase have typically been in use for three to seven years, and bourbon barrel flavors peak after six months. If the brewery is not big enough to accommodate a full barrel aging program, Gonzalez also suggests using wood chips for smaller batch levels.

Typically, barrels can be used twice, although some flavors can remain prevalent longer. At that point, the barrels can either be sold or repurposed.[62]

Wine and Spirit Flavors: finding the right match of barrel flavor characteristics can take some experimentation. For a new brewery, the combination of unpredictable outcomes and time invested in each batch can result in distinct problems. For example, it typically takes about three months for spirits flavor notes to fully incorporate in the beer; for wine it takes about six to seven. If the brewery does not have adequate inventory to support an aging program, a "lost" or failed aging attempt can damage the business.[63]

Some brewers find it beneficial to add complimentary inputs to flavor to their beer, such as fruits, florals, spices, and other additives. The following is a brief description of how these inputs can be used:

[62] www.stonebrewing.com/blog/miscellany/2014/barrel-aging-part-i-oak-flavors
[63] www.stonebrewing.com/blog/miscellany/2014/barrel-aging-part-ii-original-wine-spirit-flavors

- **Fruits**: typically marketed during the summer when fresh fruits are in season, fruits can be used with a wide variety of base beer styles, such as orange Hefeweizen, peach ale, or cherry stouts. Seasonal pumpkin beers have also seen much success as fall offerings, with many breweries crafting pumpkin and pumpkin spice beers.

- **Florals**: floral beers are another seasonal offering common to spring and summer. Perhaps one of the most popular flavors is hibiscus, however breweries are also experimenting with rose, lavender, jasmine, and lemongrass.

- **Spices**: during the fall and winter, darker and full-bodied spiced beers are typically served. Some common spices used include cinnamon, nutmeg, cloves, and ginger.

- **Other flavors**: there is an almost unlimited variety of beer flavors to choose from, ranging from vanilla, to oatmeal, to chocolate, to many more. Brewers may have to undergo multiple flavor experiments to find and perfect a variety that appeals to the farm brewery's customer base.

According to an article from *The Wall Street Journal*, many small breweries are experimenting with increasingly innovative flavors as a way to keep customers invested in the brand, even small batch releases limited to less than 20 gallons. Through these "one-night release parties," breweries are able to experiment with more unusual flavors with less risk. Burial Brewing Company, a brewery based out of Asheville, North Carolina, reports these types of events as an effective revenue driver and promotional tool, bringing customers in to the facility for regular brunch events with guest chefs, musicians, and seasonal beer offerings.[64]

The Place: From a marketing point of view, being located in a rural area can allow the brewery to forge solid connection 'to the farm,' a feature that may be useful to promote day-trips and some types of events. Operations located in an urban area have their own unique benefits also, allowing the brewery to pull from an immediately available customer pool.

Effective marketing can emphasize the physical characteristics of a business's location to produce a coherent story, highlighting the brewery's products and their unique characteristics.

Malted beverages are often closely tied to a sense of place, as exemplified in the recent popular interest in IPAs. From 2008 to 2015, IPAs increased from 8 percent of the overall craft beer segment to 27.4 percent.[65] Breweries across the nation have been able to take advantage of the beer's exceedingly customizable qualities, tying in local and regional flavors.

[64] www.wsj.com/articles/craft-brews-in-weird-flavors-draw-crowds-1422483532
[65] www.brewersassociation.org/insights/the-next-ipa/

The location chosen for the brewery's facilities can also affect several aspects of its operations and costs. Location in an urban setting can offer access to a much higher population density and a steady customer flow for the tasting room and retail sales portion of the business. It can also decrease the travel and transportation costs of delivering product to other distribution locations and warehouses. However, urban locations can often represent much higher leasing and infrastructure costs, and zoning and other restrictions can often be more difficult to navigate.

Being located in a rural area maintains a solid connection to the farm, while an urban setting provides a large customer pool.

Being located in a rural area mitigates some of the previous issues raised, but falls short of the immediate customer access of the urban location. While restrictions and infrastructure costs may be lower, the cost of transportation is likely to increase, particularly if the brewery is not located near a significant highway or other thoroughfare that allows access to population centers.

Pricing Strategy: An effective pricing strategy will allow a farm brewery to penetrate the market with affordable prices for high-quality malt beverages with locally grown inputs. As the brewery becomes known for consistently providing this type of product, customers will want to repeat their experiences and recommend the products to others, especially if they perceive the product quality to be in line with the price.

The brewery may opt to implement a variety of prices, depending on a number of factors, such as wholesale vs. retail prices, limited promotions, and special events at the brewery. Happy hour time slots have been successfully used by many breweries, bars, and restaurants, and can help in bringing in new customers who have not visited the location before. Conversely, seasonal or limited beer offerings have the ability to capture a higher price point due to their more exclusive nature. However, if a specific variety does not sell as well as anticipated, the brewery may find it necessary to mark down prices to prevent product waste.

Promotional Plan: Promotion is a critical part of marketing the brewery. Though it can be expensive, wisely investing marketing funds can get the "biggest bang for the buck" with a strong and focused approach to back up the sales plan. The brewery may consider investing the necessary funds to succeed, particularly considering it would be a new business trying to enter an established market.

American consumers are becoming more discerning as to how and where their food and beverages are produced, and what cultural and environmental practices were used to make them. This project fits perfectly into this new consumer demand, and one of the most important tools for marketing such a venture is the "word of mouth" factor. The brewery may decide to place an emphasis on providing a positive first impression for customers, so every visitor will tell his or her friends about the craft brewery.

To stand out in the marketplace, local products must create brand recognition and loyalty among consumers. A website, advertising and tasting program work together to promote the brewery's brand and image. Because the prototypical brewery is intended to be a local business, it may consider undertaking some non-traditional marketing strategies to introduce its products to the customer and attract more visitors to the premises. The brewery can also utilize traditional marketing materials, such as souvenirs, free samples, brochures, and traditional advertising.

Additional ideas for promotional and marketing activities can include:

- Trade activities such as:
  - Participation in beer competitions and festivals
  - Advertising in a major national brewing publication focused on the malted beverage market
  - Incentives to distributor/s
- Consumer activities:
  - Press trips for general and travel media, and brewing press specialists.
  - Media outreach to food and beer magazines
  - Tastings with experts and malt beverage clubs
  - Participation in festivals
  - Tastings with associations, charitable events, car expositions or local clubs
  - Advertising campaign in main restaurants and bars
  - Publication in travel magazines

Trade Organizations
The brewery could obtain membership in groups such as the American Malting Barley Association and the Master Brewers Association of the Americas. The brewery can seek to promote its malt beverages within all relevant organizations.

Public Relations and Print Materials
One vital component of the brewery's promotional activities is print and online media, including a listing on the Virginia Department of Agriculture and Consumer Services' website on their Virginia Grown web page. An entry on the page can show the brewery's contact information, location, and product listing. This website can be a great promotional tool for the brewery because it is free and from a source consumers trust.

The business can also utilize other print material within and outside of the brewery to further promote products and activities and increase sales. These print materials could include tasting sheets for the tasting room listing the various beers offered and allow customers to track which types they enjoyed most.

Signage
Signage along the interstate and smaller roads leading up to the brewery could be an effective part of the promotional plan. Advertising including state road signs along the interstate and major highways can allow the brewery to capture traveling customers. Signage at the brewery's location can further emphasize and support the overall marketing image.

Online Presence
Effectively handling a presence on the internet is becoming one of the most essential elements of managing a brand. These types of activities include presenting an engaging website with

photographs and regular updates, and using social media sites to keep customers involved in the business, increasing the chances of repeat visits. People expect to be able to find businesses online so they may learn more about the business and its products. In addition to connecting with consumers, a strong online presence will help generate additional media coverage.

Web Site
An effective website contains at least basic information for customers interested in visiting the brewery or purchasing their products. To keep costs low, the site can be simple, but still professional, appealing, and with photographs of the location and products. Part of engaging customers will be to add a few interactive elements and maintain up-to-date information.

Social Media
As consumers' dependence on social media continues to grow, the importance of a business having a strong presence on relevant sites cannot be overstated. More and more, businesses are finding it extremely beneficial as an aid to keep customers engaged in the business and increase the chances of repeat visits.

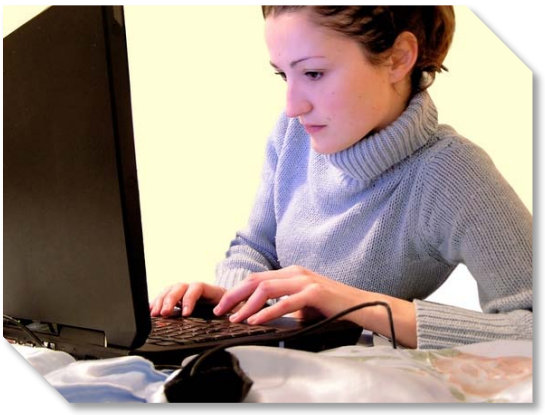
Though the initial focus may be on traditional sales channels, the brewery will eventually expand the business and having these marketing tools already in place can provide a solid platform to capture future retail sales markets, such as online sales or expansion into another city.

Because social media is an ever-evolving marketing tool, popular sites tend to come and go with regularity. The brewery's owners may find it helpful to research and decide what site (or sites) will be most beneficial to their long-term marketing strategy. The following are just a few examples of websites that have been used successfully in marketing activities.

Facebook
Social media sites offer an ideal opportunity to connect and build relationships with customers for very low cost. Through Facebook, users can "like" a business, and receive periodic updates as the business posts new content. In addition, the business can include a link to their dedicated website to encourage traffic. The brewery can use Facebook as a way to communicate with customers and educate them about the brewery and industry.

Twitter
Similar to Facebook, Twitter is another social media site that allows a business to engage customers by posting short updates with links to pictures or other sites. People can receive updates and posts by following the business's page, which allows the user to see a constant feed of updates as the business posts them. Followers can also post about the brewery and have their comments visible to other Twitter users by including the business's username with a hashtag (#) in their post.

Instagram
This mobile platform is geared toward sharing photos and videos, and links with other social networking sites. Users can take pictures and select from a number of filters and effects to change their images. Brief descriptions typically accompany the pictures and users can comment on and repost those pictures they like. Similar to twitter, users often insert hashtags to their posts to link them to over-reaching topics on the site.



Frequently, consumers of all types begin their search for a product or service online. Social media sites like those mentioned previously are examples of social media sites that are currently responsible for a large portion of internet and web traffic, and utilizing popular sites can make it easier for a business to present a brand in each of the places people visit on a regular basis.

Artisan and craft oriented businesses are also finding marketing success in producing short "how-to" or discussion videos that cover various aspects of brewing, quality control, ore various topics related to the brewery's products or philosophy and posting them to YouTube.

Regardless of the method chosen, owners who utilize such low-cost marketing approaches often find they are better able to connect with their target markets and control presentation of their business and product philosophy to a greater degree than previously possible. Social media, regardless of its present iteration, will likely remain a powerful tool for the small business owner.

FINANCING

There are a variety of avenues through which the prototypical malting and brewing venture could obtain additional funds and assistance for establishing and growing the business. Many grant programs, ranging from the national to the state level, specialize in assisting a business such as the one proposed for this study. While certainly not comprehensive, the following are some examples of these types of organizations.

National Funding and Aid

Federal State Marketing Improvement Program Funds (FSMIP)

The program provides matching funds to State Departments of Agriculture, State agricultural experiment stations, and other appropriate State agencies to assist in exploring: new market opportunities for U.S. food and agricultural products, research and innovation aimed at improving the efficiency and performance of the marketing system, and address barriers, challenges, and opportunities in marketing, transporting, and distributing U.S. food and agricultural products domestically and internationally.
www.ams.usda.gov/services/grants/fsmip

Value-Added Producer Grant Program (VAPG)

The 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.
www.rd.usda.gov/programs-services/value-added-producer-grants

Rural Economic Development Loan and Grant (REDLG)

The REDLG program provides funding to rural projects through local utility organizations. Under the REDL program, the USDA 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.
www.rd.usda.gov/programs-services/rural-economic-development-loan-grant-program

Farm Ownership Loans (FO)

Farm Ownership Loans are issued through the USDA Farm Service Agency and is specifically intended to help improve a farm overall. It can be used for purchasing farmland, constructing or repairing buildings, and to promote water and soil conservation. The current maximum amount this loan will pay out is $300,000.
www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-ownership-loans/index

Farm Operating Loans (OL)
This loan is also offered through the USDA Farm Service Agency. It is meant to help improve the operations of a farm; it can be used to purchase livestock, farm equipment, feed, seed, fuel, farm chemicals, insurance, and other operating expenses. This loan can also be used to pay for minor improvements to buildings, land and water development, family subsistence, and to refinance debts. This loan's current maximum amount is $300,000.
www.fsa.usda.gov/programs-and-services/farm-loan-programs/farm-operating-loans/index

Farm Storage Facility Loans (FSFL)
The USDA Farm Service Agency offers this low-interest loan program, targeted at helping farmers keep their food safe and fresh until it is ready for sale. Farmers can apply for assistance in either building or updating storage facilities for a variety of commodities, including some of the grains and barley involved in production of malt beverages. Eligible producers can borrow up to $500,000 per loan, after making a minimum down payment and agreeing to loan terms. There are also microloans available that require less documentation and do not require previous production history.
www.fsa.usda.gov/programs-and-services/price-support/facility-loans/farm-storage/

Sustainable Agriculture Research & Education (SARE)

SARE covers numerous aspects related to research and education in agriculturally related fields. Since 1988, the SARE grants and education program has advanced agricultural innovation that promotes profitability, stewardship of the land, air and water, and quality of life for farmers, ranchers and their communities. SARE grants fund research and education projects exploring areas such as:

- On-farm renewable energy
- Pest and weed management
- Pastured livestock & rotational grazing
- No-till and conservation tillage
- Nutrient management
- Agro-forestry
- Marketing
- Sustainable communities
- Systems research
- Crop and livestock diversity
- and others

Since 1988, SARE has funded more than 5,000 projects with grants for farmers, ranchers, extension agents and educators, researchers, nonprofits, students, communities and others.
www.sare.org/Grants

Business and Industry Guarantee Loan Program (B&I)
The purpose of the B&I Guaranteed Loan Program 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.
www.rd.usda.gov/programs-services/business-industry-loan-guarantees

Rural Microentrepreneur Assistance Program (RMAP)
The purpose of the 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 are in need of 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.
www.rd.usda.gov/programs-services/rural-microentrepreneur-assistance-program

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.
www.sba.gov/loanprograms

Virginia Assistance

Governor's Agriculture and Forestry Industries Development Fund (AFID)
This funding program awards grants to eligible applicants who are looking create or expand a facility used to add value to Virginia grown agriculture or forestry items. The grant awards a maximum amount of $250,000, or 25 percent of qualified capital investment. The funding program does stipulate that at least 30 percent of the agricultural or forestry product used to make an end value-added product must come from Virginia.
www.vdacs.virginia.gov/agriculture-afid-facility-grants.shtml

Virginia Foundation for Agriculture, Innovation, and Rural Sustainability (VA FAIRS)
VA FAIRS is a not for profit foundation based in Richmond, Virginia, with the mission of assisting rural agricultural enterprises. The Foundation offers technical and cooperative assistance that involves strategic planning, feasibility analysis, workshops and training, finance assistance, and assists with the creation of business documents in order to help producers and communities in developing and advancing their agricultural, economic and social interests to enhance their quality of life.
http://www.vafairs.com/assistance.shtml

Virginia Tech and Virginia State University Cooperative Extension[66]
The Virginia Cooperative Extension helps to link the resources of Virginia Tech and Virginia State University to individuals within the state. Working through collaborations between the Universities and other organizations, the Cooperative Extension program provides services through "107 county and city offices, 11 agricultural research and Extension centers, and six 4-H educational centers."
www.ext.vt.edu/

[66] www.ext.vt.edu/about/index.html

REGISTRATION, LICENSING, AND REGULATION

Registration

The registration needs of a venture can vary, depending on federal, state, and local laws. Some registration processes are free of charge, but certain types of business are subject to various registration fees and permits. A farm malting and brewing facility will have to register with specific regulatory entities because of the nature of the business and products.

Ventures can form under another business's or owner's name, or a fictitious name, which requires the filing of a DBA (Doing Business As) form. Sometimes known as an "assumed name" certificate, a DBA is a document that provides owner identification when a business is operating under any name other than their legal name. Ventures organized as corporations may also need a DBA if they plan to use a different name than the one provided on their corporation paperwork (legal name).

Taxpayer ID and Employer Identification Numbers

The Federal (Employer) Identification Number, also known as a Tax Identification Number or EIN, is a number issued by the IRS for the purposes of identifying businesses. If the business does not have employees or is a type other than a corporation, a Social Security number generally functions as the EIN. Nearly all business structures that employ individuals, as well as other business entities, use EINs for this purpose.

Methods to apply for an EIN:

- Use form SS-4: Application for Employer Identification Number
- Contact the IRS at: 1-800-829-1040 or 866-816-2065
- Online at: www.irs.gov

It is necessary to keep accurate records for tax purposes (bank deposits, sales receipts and other elements of support) and to retain records for examination by IRS.

Some of the most complex issues facing small business owners today are the various taxes and tax structures. The business may be subject to, or responsible for collecting or withholding:

- Taxes on the business itself
- Sales and Use taxes
- Ad Valorem Taxes (Taxes on Property)
- Employment and Income Taxes

More specific tax information is located in the Appendix.

Brand Registration and Trademark

According to the U.S. Patent and Trademark Office (USPTO), a trademark includes any word, name, symbol, device, or any combination thereof, used or intended to be used in commerce to identify and distinguish the goods of one manufacturer or seller from goods manufactured or sold by others, and to indicate the source of the goods. In short, a trademark is a brand name.

The owners may trademark and register the venture's name and logo design at the national level. Failure to acquire appropriate intellectual property protection can allow others to pirate the venture's work and reputation. The practical purpose of a trademark is to prevent consumers from becoming confused about who provided the goods or services they purchased.

Licensing

Licensing and permits are an essential part of any venture that involves alcoholic beverages, and must be obtained from the VABC in Virginia. Businesses must acquire a Brewery License in order produce alcoholic beverages. This license has three producer volume categories: less than or equal to 500 barrels annually, between 501 to 10,000 barrels annually, and greater than or equal to 10,001 barrels annually.[67]

On the federal level, the Alcohol and Tobacco Tax and Trade Bureau (TTB) oversees licensing and regulation. Owners must obtain permission to operate a malting beverage facility in order to begin operations.

When applying for a federal license, a brewery needs to have detailed diagrams and architectural drawings of the facility and process showing the product flow and equipment list. It will also need proof that it has obtained a federal bond. A realistic timeframe for applying for a federal license is typically four months.

After applying for a federal license, the venture can apply for a state license, as it only needs to have a pending federal license to apply for a state license. The facility is required to have at least minimal production equipment on site before the state will issue a license. The state will also conduct site visits to confirm that the necessary equipment and facilities are available.

There is a 31-day minimum waiting period before the venture can receive its state license. When applying to the state, the owners must place a legal notice in a local newspaper in the region where it is located for two consecutive weeks. The 30-day timeframe begins on the date the notice is first published and the owners must provide an affidavit from the newspaper.

It is helpful for potential malting and brewing owners to familiarize themselves with the local, state, and federal regulation and taxation laws governing the production and sale of malt beverages. Because there are variations in product types, quantities, and intended usage, it can occasionally be difficult to ascertain the applicability of a certain law or regulation.

It is recommended that a brewery or other alcohol producing operation in Virginia works closely with its local ABC compliance agent. A list of Virginia ABC compliance agents can be found at the VABC website.

For information regarding local permits and licensing, consult a local Chamber of Commerce or Small Business Development Center.

For information on Federal permits, contact the TTB's National Revenue Center toll-free at 1-877-882-3277, directly at (513) 684-3334, or by email at ttbquestions@ttb.gov.

Labeling Resources

- **Applying for a COLA:** www.ttb.gov/alfd/alfd_cola_exemption.shtml
- **Products requiring a Pre-COLA Product Evaluation:** www.ttb.gov/industry_circulars/archives/2007/pre-cola_eval_spirits.pdf.

Labeling

As part of labeling regulations, all alcohol producers are required to apply for a Certification of Label Approval (COLA) from the TTB. A COLA helps ensure that a producer is creating, labeling, and marketing products in accordance with Federal laws and regulations.

[67] www.abc.virginia.gov/licenses/get-a-license/industry

The venture will need to obtain a COLA before selling any products. The typical wait time for approval is 90 days. For many alcoholic beverage products, the TTB requires a Pre-COLA Product Evaluation to determine if the proposed label represents the product adequately and does not mislead the consumer. During this process, the TTB will review the ingredients and formulation, and may include a laboratory analysis of the product.

The TTB is responsible for approval and enforcement of labeling requirements for malt beverages. Essential information required by the section 27 of the Code of Federal Regulations (CFR) includes Brand Name, Name and Address, Alcohol Content, Caloric and Carbohydrate Representations, Health Warning Statement, Country of Origin, Class and Type, Presence of Neutral spirits and Coloring, Flavoring and Blending Materials, Net Contents, Prohibited Practices, Statements of Age and Percentage, and Voluntary Disclosure of Major Food Allergens. The following figure shows the type of information typically found on an alcoholic beverage label.

Figure 7: TTB Labeling Guide

WHAT A MALT BEVERAGE LABEL TELLS YOU

In recent years, changes in tastes and technologies have led to an increasing variety of malt beverage products available in the marketplace. "Malt Beverage" is the general name given in the Federal alcohol labeling regulations for all products made at a brewery with malted barley and hops. It includes things like beer, ale, lager, flavored malt beverages, and even "near beer." In order for the consumer to understand the type of beverage in the container, a review of the information on the label is essential. TTB has designed this guide to help the consumer make an informed choice when buying a malt beverage by explaining the information that must be present on the label. TTB regulations can be quite detailed in regard to the production of a malt beverage and the information appearing on the bottle; not every possibility is presented here, but this guide will give you a good grasp of the fundamentals. For more detailed information please see the regulations listed on the back of this pamphlet. You may also want to contact your State alcohol beverage authority for information regarding its malt beverage label requirements.

DRAFT/DRAUGHT

The presence of "Draft/Draught" on a label generally means that the product has not been pasteurized and some other method of removing or inhibiting the growth of bacteria has been utilized. However, pasteurized beer may be described as "Draft Brewed" or "Draft Beer Flavor" as long as the label discloses that the beer is pasteurized. The term may also be used if the beer is packaged in containers of one gallon or larger and the contents are to be drawn off through a tap, spigot, faucet, or similar device.

NAME AND ADDRESS

The name and address of the bottler or importer must appear on the brand label. However, the address of the bottler's principal place of business may be used instead of the actual location where the bottling took place. It is also permissible for a bottler/importer to use a duly authorized trade name in place of its usual operating name.

ALCOHOL CONTENT

An optional statement of alcohol content expressed in percent by volume may appear on the label. Federal regulations require the alcohol content to appear on the labels of flavored malt beverages that derive alcohol from added flavors. However, some State laws have their own requirements with regard to alcohol content statements.

LITE/LIGHT/LOW-CARB

A malt beverage may be labeled with a caloric representation (such as "Light" or "Lite") as long as a statement of average analysis appears on the label. This statement must include the amount per serving of calories, carbohydrates, protein, and fat. In addition, a malt beverage may be labeled as "Low-Carbohydrate" if the label includes a statement of average analysis and the product contains no more than 7 grams of carbohydrates per 12-ounce serving.

HEALTH WARNING STATEMENT

By law, this statement is required on all alcohol beverages containing 0.5% or more alcohol by volume.

BRAND NAME

The brand name is used to identify and market a malt beverage. A brand name may not mislead the consumer about the age, identity, origin, or other characteristics of the malt beverage.

CLASS DESIGNATION

The brand label of a malt beverage must contain the class designation of the product. Examples of class designations are beer, ale, and lager. Ale, stout, and porter are classes that must be fermented at a comparatively high temperature. Products labeled "Wheat Beer" must be made from a fermentable base that consists of at least 25% by weight malted wheat.

When a malt beverage is made with the addition of spices, fruit, honey, or natural flavors, it requires specific labeling to indicate the class designation. These malt beverages must be labeled with a statement of composition that reflects the base malt product and the added ingredients, unless otherwise known to the trade under a particular designation. Examples of statements of composition that you might see on malt beverage labels include "Premium malt beverage with natural flavors," "Ale fermented with spices," or "Belgian-style Wheat Ale brewed with natural flavors." These products must also bear a distinctive or fanciful name (such as "Tammy's Treat"). A malt beverage must derive at least 51% of its alcohol content from the fermentation of brewing ingredients, with stricter limits for products with an alcohol content of more than 6 percent alcohol by volume.

NET CONTENTS

The net contents of a malt beverage container must be stated in English units of measure (e.g., pints, fluid ounces).

COUNTRY OF ORIGIN

Pursuant to regulations issued by U.S. Customs and Border Protection, a Country of Origin statement is required on containers of imported malt beverages. Acceptable statements include "Product of (*insert name of country*)" or "Produced/Brewed in (*insert name of country*)."

Internet

The Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for managing and coordinating the Domain Name System (DNS) to ensure that every address is unique and internet users can find all valid addresses. For more information, visit www.icann.org.

Domain names can be registered through many different companies (known as "registrars") that compete with one another. A listing of these companies appears in the Registrar Directory available at www.internic.net/regist.html.

Regardless of the sales channel, all consumable foods sold in the U.S. must be in full compliance with FDA food labeling requirements that are specified in the U.S. Code of Federal Regulations. The FDA regularly monitors companies' websites so they have to comply with all regulations and claims that are made about the foods and/or its ingredients.

Regulation

National Level Regulatory Bodies

Environmental Constraints (EPA)

The U.S. Environmental Protection Agency (EPA) and state environmental agencies regulate the impact of businesses on the environment. The EPA develops and enforces regulations that implement environmental laws enacted by Congress. Likewise, state agencies enforce regulations that implement laws enacted by the state legislature.

The U.S. Small Business Administration divides environmental regulations into different areas such as air pollution, basics of environmental compliance, cleanup, ecosystems, environmental management (odor control, etc.), environmental permits and planning, pollutants and chemicals, pollution prevention, storage tanks, waste, and water (preventing contamination of water supplies, etc.). More specifics on each case are available at www.sba.gov.

Owners of the venture would find it beneficial to consider the environmental constraints related to use of natural resources as well as in processing and waste disposal. Thus, the environmental effects of food processing are linked intimately with the type of product, processing technique, and the effluents from that process. It is necessary to determine the characteristics of the effluent to identify the best option for treatment according to the end purpose (for example land application). The Environmental Protection Agency, as well as FDA and Department of Agriculture coordinate efforts to enforce laws in agrifood activities.

FDA

The U.S. Food and Drug Administration (FDA) oversees much of the nation's food supply as well as drugs and medical devices. The agency is responsible for interpreting the law and writing regulations concerning specific food products and processes. Rules and regulations established by the FDA are published in Title 21 of the Code of Federal Regulations (CFR), which can be found at www.ecfr.gov. These laws are intended to assure that foods are safe, pure, wholesome, and produced under sanitary conditions.

FDA inspectors have the authority to inspect any establishment where food is processed, packaged, or held for shipment in interstate commerce. They can also inspect products after shipment, vehicles used to transport food in interstate commerce, equipment, finished products, containers, and labeling procedures.

The following are organized under the purview of the FDA:

- **Food Safety Modernization Act (FSMA)**

The FSMA, the broadest reform of food safety laws in more than 70 years, was signed into law on January 4, 2011. It aims to ensure the U.S. food supply is safe by shifting the focus from responding to contamination to preventing it, and requires that food from abroad be as safe as domestically produced goods.

The FDA has redesigned its webpage dedicated to the Food Safety Modernization Act (FSMA), accessible at www.fda.gov/FSMA. The agency encourages consumers, industry and food-safety professionals, local and state regulators, and international trading partners to get more involved in implementing the new law by learning what the FDA is doing, as well as providing feedback to help guide the FDA in the future. Key elements of the page include:

- A link to a web-based search engine for recalled foods
- Frequently asked questions about landmark food-safety legislation
- Videos and graphics explaining how the law will be implemented
- Information about public meetings on these reforms

A new rule strengthens the FDA's ability to prevent potentially unsafe food from entering commerce. It allows the FDA to detain food the agency believes has been produced under unsanitary or unsafe conditions. Previously, the FDA's ability to detain food products applied only when the agency had credible evidence that a food product presented was contaminated or mislabeled in a way that presented a threat of serious adverse health consequences or death to humans or animals. Full implementation of the law will take time; however, beginning July 2011, the FDA is able to detain food products that it has reason to believe are adulterated or misbranded for up to 30 days, if needed, to ensure they are kept out of the marketplace.

Preventive controls, the systems that a manufacturer of foods implements to identify the hazards associated to the product and the scientific controls to minimize the risk of occurrence of those hazards are the manufacturer's responsibilities, though FDA can provide guidance. The legislation provides some exemptions based on size, who the facility distributes to (for example to a retailer grocery facility, etc.), and low risk activities, especially those that occur at the farm that may be manufacturing but are still considered low risk. This new law reinforces the need for farmers to tabulate and document procedures as well as evaluate the risks to human health from ingestion of the products they produce.

- **Federal Bioterrorism Act of 2002 (BTA)**

The federal Bioterrorism Act (BTA) is driving significant changes in food regulation. This federal law mandates regulations regarding record keeping and product traceability. The FDA has published a guidance document that summarized the recordkeeping and traceability requirements. More information is available at www.fda.gov.

Producers will be required to trace ingredients one-step backward in the food chain and tie the ingredients to finished products one-step forward in the chain if the products are being sold through retailers or wholesale distributors.

Other Entities

OSHA

The Occupational Safety and Health Administration, or OSHA, is responsible for enforcing compliance with U.S. laws regarding safety and workplace conditions. Compliance is expected to be voluntary, with inspections as a consequence of extended non-compliance.

Employers are responsible for providing a safe workplace that does not have serious hazards and follows all OSHA safety and health standards. Employers must identify and correct safety and health problems. OSHA further requires that employers try to eliminate or reduce hazards first by making changes in working conditions rather than merely relying on masks, gloves, earplugs or other types of personal protective equipment (PPE). Switching to safer chemicals, enclosing processes to trap harmful fumes, or using ventilation systems to clean the air are examples of effective ways to get eliminate or minimize risks.

If there are laboratories in the facility, a manual with clear procedures for each quality test must be in place and in compliance with FDA and USDA regulations. Safety gloves, hats, industrial aprons, boots, and glasses must be available for workers in the processing areas. In this context, having accident insurance for workers is an important matter as well.

Exit signs, easy access in and out of the building, fire extinguishers, evaluation, medical supplies, and procedures are important considerations. Other issues include hazard prevention and control, safety and health recordkeeping, and injury/illness records. It is important to develop an action plan to cover these types of situations. More details are available at www.osha.gov.

The owner(s) is/are responsible to provide a safe environment for both employees and the public. Examples of safety precautions include:

- Installing security elements such as clear exit signs at the facility, fire extinguishers, access for disabled persons, first aid kits and emergency procedures
- Providing designated areas for sample analysis where special ventilation systems must be in place if chemical substances are used
- Using “caution hot” signs after burners have been used
- Using “caution wet floor” signs after floors are washed
- Protecting processing facilities against vermin entering the production area
- Ensuring customers do not get intoxicated during a tasting event
- Maintaining access/entrance to the farm. What was once acceptable as access to a farm for agricultural purposes may no longer be legal access for the general public

Consumer Protection Concerns

The Federal Trade Commission (FTC) is the nation's consumer protection agency. The FTC's Bureau of Consumer Protection works for the consumer to prevent fraud, deception, and unfair business practices in the marketplace. More information is available at www.ftc.gov.

Regulations and Good Practices

Labor Regulations

It is critical to choose the right method for recruiting and selection that best adapts to a business venture. Having clear and defined objectives, duties, and responsibilities for each position will ensure the proper selection of personnel, as well as avoid costly lawsuits related to discrimination and sexual harassment.

Many additional labor laws and regulations will begin to affect the business if the staff approaches 50 employees. It is important to monitor operations carefully to determine if the extra labor is feasible given the additional cost that new regulations may carry. Affirmative Action, Equal Employment Opportunity, the Family and Medical Leave Act, and the Affordable Care Act all have provisions and regulations that are triggered once a business reaches the "50 or more" employee mark.

Employment Eligibility Verification

Workers must have valid work permits if not U.S. citizens. Each farm labor contractor, agricultural employer and agricultural association which is subject to the MSPA and who employs any migrant or seasonal agricultural worker(s) shall post and keep posted in a conspicuous place at the place of employment a poster prepared by the Department of Labor which explains the rights and protections for workers required under the Migrant and Seasonal Agricultural Worker Protection Act (source: DOL).

State Health Department Regulations

Businesses must consider state Department of Health regulations. These regulations, designed to protect the health of employees as well as the environment, must be considered if the business handles food of any kind, or sewage or drainage. Typically, specific licenses or permits are required depending on the nature of the venture. More information on Virginia's specific guidelines is available at www.vdh.virginia.gov/LHD/newriver/FoodandRestauranthtm.htm.

Food Handling Regulations

Any person who handles food must be aware of current food legislation. The primary enabling legislation states the aims and objectives of the law. This provides the power to the relevant U.S. Departments of State to introduce specific regulations. For example, the Food Safety Modernization Act is a legislation approved by Congress and later allows the Food and Drug Administration to write a regulation/s for that particular law. In general, food legislation has two objectives: to ensure that the food offered is of the quality it is supposed to be, and that it will not be harmful to the consumer.

In the US, about 48 million people (1 in 6 Americans) get sick, 128,000 are hospitalized, and 3,000 die each year from food-borne diseases, according to recent data from the Centers for Disease Control and Prevention. This significant public health burden is largely preventable.[68] For food processors, there are parameters for minimum standards with which products have to comply. For example, in bacteriological quality terms, tests done by laboratories have to follow the specifications as stated in the Bacteriological Analytical Manual (BAM) of the U.S. Department of Health & Human Services, U.S. Food and Drug Administration (FDA). This manual is available at www.fda.gov.

[68] http://www.fda.gov/Food/FoodSafety/FSMA/

Good Manufacturing Practices

There are basic sanitation principles with which food manufacturers have to comply, which 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.

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 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.

While these GMPs are generic, they provide an excellent overview of most facets of sanitary facility operation. Once understood, a facility operator can use these codes as to develop GMPs for his or her 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.

An effective written GMP program includes sanitation and pest control policies, and documentation, along with information about cleaning chemicals used in the plant, how effectively they are handled and stored, and how the Material Safety Data Sheets (MSDS) are maintained. The sanitation program typically details weekly, monthly, and periodic cleaning schedules and how cleaning is conducted, monitored, and recorded.

The pest control program should be developed in conjunction with a professional pest control operator who will assist in recordkeeping as well as making facility recommendations that will help to exclude pests and reduce harborage areas.

A good GMP plan includes a section on “Production and Process Controls” that addresses the methods of preventing contamination of the spirits being produced, processing time, temperature controls, and other critical factors, such as moisture, salinity and acidity.

The facility must have a means of lot coding each batch of product, so a product recall can be initiated in the event that it is necessary.

Processing Procedures

Written product specifications, processing flow diagrams, and processing procedures are typically constructed both for ease of tabulation for the owners of the venture, as well as for use in inspection and regulation aspects of the business. In some cases, detailed diagrams and other information regarding processing procedures may be required.

Food Safety and Quality Assurance

The production of safe, high-quality products is of primary concern to the owners of the project. Food safety begins with clean practices through the entire supply chain. Good agricultural practices, an understanding of microbiology, adequate manufacturing practices, safe procedures for cleaning and sanitizing, and a thorough understanding of the principles of Hazard Analysis and Critical Control Point (HACCP) development are all critical to the project.

Hazard Analysis Critical Control Point (HACCP)
HACCP is a widely recognized system for increasing safe food production. A HACCP Program identifies the steps within a food process that contain the greatest hazards, identifies scientifically validated steps that can reduce these hazards to an acceptable level, institutes these control measures, and documents their use and effectiveness.

Developing and implementing a HACCP plan requires a considerable commitment of time, money, and effort. It is important to recognize that an 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 rather to use solid practices as a basis for a food safety program that can provide the highest assurance of safety.

A HACCP system is a way to address food safety requirements for third party audits, federal and state inspections, and wholesale customer requirements. Providing this type of written analysis documentation can address the food safety requirements outlined by these various agents, and serve as a benchmark for quality assurance.

HACCP Program Resources
The Master Brewers Association of the Americas' Food Safety Committee provides valuable resources on developing HACCP plans, which can be accessed at:

http://www.mbaa.com/brewresources/foodsafety/Pages/default.aspx

Transportation Regulations[69]
Owners of the business will have to decide whether to contract delivery services out to an external company or use their own trucks and drivers. Should the venture decide to conduct its own deliveries, it will have to comply with specific regulations designated by the Federal Motor Carrier Safety Administration (FMCSA). Some pick-ups and deliveries made within a 60-mile radius may fall under some exemptions, but overall delivery operations conducted by the venture must observe FMCSA guidelines. More information can be found at www.fmcsa.dot.gov/regulations.

Risks
It is the owners' responsibility to familiarize themselves with the federal, state, county, and local laws governing their business. Failure to do so may result in penalties, fines, and ultimately cessation of business. The following sections are intended to provide a general overview of possible considerations that could affect a business, and are not intended to be exhaustive.

While the prototypical malting and brewing venture discussed throughout this document is described with certain defined assumptions about the type of business operation it will be, there can be are numerous activities associated with such a business that may fall under the authority of various non-alcohol related entities, such as agritourism or food service.

Categorical Risks
The venture will face many potential risks as it continues to develop and increase sales. Though it may be difficult to quantify a specific dollar value of these risks, it is useful to present them and permit the venture and its owners to determine their own level of risk tolerance.

[69] www.fmcsa.dot.gov/rules-regulations/truck/driver/hos/fmcsa-guide-to-hos.PDF>

- **Capital Risks:** The project will continue to require capital outlay. Insufficient access to capital funds is a primary reason new businesses fail. The assumptions in this study do not include much leeway for unexpected cost overruns that could endanger the venture.

- **Cash Flow Risks:** There may be periods during the year that the venture experiences negative cash flow. It would be beneficial for the owners to monitor these times for business liquidity. A small change in price or payment period could quickly turn a profit into a loss or exacerbate this cash flow risk.

- **Management Experience Risks:** Businesses "fly" or "die" based on the caliber of management. It is imperative that management has experience in the industry. The selection and oversight of management, both at the business as well as the operational level, are critical for the success of the venture.

- **Legal Liabilities and Risks:** The venture will face legal liabilities and potential risks due to the nature of the product, visitor risk, transport and/or delivery, worker safety, and environmental risks. Because the venture may serve alcoholic beverages, the owners should exercise great care to minimize risks from serving products to underage persons and reduce risks from traffic accidents after leaving the location. Where possible, the owners may reduce risk with insurance and written policies.

- **Regulatory Risks:** The venture will need to continue to address a large number of regulatory risks as it moves forward. These factors can potentially constrict the venture's ability to operate profitably. Additionally, regulations are in constant flux; statutes that may not affect the operation today could have a dramatic impact in the future. For example, environmental regulations for the production of malt beverages might change, labor and farm operation regulations may change, and changes enacted in the regulatory framework of liquor could affect the entire organization of the sector within the state.

- **Operational Risks:** Due to the venture's newness, it may experience several operational issues that do not proceed along the lines of the assumptions of this study. The quality of the company's products is highly dependent on the skill of the brewer and production practices, and sales are in turn dependent on reaching the venture's target market.

  The owners could face operational risks in equipment handling and processing if human resources are not sufficient to cover minimum management requirements. For example, if equipment quality or analysis of water or product handling does not comply with state and federal regulations, the entire venture risks failure.

- **Market Development Risks:** The craft malting and brewing facility will need to establish itself as a vendor in a competitive industry with many established players. There is no guarantee that the venture will succeed in encountering sufficient buyers to purchase its products. It is assumed that consumers have an interest in a specific craft malt beverage; this may not be a true assumption.

  Sale of products through Virginia ABC liquor stores is subject to a minimum annual profit requirement, and companies that do not achieve this minimum may have their products removed from the stores' shelves, further exacerbating sales declines. The proposed image for the venture is based on a minimum promotional strategy budgeted

and explained in the study, but there is still risk the proposed activities may not be sufficient to support the sales strategy.

- **Price Risks:** There is no doubt that consumers are becoming more interested in how and where their food products are produced. The Virginia malting and brewing industries are still evolving and the market is still in development, with numerous producers entering and exiting the market on a yearly basis. For this type of product, it is not unusual for prices to undergo wide swings and periods of significant depression. Likewise, local and national prices of alcoholic products may maintain or improve their price positions.

- **Food Contamination Risks:** Although people have been producing alcoholic beverages for centuries, food contamination has recently become an area of significant concern in the agriculture and food industries. Various forms of contamination could occur, causing possible illness, product recalls, or simply leading to a poor reputation and irreparable damage to the brand. Careless bottling and storage techniques by the retailer could also contribute to the risks previously mentioned.

  Malting and brewing beer utilizes water as a major ingredient. Failure to source water from a potable source could jeopardize the whole project. Strict regulations exist regarding this ingredient, and the owners will need to ensure continued compliance.

- **Production Risks:** If the venture experiences production issues due to adverse weather conditions affecting input supplies, it could become highly dependent on other producers providing the necessary commodities. The business could be at risk from the farm or from producers not supplying a sufficient quantity for purchase. In such situations, the business would also be subject to the timely delivery of product in order to meet production goals.

- **Inventory Risks:** Even though most businesses like to keep an amount of inventory on hand, high inventory quantities could represent a risk in terms of cash flow shortages in the early stages of the venture. If sales are not as expected, inventory may increase, and if negative cash flows occur, it may not be able to comply with its short-term obligations.

Registration of Food Facilities

Facilities that process, store, or ship food for human or animal consumption are required to register with the FDA. First, the owners must establish, a free on-line account at www.cfsan.fda.gov/~furls/ovffreg.html. Once an account is established, the owners can register the farm or company and edit the registration information. The Food Safety and Inspection Service (FSIS) of the USDA has prepared a guideline with good practices for food processors to take into account, which is available at www.fsis.usda.gov.

Product Liability Insurance

Similar to other food products intended for retail sale and consumption, malt and malt beverages may be subject to various contamination risks and potential for recalls and food safety issues carries a risk of liability. The operation will need to have a product liability insurance policy in place. This type of insurance is available through most commercial insurance carriers. Insurance carriers can be contacted to provide quotes.

OPERATIONAL CONCERNS

While the following section presents details about the basic procedures envisioned for the malting and brewing facility, each venture may examine and respond to its own unique business environment. To remain a successful commercial enterprise, the owners of this type of venture typically revise procedures as they discover new opportunities or obstacles.

Location and Site Specifications

The expansion's location is a critical factor in its daily operations, as relative costs are directly related to factors related to its position in the state. Labor, transportation, utilities, waste disposal, and other components of operations will be affected by the ultimate location of the malting facility. From a marketing point of view, a good location is essential to establishing a successful business, and the facilities would ideally be visible from a major roadway.

For the purposes of this study, the malting facility is located adjacent to the brewing facility and tasting room, although some may choose another location due to space constraints or other factors. The site should have sufficient space to handle initial operations as well as room for growth, as demand necessitates expansion. The building will house normal operations as well as the brewery's tasting room. The tasting room, used as a marketing tool to drive consumer awareness of the product, can also serve as an income stream from non-alcoholic products sales. The goal is for the venture to be a destination as well as a production facility.

The facility space dedicated to events and tastings will allow the brewery to generate additional revenue from offering services for special occasions, brewery tours, and demonstration of the production process. The site could also serve as a host for other events or tastings that would increase the brewery's brand recognition in the region. The facility may also include space or appropriate structures for production inputs and equipment storage, including grains, fermenting, and bottling equipment.

A good location is essential to establishing a successful business, and it should be visible from a major roadway.

The venture's visibility near high traffic routes will facilitate customer flow, so adequate parking for employees and visitors, including accommodations for cars and buses, will be essential. A facility of this style typically includes a reception area for guests, a bar or tasting area, and a space to sell products and souvenirs. The site may also include miscellaneous space, such as office areas, break rooms, storage, and restrooms. It is recommended that brewery and malting areas be separate from those dedicated to guest and tasting room spaces. The brewery equipment room can be located at the back of the building and can include windows from the tasting room to the equipment, so visitors can watch the beer being made.

The facility must be safe, clean, and follow all the requirements by both groups. The building must be regularly inspected to ensure compliance, and the owners may find it helpful to begin assessments as early as possible in order to prevent any delays in opening the business.

Zoning – General Requirements

The brewery will have to obtain zoning approval from the town in which it is located. The guidelines for zoning may differ for each area. Information on zoning requirements can be found on county websites specific for the county in which the venture is located.

At times, zoning issues can delay the opening of a new business, especially since zoning boards can deny approval for a business or force the owners to change their location or building plans. It may be hard for brewery owners to establish a location within a rural county, due to resistance surrounding associations with the alcohol industry, and these areas may require additional steps before to obtain zoning approval. The best approach to overcoming zoning delays is to begin the process early while the business is still organizing and before approaching the VABC.

Zoning – General Requirements

It is critical that the business remains current with any zoning requirements related to the proposed venture and any expansion in the future. For the sake of the study, basic zoning information follows as a reminder of the steps that may need to be taken as the project moves ahead. If the owners decide to expand the facility, they would need to address a number of issues including, but not limited to, the following:

- Visual impact - including the need for buffering, screening and landscaping of the facility
- Flora and fauna, and their effects on the local eco-system
- The impact of noise from the plant (limited)
- Traffic study addressing the intersection design, turnaround areas, and car parking
- Management of additional wastewater
- Additional requirements for water and power to the site
- Soil suitability in regards to building foundation, erosion control and absorption

Table 2: Standard Requirements 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 beams around the perimeter to control run-off and run-on, if required
5	Plan areas for raw material storage, if applicable
6	Set up equipment in locations convenient to the process
7	Construct retainer walls and footings
8	Develop a screen/landscaping around the site
9	Install appropriate utilities depending on the method and process
10	Obtain proper permits (this is mandatory) —Local: zoning, building, and land use —State: water discharge, access, air, and health department

For more information on zoning, see www.sba.gov/content/basic-zoning-laws. Alternatively, contact your city, municipality, or county zoning official.

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

Vegetative controls that may need to be implemented include tree protection tape, permanent and temporary seeding, and erosion control. Erosion control would include blanket/matting on steep slopes. Structural controls that may be implemented include construction entrances, silt fencing, diversion dikes, temporary sediment traps, rock check dams, storm drain inlet & outlet protection, and surface roughening. The table above presents the requirements for site development of a typical facility. Local requirements and the exact type of facility to be constructed will determine the exact site requirements.

Water & Sewer

Specific regulations govern the sources of water used in the production of food products. When locating any agricultural business that includes the production of large amounts of waste or byproducts, it is essential to address the regulations and constraints of disposal. If a facility utilizes a municipal water and sewer source, specific regulations governing the allowable limit of dissolved solids, as well as chemicals, nutrients, and pH levels allowed in wastewater will need to be addressed prior to production.

If the facility is located in a region that does not include access to a municipal or other standardized water and sewer supply, environmental regulation may affect the disposal of production waste or by-products. The general procedures installing a water source include the drilling of the well, inspection, water sampling, testing for compliance, and then approval for operations. After approval the water is typically tested on a quarterly basis, then subjected to a periodic survey, which typically takes place every five years.

State level testing and monitoring requirements can include testing for bacteria, chlorine residuals, nitrates, iron and manganese, and possibly fluoride and sodium levels among others. Reclassification from a small business to being a federally inspected water source would require more stringent monitoring of the water's quality. Federal monitoring generally includes an addition 60-70 parameters, as well as testing for inorganic and organic compounds, pesticides, herbicides, petroleum products, etc.

Many pretreatment protocols mandate that the facility treat the wastewater, either by physical, chemical, or biological processes, to reduce the amount of pollutants, or alter pollutants to a less harmful state prior to discharging to the sewer system.

Programs and regulations often include rules stating the facility must self-test its effluent water on a regular basis and provide records and results of this monitoring to the governing sewer authority. In addition to self-monitoring, the facility may be subject to local government testing.

Failure to abide by applicable laws and regulations in this arena may result in fines or the cessation of business if they are not properly addressed.

Equipment Specifications

It can be beneficial to consider the many ranges of equipment manufacturers before deciding which will fit best for the brewery. This decision may involve consulting experts on artisan brewing operations to provide advisement on the various options.

The owners may choose to purchase state-of-the-art brewing equipment specifically designed for a small, artisan, or craft operation, or may source used equipment. Apart from the main brewing equipment, other items are also often required, such as packaging and sales related equipment associated with the onsite tasting room. The following table contains examples of equipment commonly used for a brewery, tasting room, and gift shop.

Table 3: Examples of Brewery, Tasting Room, and Gift Shop Equipment

Mash tank	Box rollers/pallet jack	Hand cart
Other tanks	Trash cans	Movable stairs
Fermenters	Trash can dolly	Wet/dry vacuum
Milling equipment	Processing utensils & supplies	Display cases
Sales racks	Pump (sanitary)	Bar
Bottles and Labels	Bottling holding tanks	Sink/sump pump
Bottling equipment	Measuring vessels	Signage
Burner	Piping and Tubing	Fire extinguisher
Hoses, fittings, valves	Sterilization equipment	Smoke detector
Tables and chairs	Chemicals misc./cleaning etc.	Exit signs
Ice machine	Tank cleaning equipment	Dishwasher
Refrigerator	Capper	Vacuum cleaner
Lab equipment	Alternate pneumatic capper	Computers and scanners
Fans	Labeler	Desks and Office Chairs
Temp/humidity indicators	Air compressor	Work tables
Glasses for tasting	Pressure washer	Bags
Cooling systems	PLC controls systems	Water filtration systems
Yeast propagation systems	CIP systems	Milling systems/hoppers
Pumps	Catwalks	Cooker
Bottling line	Custom metal fabrications	Waste water filtration

Waste

Finding a sustainable outlet for waste generated by the brewing process is an important part of the operation. Several breweries employ sustainable methods of distributing spent grains to local farms for use in soil beds or animal feed. Some others also incorporate these materials into the kitchen through artisan breads and other dishes. If the grain is composted, it can be used as fertilizer, as it is rich in nitrates and sulfates and is optimal for nourishing some types of plants.[70]

The minimal amounts of wastewater, including water from cleaning the equipment, can be disposed in the town sewers or through other approved methods.

[70] www.craftbeer.com/craft-beer-muses/sustainable-uses-of-spent-grain

Quality Control

Another significant concern for the brewery will be consistent quality and taste of the product, which can be achieved through efficient control procedures and testing. This type of monitoring involves every stage of production, from quality of the water to quantity and quality of the inputs. While the brewery may not have the ability to establish a comprehensive lab facility on site in the beginning, it is crucial they implement an organized process for quality testing.

Quality Assurance of Supply

The quality of inputs used in the brewery's products will be a chief determinant of their overall value and consistency. Depending on the product lines offered by the brewery, the owners may need to find growers of multiple commodities, such as hops or seasonal grains. The volume of production necessary will determine if the brewery will need to source products from multiple producers or just one. As with any other type of business, input suppliers for the brewery will need to meet the business' guidelines.

Seasonality can be a significant issue for every brewery. Establishing a consistent inventory of supplies is vital because customers expect for product to be available throughout the year. Inputs used in malted beverage production have a seasonal cycle of production, yet the brewery needs to have product available year-round. For the business to grow and thrive, the producers must be prepared to supply what customers demand year round by sourcing enough inputs to fuel production and meet demand.

If producing an aged product, amount of inventory will need to be balanced with the time necessary for production and aging. While some premium products may be available on a limited time basis to customers, the business will need to maintain basic levels of sales to provide sufficient cash flow to remain in business.

Water Sources

Plenty of clean water supply will be needed to maintain the cleanliness of the facility's operations. This water will be used as a cleaning medium, to heat and cool products, and as an ingredient in the products. All personnel will receive training and be responsible for the correct use of water.

If the brewery chooses an on-site water source, such as a spring or well, it may establish additional controls and treatment, which may include filtering, cleaning compounds and other processes to ensure compliance with regulations regarding the use of the water source. In this context, waste disposal must also be managed according to local and state regulations.

The Virginia Department of Agriculture and Consumer Services (VDACS) requires that agri-food businesses using water in the food and beverage processing operation have to be **drinking water** quality, regardless of its source (pond, spring, etc.). This means that the water has to be potable. Water must be treated with chemical agents or subjected to ultraviolet treatment to destroy any potentially dangerous pathogenic microorganisms before it is filtered. Water has to be safe in microbiological, chemical, and physical terms. VDACS will test the water to make sure it meets safety standards as part of the licensing process.

Apart from the water's drinkability, iron content will have to be monitored, as it can affect the taste and quality of malted beverages. If water is to be stored, it must be kept in closed containers/tanks. Any bottles and containers used in the food processing operation must be

sterilized with water that meets VDACS' safety standards to avoid cross contamination. Failure to use water that meets these standards can result in penalties for the business or its owners.

Food Safety and Sanitation[71]

In any operation where the product is intended for human consumption, considerations in regards to food safety and sanitation are critical. Given the characteristics of a brewery operation (high alcohol concentration), many common pathogens are not a problem as the presence of the alcohol is often enough to discourage proliferation of contaminants.

Depending on the equipment used, producers may need to consider specific cleaning protocols for manual operations, or how best to address the sanitation needs of a more automated system. Frequently, automated systems operate with via a CIP (clean in place) sanitation system. Other methods of cleaning can involve pressure washing, steam cleaning, and decisions regarding filtration and chilling of the end-product, especially when the process involves aging.

Raw materials used as inputs must remain sanitary throughout the production process. The brewery may find it helpful to establish and use tabulated practices for monitoring and controlling batch operations, and the necessary laboratory equipment for control, such as hydrometers, thermometers, etc., may be used and the results recorded in a quality control log.

Cleaning procedures typically takes place in two steps: cleaning and sanitizing. During cleaning, soil deposits are removed, whereas sanitizing destroys microbes that are left in the clean surface. For production equipment cleaning, fermentation vessels can be cleaned by filling with hot water (at least 171°), detergent, and steam using a CIP or similar system. After the appropriate cycle time, the tank is emptied, rinsed with water, and steamed to sterilize the components before new components are pumped into the vessel.

Personal hygiene and product handling must also be taken into consideration in this project. Supervisors are responsible for ensuring any employees involved with processing operations follow a strict set of quality guidelines. Bottling procedures must be clear and all necessary quality precautions followed.

A good sanitation program will help ensure the brewery's compliance with regulations, prevent contamination, improve the quality and shelf life of the end-products, reduce energy, maintenance, and insurance costs, and increase general quality and confidence of the business.

[71] Gardner, Denise. "Distillation & Whiskey Production: Notes from the Kentucky Bourbon Trail." Penn State University.

INDUSTRY EXAMPLES

The prototypical malting and/or brewing venture surveyed in this study will sell products largely through the tasting room and ABC stores in Virginia, with long-term plans to expand sales to other states. It is critical for the owners of the venture to monitor its activities—such as prices, products, labels and/or packaging, suppliers, distributers, promotions, etc.—to keep pace with competition in the marketplace. In addition to local producers, regional, national, and international examples of malting and brewing businesses are present in the same marketplace, making it a challenge for a smaller batch beer producer to compete. However, quality is the key to success and a local brewery can ensure their beers are of the high quality their niche customers' demands.

Examining leaders in the industry provides opportunities for a new malting and/or brewing business to find unique approaches to marketing and production. While the large number of producers may initially represent direct competition for a new brewery, it also provides opportunities to study the most effective marketing and production methods and gain insight into the larger market.

The beer market remains more competitive in some categories than in others, but overall, every brewer strives for a unique product line that stands out from the competitors. The legal environment in which some breweries operate makes it easier to penetrate local markets, though under controlled conditions. The craft brewery option is different from the mass-produced, commercial beer market, which is influenced by large firms who enjoy economies of scale.

High quality inputs, equipment, and processing conditions are of vital importance to the brewery.

Larger companies can provide more "technical" products to restaurants and retailers at relatively low prices, with big promotional campaigns. However, consumers interested in higher quality artisan beers, and consequently lower volumes of production, provide a niche market for the brewery's products.

From analysis of other breweries, it can be concluded that high quality inputs, equipment, and processing conditions are of vital importance — even details such as the quality and type of glassware in the tasting room and the presentation via the webpage are critical to the success of the brewery. The brewery will market the products as well as showcase its superior customer service. The examples presented in the following section show how other breweries carry out their marketing at this level.

Virginia: State Examples

According to Virginia's tourism website, the craft beer industry has rapidly grown from a mere handful of brewers a couple of years ago to over 100 today. There are a number of "beer trails" across the state, encouraging visitors to stop at a number of local breweries. Some notable farm breweries are described in the following section:

Wood's Mill Malt House (Lovingston, VA)

Wood's Mill Malt House is a "dirt-to-glass" malting facility. They malt only local barley and other grains, growing the majority of their inputs on their 300-acre farm and using traditional floor-malting methods in

their 4,000 square foot malt house, which has the capacity to produce 6,000 pounds of kilned base malts per week. They have been successfully processing grains into high-quality malts for local home brewers, craft breweries, and distilleries since opening in 2014. Construction of an on-site brewery and tap room is underway, with en estimated opening date in the spring of 2016. Wood's Mill will be serving craft beer made totally from farm-sourced ingredients, becoming one of the first breweries in the U.S. to grow, malt, and roast the grains and brew the resulting beverage all on the same property.

Kelly Ridge Farms (Meadowview, VA)

Kelly Ridge Farms is a family owned farm in Southwestern Virginia, operated by Justen Dick, a licensed environmental geologist and member of the Old Dominion Hops Cooperative. Kelly Ridge utilizes cutting-edge growing practices and collaborates with researchers at Emory and Henry College. The farm focuses on providing brewers with unprocessed wet hops through both bulk orders and local retail outlets. The hop yard's first planting was in the summer of 2013 and has grown to its current offerings of mainly Cascade and Nugget varieties with a selection of five other varieties in trial stages.

Lickinghole Creek Craft Brewery (Goochland, VA)

This farm brewery is housed on a 290-acre plot near central Virginia. Having started in 2011, the working farm and brewery has won awards in the Great American Beer Festival and the Virginia Craft Brewer's Cup, and eight of their beers are listed on Beer Advocate's "Top Rated Beers of Virginia" listing. They have a consistently rotating list of beers with release parties to draw in new and existing customers. The brewery's main portfolio consists of a Russian Imperial Stout, an ale fermented in oak barrels, several types of ales, and a few IPAs. The website also has an online store where visitors can purchase Lickinghole Creek Craft Brewery branded merchandise.

The brewery grows its own barley and hops on-site. The website states that they recently harvested approximately 25,000 pounds of barley, sending 2,000 to a local Malt House in Nelson County to be malted for production. They have many plans for expansion, and plan to grow a second variety of barley in the coming year.

Dirt Farm Brewing (Bluemont, VA)

This 100-acre family owned and operated farm brewery is located in Loudon County, about a mile away from the village of Bluemont. The brewery's property was previously used as a weekend retreat in the 1940s, but has been repurposed into a rustic tasting room with seating for events. The facility is located next to the family's 400-acre farm, in which the Zurschmeide family grows and harvests most of the inputs for their products, including a 3 acre hop yard and 10 acres dedicated to grain.

Dirt Farm Brewing's beer offering list is slightly more limited, with a total portfolio of eight beers, including two seasonal lines: Peter Peter Pumpkin Ale and Som-Peach Ale. With the exception of two IPAs, the rest of their products are limited to ales. This brewery makes good use of social networking, with an appealing website, active twitter account, and Facebook page.

Swover Creek Farm Brewery (Edinburg, VA)

In 1998, the St. Clair family established Swover Creek Farms to diversify crops. The farm has been in the family for over a century and currently produces various types of berries, asparagus, and hops. They also have a farm kitchen, which makes artisan crafted sausages with local meats, which has grown to include 10 varieties of flavors. From the end of August to early September, customers can come and pick their own hops from a selection of approximately 14 varietals.

In 2014 they established an on-farm nano-brewery, which is located in a renovated tractor garage. While it is new, the brewery offers a rotating menu of four beers, many made with crops from the farm, especially hops and berries. They have initiated a Farmers' in the Ale Club as a method to encourage repeat visits and advertise with a custom beer mug.

Nearby State Examples

Competition from North Carolina and other surrounding states is also considered in the present study. The following is an analysis of notable farm breweries in nearby states.

Weeping Radish Farm Brewery (Grandy, NC)

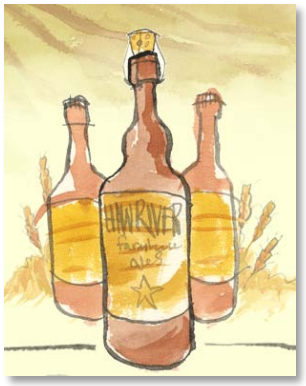
Weeping Radish, North Carolina's oldest microbrewery, began as a restaurant and brewery opened by Bavarian Uli Bennewitz in 1989. At the time, brewery sales to consumers was illegal, so Uli worked to change North Carolina law, allowing micrbreweries to sell beer to customers on-site. The original site in Manteo quickly became too small as demand for micro-brews steadily grew. Uli began his new project was in Grandy, NC, in 2001. Now, Weeping Radish Farm Brewery also operates an on-site butchery and pub, as well as a retail counter offering items such as sausages, bacon, and beer to-go.

The original brewery in Manteo was a 5-barrel system, equaling 10 standard kegs. Now, Weeping Radish is capable of brewing 20-barrel batches, with six 20-barrel primary fermenters and sixteen 20-barrel aging tanks. The original brewery could only brew three styles of beer at a time, bow now offers up to seven draft choices as well as seasonal styles such as Oktoberfest and Christmas Beer. They offer their beer locally in 16 oz cans, 1 liter refillable bottles, 5 Liter Mini Kegs, and 5 or 15.5 gallon kegs.

Courtesy of Weeping Radish Facebook Page

Haw River Farmhouse Ales (Saxapahaw, NC)

This brewery is located in a repurposed dye building from the Dixie Yarns Cotton Mill in Saxapahaw, North Carolina. The 3,000 square foot building is home to a 10-barrel brewing system that allows the brewery to craft numerous small batches of innovative Belgian-style ales, ranging from more classis pale ales to special batches such as the Double Chocolate Habanero St. Benedict's Breakfast beer. They are also experimenting with a few varieties of seasonal beers and sours, a type of beer growing in popularity among beer and cider enthusiasts.



In Haw River's mission to be a local and sustainable business, they have established a Farmhand Exchange program to connect local farmers, builders, and local artisans to obtain local, high-quality goods that would otherwise have been shipped from hundreds of miles away. The website states, "All our Farmhand Exchange members are located within a hundred miles of the brewery, dedicate a portion of their sales to local charities, and pledge to practice responsible growing practices in their own businesses."[72]

National Examples

Following is a description of some national examples of successful farm breweries selected by the consultants.

St. Croix Valley Hops (Croix Falls, WI)

This enterprise is owned and operated by Eric and Tammy Anderson. The Anderson have been growing specialty crops on their farm for over 20 years, and successfully growing hops since 2012. They contract-grow varieties which have been tested for suitability in the Midwestern climate, providing hand-picked hops and clean hop plants to both craft and home brewers. In 2016, St. Croix will be growing eight varieties of malt, including Cascade, Centennial, Chinook, and Zeus. St. Croix Valley Hops is a charter member of the Gorst Valley Hops processor and supplier in Sauk County, Wisconsin.

Valley Malt (Hadley, MA)

Founded in 2010 by Christian and Andrea Stanley, Valley Malt started out of a mission to bring local malting back to New England. Beginning first with barley acquired from local farmers, in 2012 Valley Malt began to grow its own organic barley on a 35 acre farm. This has grown to 70 acres, providing large quantities of home grown barley in addition to that produced by other local farmers. Valley Malt produces a variety of malts including 2-Row Pale, 2-Row Pilsner, 6-Row, smoked, roasted, and crystal. In addition, they grow other grains such as wheat and rye which they also offers as malts. Valley Malt's goal is to get locally produced malt to local brewers, and they have partnered with a number of brewers from Delaware to Maine.

[72] http://hawriverales.com/our-brewery/farmhand-exchange

Hopshire Farm & Brewery (Freeville, NY)

"Beer from a farm, not a factory," is the motto for Hopshire Farm & Brewery. Hopshire is a family owned and operated hops farm and brewery in Freeville, NY, the retirement project of Diane Gerhart and Randy Lacey. They have been growing hops for over 9 years at their home, and in 2011 purchased 35 acres of farmland to expand their crops. Their website is well-designed and highly functional, and features up-to-date "Beers" and "Events" pages, though the "About Me" page is years out of date. They have an active Facebook page, with nearly 3,000 likes and over 100 5-star reviews on which they promote regular farm events and advertise new beer releases.

Embracing New York's rich history with hops, their brewery fuses historic aesthetic design with efficient technology. The Hopshire brewery building is a recreation of a 19th century NY hop house built with modern techniques for a high performance building. The brewery features 8 taps which offer a constantly rotating selection of farm-brewed beers, made from hops grown on-farm and other locally-sourced natural ingredients such as berries and cherries. The brewery is community oriented and hosts weekly events featuring local live music and food trucks. Facebook comments from visitors make it plain that Hopshire is a favorite destination for out-of-towners who make it a point to visit whenever they are in the area.

Rogue Ales (Oregon, California, and Washington)

In 1988, a group of like-minded entrepreneurs opened a brewery and pub in Ashland, Oregon. Originally, the beer list was limited to two offerings: an American Amber and Oregon Golden. The business has since grown into 10 "public houses" and tasting rooms, and two farm locations where they grow their own beer inputs. Since opening, the brewery has won hundreds of awards for their products, and produced a wide variety of beers from pilsners to stouts to lagers.

Both of Rogue's farm properties are located in Oregon, where they grow, harvest, and process their own hops, rye, jalapenos, pumpkins, hazelnuts, honey, and other inputs for their award-winning beers. Their barley farm, located in Tygh Valley, is a 3,800 acre ranch that houses the malting facility. After seeing much success with their farm operations, Rogue launched a specific "Rogue Farms" line of specialty beers, such as Chipotle Ale, Good Chit Pilsner, and 7 Hop IPA.

Brewery Financial Study & Scenario Analysis

Even if an existing brewery has been operating successfully in the past, it can still be helpful to assess financial operations and projections into the future. With the addition of a malting facility, the owners can analyze the business' financial future for the next few years to plan ahead for potential obstacles and/or opportunities that can arise in the initial years of operation.

While there are almost an unlimited number of ways a business can organize its financial plans, they typically all share a few of the same characteristics. The consultants have created a basic model for the business' first three years of operations after expanding to include malt production, including a number of factors that can positively and negatively affect the business. A scenario analysis is provided to show how certain changes to the business can affect the over financial viability and growth of the business.

PRELIMINARY BREAK EVEN MODEL FINANCIAL PROJECTIONS, ASSUMPTIONS, AND METHODS

This analysis contains basic models for three years of operations for an already established brewery in Virginia. Estimations based upon similarly sized operations, industry research, and the consultants' knowledge have been modeled in Excel spreadsheets to approximate the venture's potential expense and revenue.

This model attempts to be realistic while still permitting ease in interpretation. Though attempts have been made to make the tables as transparent as possible, several key project descriptions will be presented in this section. Actual revenues and expenses are likely to be different than estimated as costs, price points, market conditions, and other factors have significant impacts on the brewery's potential. The analysis presented here is intended to provide estimates only.

General Information

The proposed brewery will sell multiple beers in both retail and wholesale formats year round. In the model, 65% of the brewery's sales are through onsite sales and tasting room guests with the remaining 35% through wholesale outlets. Peak business is anticipated to be in the holiday months, but sales will be conducted throughout the year.

Seasonality

Sales remain consistent in the first six months of the year, increasing from July onwards as the holiday season approaches. December is anticipated to be the highest sales figure month, totaling about 15% of revenue. It is assumed seasonality percentages will align with industry standards. Beer becomes more popular as the year goes on, reaching its peak in December. This is due to multiple factors such as agritourism increases in the summer and fall months, increased beer varieties due to holidays, and other factors. The following table outlines the estimated seasonality of the brewery.

Table 4: Seasonality of Sales

Seasonality											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5%	5%	5%	5%	5%	5%	7%	12%	12%	12%	12%	15%

Beer Production and Recipe

The facility will sell three main lines of beer with several seasonal varieties offered throughout the year, all based on the same basic recipe, with variations in ingredients to produce the desired end-result. For model purposes, a single average price point for the inputs has been utilized to produce the revenue figures.

Processing revenue from one month would be collected by the end of the following month. The average total lag estimated for payment is 30 days at 8.5% interest in the model.

While there are a variety of other containers a brewery could use for beer production, this study will focus on bottles as the sole container used. The beer will be categorized as inventory ready

for sale and will be stored on site until sold. The following table shows the production breakdown for each of the three years of the study.

Table 5: Beer Production Figures in Barrels

Year 1	1,400 BBL
Year 2	1,650 BBL
Year 3	1,900 BBL

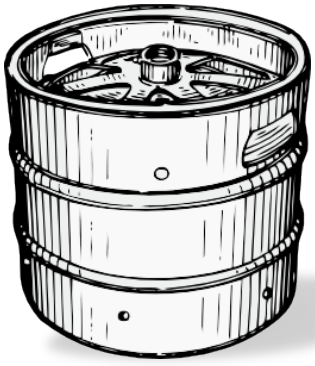
The brewery will produce approximately 1,400 barrels (BBL) in year one, rising to 1,900 barrels by year three. The recipe, based on a 15 BBL system, begins with a 465 gallon batch and yields approximately 82%, or 382 gallons, of finished product. Complete production time for one batch is 7-10 days. Production equipment necessary to complete multiple batches at a time will be necessary for the brewery to meet production quotas.

Production Loss
The equipment sourced by the owner is anticipated to have about an 85% efficiency level in conversion from inputs to outputs during the first year of operations. Efficiency is anticipated to remain stable over the life of the study. Small increases in efficiency are possible as brewers and production employees become more comfortable and acquainted with the brewing process, resulting in fewer mistakes during production.

Percent of Product Withheld from Sales
It is assumed that 5% of product produced by the brewery will not be sold, due to product shrink, returns, etc. This amount also accounts for promotional purposes such as product poured in tasting room or used by staff and owners.

Packaging Sizes:

Table 6: Packaging Sizes

		
Kegs: 31 gallons	**Glasses (on tap)**: Multiple sizes (12 oz. glasses and 3 oz. flights)	**Bottles**: 12 oz.

Distribution of Sales
The following table shows the percentage of sales divided between retail and wholesale as well as sales quantity percentages (glasses, bottles, and kegs.) The brewery will begin operations with entirely retail sales as it enters into the brewing market. As the project progresses, the business will begin wholesale sales in addition to its retail sales. With brand establishment, customer base

increases, and wholesale accounts will increase to about 35% of sales by the end of year three. Estimated wholesale/retail split by the end of year three will be 65% retail and 35% wholesale.

Table 7: Goal for Distribution of Sales by Year Three

Product	Wholesale	Retail
Kegs	30%	5%
On Tap Glasses (3 and 12 oz. servings)	0%	20%
Bottles	5%	40%
Total	**35%**	**65%**

Waste

The waste products created by the brewery will be picked up by local agricultural entities for use in their facilities. Agreements with these local entities will be discussed, established, and modified as needed throughout the duration of the project. It is assumed waste will be revenue neutral. Some larger brewing entities use waste as an income source, but the brewery will not be at production levels sufficient to support this avenue of business during this time.

Inventory

Beer will be produced year round and will be sold after a minimal inventory holding period of one to two weeks. Beer inventory will be held in inventory for a maximum of 30 days. Inventory will experience a 2 week lag between production and when it is sold to consumers.

Project Timing

The model focuses on three years of operation for an already existing brewery in Virginia.

Revenue

The brewery will obtain revenue primarily through the sale of beer, with other smaller lines of revenue, such as non-alcoholic products. Beer will be sold on tap in the tasting room (pints, bottles, and flights), onsite in bottles, and to wholesale outlets in the form of bottles and barrels. The brewery also offers food through a catering service in the tasting room, as well as a small line of merchandise and souvenirs branded with the brewery's logo and name.

Price Points

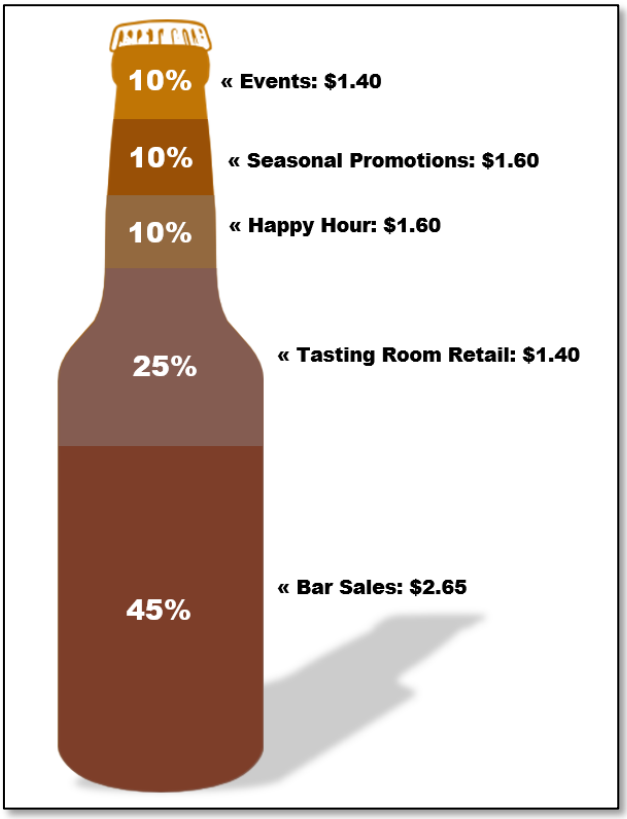
The brewery will utilize a retail and wholesale price for finished goods. The retail prices in the table below represent the prices paid by customers, while the wholesale prices are those received by the brewery when selling to distributors. The prices listed below will increase by 5% in the second and third years of the financial model.

Table 8: Product Pricing

Product	Retail	Wholesale
On-Tap (By the 3 oz. flight)	$2.50	N/A
Barrels	$300	N/A
Bottles 12 oz.	$2.00	$1.00

Processing revenue from one month will be collected by the end of the following month. The total lag estimated, on average, for payment is 30 days at 8.5% interest in the model.

Figure 8: Sales Outlets and Price per Bottle



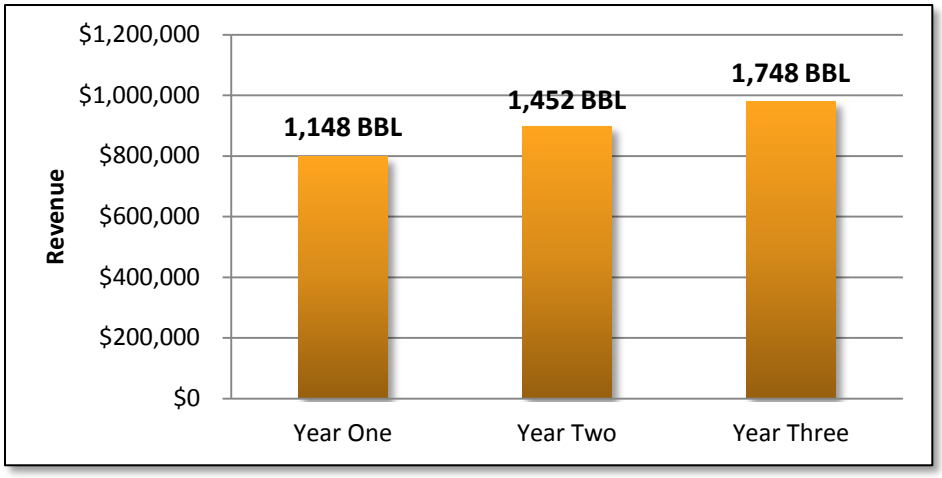
The pricing discussed in the previous chart represents how a typical brewery may have several price points for the same product, depending on how it is used. Happy hour, events, sales, etc. will all have different market pricing opportunities. The $2.00 price per bottle is a weighted average of the five price points shown above. For ease of comparison, all prices discussed are examined on a price per bottle basis. For example, bar sales will be conducted in pints, while beer sales at events may be conducted in pints or flights.

On-site bar sales will account for 45% of bottle sales and will sell for $2.65 per bottle. These bottles will be individually sold for on-site consumption to bar patrons, tasting room guests, and other farm tour guests. Happy hour will also take place throughout the week at selected times in the tasting room. Accounting for 10% of bottle sales, happy hour beers will be half off, priced at $1.60 per bottle. Alongside these retail and happy hour sales, events will be conducted at the brewery such as weddings, receptions, parties, etc. These beers will account for 10% of bottle sales and will be sold for $1.40 per bottle.

Tasting room retail sales will make up about 25% of bottle sales and will be sold in six-packs to be taken home by customers. On a per bottle basis, tasting room retail bottles will be sold for $1.25 a piece, totaling $7.50 per six-pack. The brewery will also have seasonal promotions that account for 10% of bottle sales. As seasonal events/holidays approach, these specific beers will be sold at a discount to attract new customers. These beers may also be used in promotional giveaways/tastings in conjunction with events or other occasions. These seasonal promotional beers will be sold for $1.60 per bottle.

Sales For ease of comparison, barrels are the units used when discussing sales and production. The brewery will sell approximately 1,150 barrels of beer across multiple product lines in year one. These sales of barrels equate to about $800,000 in revenue. This barrel number rises to just over 1,450 sold in year two in conjunction with sales levels of just under $900,000. This figure rises from year to year, ending just under $980,000 in year three and barrel sales of about 1,750.

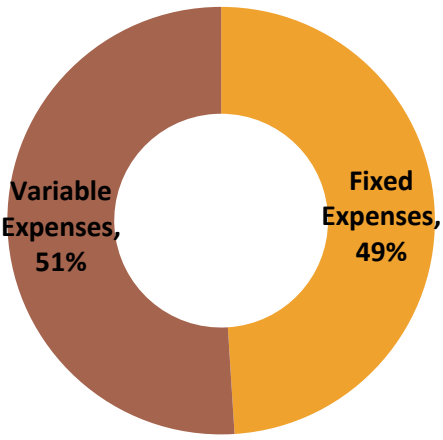
Figure 9: Barrel Revenues and Quantity Sold



Expenses

Expenses are presented for both variable and fixed costs. Variable costs are those that change with production and are directly associated with sales. Fixed costs are the overhead costs that are required for the business to function, examples of which can include loan interest payments and management salaries. As shown in the following figure, variable and fixed expenses make up almost the same amount of overall expenses with variable accounting for 51% of all expenses and fixed expenses accounting for the remaining 49%.

Figure 10: Expense Breakdown



Variable Costs
Variable expenses are the largest expense category the brewery will incur over the three year plan, as it represents variable labor, delivery and transportation, packaging materials, production inputs, among other smaller categories. The largest variable cost incurred by the brewery is related to production. Included within these expenses are the ingredients and components necessary to craft beer. Input costs are approximately ($85) per barrel. Year one shows this cost to be about ($118,000) or about 15% of revenue. This cost remains stable in percentage of sales but rises in cost in years two and three to ($143,000) and ($169,000), respectively. Steps should be taken to reduce this cost as much as possible through the use of different vendors for some ingredients, more efficient growing methods, and/or more efficient production practices.

The second largest variable expense category for the brewery is product packaging. Barrels, bottles, glasses, and flight packaging total about (13%) of sales, at about ($105,000). These costs remain stable in percentage and increase in price over the life of the plan as production increases. This cost will reach more than $111,000 by the end of year three. The packaging used by the brewery varies in price. Kegs cost ($100) per unit, 12 oz. bottles cost ($0.08), and flights cost about ($0.05) per unit. Packaging will be purchased in bulk in January of each year while any additional packaging needed will be purchased in June. Purchases made in June are expected to replace any breakages or anticipated breakages throughout the year such as glassware being dropped, kegs being dented, etc.

1) Variable Labor: Efficiently operating a venture of this type requires a number of roles to be filled. In some cases, multiple roles can be filled by one employee, which can help save on staffing costs. In addition, full-time staff is frequently supplemented with part-time seasonal labor as well as volunteer staff.

- **Tasting Room Associates:** Over the life of the plan, several tasting room associates will be hired to assist the tasting room manager in providing service to customers. These employees will be responsible for pouring samples, selling bottles, assisting with event setup and cleanup, and other service duties as assigned. These employees will be paid $10.00 an hour and will be under the direct supervision of the tasting room manager.

- **General Laborers:** Over the three year period of the model, the facility will employ 1-3 general laborers. These employees will be responsible for assisting management in general upkeep and production duties. This position will pay approximately $10.00 an hour in year one, with a $0.50 increase per hour per year thereafter.

- **Administrative Staff:** An administrative position will be filled at the beginning of the three year period. This individual will handle communication between the facility and clients, assisting management with any office needs, daily bookkeeping, and other duties as assigned. This individual will be paid $15.00 an hour.

- **Maintenance Labor:** A maintenance employee will be hired to assist the head brewer and tasting room manager with repairs of tasting room equipment and brewing equipment. This position will pay $12.00 an hour and will divide duties amongst the production facility and tasting room.

The labor positions, number of employees, and wages used in this study were determined using industry research. Employee expense assumptions are comparable to figures of operations which are similar in size and scale. Management should reassess, as often as monthly, whether the

current number of employees and their wages fit exactly what is necessary for the brewery to operate. Extraneous positions should be eliminated if necessary while additional labor should be hired if the current labor cannot handle the workload.

Fixed Costs
Once variable costs have been accounted for, an average of 62% of sales dollars, roughly $550,000, remains to cover fixed expenses. Fixed expenses are overhead costs that do not directly vary with production or sales. For the purposes of this study, the five main fixed expense categories are as follows:

1) General Administrative: General and administrative expenses make up the largest percentage of fixed costs, representing an average of about 23% of sales combined.

- **Salaried Labor:** Salaried labor is categorized as an administrative expense and is the largest single fixed cost, representing about 16% of sales. This category is comprised of the annual salary of the four positions discussed previously.

- **Fringe and Overhead:** Employee overhead is estimated to be 30% of salaried labor. This expense accounts for just under 5% of sales.

- **Telecommunications:** $3,000 a year has been set aside for telecommunications expense. This amount includes telephone service utilized by facilities as well as management for the purpose of communication with owners, other managers, as well as clients.

- **Office Supplies:** $1,800 has been set aside for office supplies utilized by management, administrative staff, and tasting room associates.

- **Legal and Accounting Fees:** An expense of $10,000 is estimated per year for professional fees. These will include legal counsel as well as accounting professionals.

- **Business Insurance:** The financial model includes an annual insurance expense of $18,000. This cost is meant to encompass items such as workman's compensation, general liability, property insurance, food safety regulations, and a general umbrella policy. The actual expenses incurred by the facility may vary depending on such items as employee liability, and dependent on employee position, but the cost included in the model falls in line with the charges incurred by similar ventures.

2) Equipment: The second largest category of fixed expenses is equipment expenses, representing 3% of sales dollars. There are three subcategories within this section: equipment loan interest payments; repairs and maintenance of equipment; and tools, dies, and fixtures. Cost-effective strategies include leasing rather than buying, and cutting costs where applicable without effecting safety or production standards.

- **Equipment Loan Interest Payments:** These payments are expected to total about ($5,000) per year and, equal to just under 1% of sales.

- **Repair and Maintenance:** The expense for repairs and maintenance is anticipated to be just under ($5,000) for the year.

- **Tools, Dies, Fixtures:** The cost of these tools and fixtures is just over ($4,000) for the year, remaining steady over the life of the plan.

3) Marketing: The next largest fixed cost is marketing, at 3% of sales. The brewery will primarily rely on the marketing manager position to adequately ensure the surrounding area is well aware of the brewery and its standard of high quality beer products. Advertisements through multiple avenues will be utilized, such as signage, website design and maintenance, and other print materials. Total cost for this expense for year one is ($24,000.) This cost remains 3% of sales in years two and three.

4) Facilities: Representing just over 1% of sales, this cost will cover any necessary expenses associated with keeping the production facility and the tasting room up and running. Subcategories of the facilities expense include facility loan interest payments, propane and utilities for the tasting room, pest control, and computer service.

For the purpose of this study, the equipment is depreciated using the straight-line method. This equipment was valued at approximately $100,000, and the annual depreciation figure totals ($8,600). The equipment is assumed to have a 10% salvage value and a 15 year life. A variety of equipment will be necessary for the facility to run. However, because it is assumed this facility already exists and has been in operation for some time, minimal equipment amounts will be needed as compared to a facility in the start-up operations phase. Examples of the equipment categories and their cost are as follows:

Table 9: Sample Brewery Equipment Expenses

Brewery Equipment	Total
Processing and Facility Equipment	$ 68,500
General/Material Handling Equipment	$ 9,300
Tasting Room Equipment	$ 19,000
Total Equipment Purchase	**$96,800**

Processing and Facility Equipment: The processing and facility equipment represents the largest portion of equipment costs. Equipment within this category includes malting machinery, tanks and storage, testing equipment, and other miscellaneous items necessary for the malting and storage process of the brewery's products. Expected cost for these items is ($68,000). Some smaller updates will be necessary for the tasting room to accommodate newer products and events. The equipment necessary for these updates is estimated to cost ($19,000).

The malting venture will be financed using both owner equity as well as loans. It is assumed the equipment will be purchased utilizing 30% owner equity and 70% debt. The terms of the loan are 15 years at 5% interest. The monthly payment on this equipment will be approximately ($550).

It should be noted that the payments, lengths, and interest rates will vary based on how the venture chooses to finance each cost. The terms and interest rates applied to this model are based upon industry averages. Depending on the economic conditions of the country, actual interest rates may be higher or lower at inception of this brewery's venture.

Equity: Initial equity of $50,000 will be required at the beginning of this study to purchase the necessary equipment and provide the necessary facility updates to the tasting room. Management will research multiple ways to provide these funds including grants, investors, and other methods. This equity has been included in the financial model.

5) Salaried Labor: The brewery will employ four salaried labor positions: Head Brewer, Assistant Brewer, Tasting Room Manager, and Marketing Manager.

- **Head Brewer:** One individual is considered for this role for all years of the model, at a salary of $40,000 in year one. This position will be responsible for all production activities, with assistance from the assistant brewer, general labor, and maintenance employees. The head brewer will also work closely with other members of management to ensure accurate pricing, production information, and successful operation of the brewery and tasting room.

- **Assistant Brewer:** The brewery will employ an assistant brewer during the life of the plan. This individual will be responsible for assisting the head brewer with all activities related to brewing. This position will be salaried and will be paid $20,000 in year one.

- **Tasting Room Manager:** The tasting room manager will oversee all facets of the tasting room from employee management, product sales, maintaining inventories, event planning, and financial performance. This individual will also work closely with other members of management to ensure successful operation of the brewery. This position will be paid $35,000 in year one.

- **Marketing Manager:** A full-time marketing manager will be employed by the brewery during each of the three years of the study. Responsibilities will include advertisements, wholesale client interaction, and branding. Pay for year one will be $35,000.

6) Unforeseen and Contingency: Unforeseen costs and contingency expenses are reported separately from total fixed costs, and are calculated as 5% and 3% of sales respectively, covering any unexpected costs that may arise or payment defaults from customers. These two categories are calculated at a minimal level. Actual rates may vary as the operation grows.

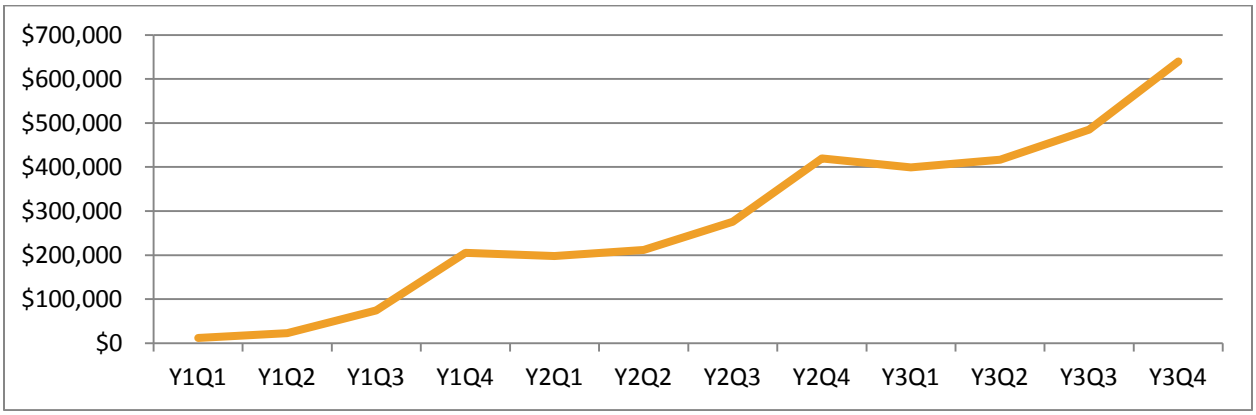
Cash Flow

The amount of cash on hand is a critical factor for this project's success. In order to not dip below zero cash on hand, a cash infusion of ($50,000) will be required at the beginning of the financial model. This supplement will be used to help alleviate cash flow issues in year one of the model. Cash on hand in the first half of year one is small due to the purchase of equipment, updates to the building and tasting room, and other investitures. The cash infusion can originate from a variety of sources, such as grants, owner equity, or other investors. For the purposes of this model, owner equity is used as the cash infusion. This equity is necessary for the venture to not fall into negative cash on hand throughout the project, and provides an adequate reserve for quick response to financial windfalls, unexpected expenses.

Cash on-hand increases consistently throughout the project, reaching $200,000 at the end of year one and rising to $425,000 by the end of year three. The lowest point of cash on hand occurs at the very beginning of the project, with about $12,000 on hand in year one quarter one.

Seasonality of sales has an effect on cash on hand throughout the project. Since sales are lower in the first half of each year, cash on hand stagnates or decreases as expenses are still incurred but only 30% of yearly sales are conducted.

Figure 11: Cash on Hand



Pro Forma Operating Statements

The *Pro Forma* operating statements as presented below and in the Appendix show the annual income statement of the operations over the three years of operation included in the model. The brewery will experience net gains in all three years of the model. Net income in year one of the model will be just over $185,000, increasing to $210,000 in year two and reaching just under $230,000 by year three.

Table 10: *Pro Forma* Operating Statement

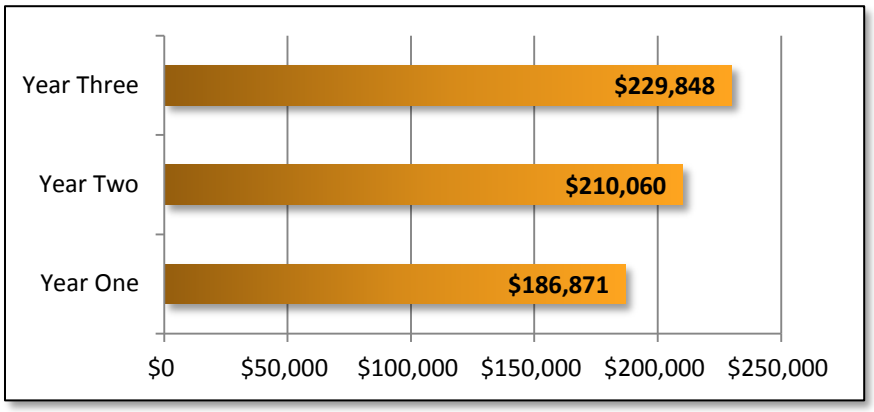
	Y1	Y2	Y3
Revenues (Sales)	$798,434	$897,510	$978,176
Total Variable Operating Costs	($291,227)	($341,832)	($383,863)
Total Variable Marketing Costs	$0	$0	$0
Variable Margin (Loss)	$507,207	$555,678	$594,314
Total Equipment Costs	($14,147)	($14,206)	($14,264)
Total Facilities Costs	($8,750)	($13,439)	($14,181)
Total Selling and Marketing Costs	($23,953)	($27,733)	($30,226)
General and Administrative Expenses	($195,300)	($203,425)	($211,956)
Unforeseen and Contingency Expenses	($63,875)	($71,801)	($78,254)
Brewery Earnings EBITDA (Loss)	$201,182	$225,074	$245,433
Interest Expense	($5,656)	($6,357)	($6,929)
Depreciation Expense	($8,656)	($8,656)	($8,656)
Net Brewery Venture Income (Loss)	$186,871	$210,060	$229,848

Annual sales in year one of the model are about $800,000. Once all variable costs have been accounted for, the model reports a variable margin of $500,000. Operational income, also known as EBITDA, is defined as earnings or losses before interest, taxes, depreciation, and amortization. EBITDA in year one of the project is about $200,000. Once the two non-cash expenses of interest and depreciation are subtracted from the EBITDA figure, the net income of year one of the brewery project is about $186,000; profit margin for that year is about 23%.

Sales in year two grow by nearly $100,000, reaching about $900,000 for the year. Variable margin grows by about $50,000 to $555,000. EBITDA for year two is about $225,000. After non-cash expenses have been subtracted, year two net income is about $210,000, resulting in a profit margin of about 23%.

The third year of the model shows sales of nearly one million dollars, at just under $980,000. The variable margin for year three is about $600,000. EBITDA and net income in year three are $245,000 and $230,000, respectively. Profit margin for year three increases slightly compared to years one and two, reaching just under 24%.

Figure 12: Yearly Net Income



As shown in the above chart, net income steadily increases throughout the project. The net income obtained by the brewery project should be considered a reinvestment opportunity. This income allows for multiple growth opportunities as time progresses, whether through increases in production, investments into more efficient equipment, further updates to the tasting room, or additional skilled labor.

Balance Sheet

The balance sheet is a snapshot at a point in time, in this case the end of year three, of a company's financial position. It is a measure of a business' assets, liabilities, and owner's equity. It is essentially a measure of what is owned, and what is owed and is typically shown to potential investors/creditors to help them make a sound decision about investing in the company. The balance sheet increases steadily over the three year period of the model, as shown in the following table. Cash and cash equivalents rise steadily throughout all three years, with about $205,000 in year one, rising to $640,000 by the end of year three. Accounts receivable grows incrementally, with about $66,000 in year one, rising to $81,000 by year three. Total assets more than double from year one to year three, from $363,000 to more than $800,000. Retained earnings coincide with the net income (loss) of the brewing operation.

Table 11: Balance Sheet

	Y1	Y2	Y3
Assets			
Cash and Equivalents	$205,212	$419,767	$639,964
Accounts Receivables	$66,536	$74,793	$81,515
Inventories	$0	$0	$0
Total Current Assets	$271,749	$494,560	$721,478
Buildings and Equipment, Net of Depreciation	$91,227	$85,404	$79,581
Other Assets, Net of Amortization	$0	$0	$0
Total Assets	$362,976	$579,964	$801,059
Liabilities and Members' Equity			
Current Liabilities			
Accounts Payable and Accrued Expenses			
Accrued Interest	($5,656)	($6,357)	($6,929)
Current Maturities of Long-Term Debt	($5,147)	($4,936)	($4,716)
Total Current Liabilities	($10,802)	($11,294)	($11,644)
Long-term Debt			
Senior Debt	$54,366	$50,539	$46,521
Less Current Maturities of Long-Term Debt	($5,147)	($4,936)	($4,716)
Members' Equity			
Member Equity and Equity Equivalents	$137,689	$335,595	$541,051
Dispersed Member Equity	$0	$0	$0
Retained Earnings (Losses)	$186,871	$210,060	$229,848
Total Liabilities and Current Members' Equity	$362,976	$579,964	$801,059

SCENARIO ANALYSIS

The financial data presented above is considered to be the "baseline" model, which is used as a stable projection and analysis of the brewery business under the assumed conditions. Actual operations may vary due to real world circumstances. To view the potential effects that changes would have on the business, the consultants have provided a number of different scenarios in comparison to this baseline model.

All variations of labor costs, product pricing, etc. are compared to the baseline model to show how one change in the model's input affects output. For example, one scenario examines the effect of increasing or decreasing labor costs and how certain parameters within the business' financial structure change. This allows ownership and the consultants to examine how stable the initial assumptions in the baseline model may be.

Comparisons have been completed for the four scenarios detailed below. These scenarios provide a robust and detailed view of potential outcomes for this brewing operation.

- **Variation in Product Pricing:** Prices in the baseline model are assumed to be on the higher-end of brewing. This scenario examines price decreases and increases and their effect on the business' operating income.
- **Variation in Beer Production Quantities:** Production quantities over the three year period are increased by 750 barrels (250 yearly) and decreased by 750 barrels (250 yearly).
- **Variations in Labor Costs:** Labor costs are increased and decreased up to 25% from the baseline labor costs.
- **Variations in Wholesale and Retail Sales Distribution:** The baseline model assumes that by the end of year three wholesale/retail sales distribution will be 35% wholesale/65% retail. The scenarios examine what effects would occur were this distribution to be 50% wholesale/50% retail and 65% wholesale/35% retail.
- **Variations in Hops and Barley Prices:** The cost of input ingredients (hops and barley) are increased/decreased up to 90% from the baseline cost assumptions.

What is EBITDA?

The scenarios presented all examine the effect that changes in input data have on the EBITDA (also known as operating income) of the model. EBITDA stands for Earnings before Interest, Taxes, Depreciation, and Amortization. EBITDA is a measure of how much income is produced by operations before taking into consider non-cash expenses such as depreciation and taxes. It gives a clear picture of where the business is financially and how successful they are in translating sales dollars into income. Considering effects on EBITDA is a good measure of what changes occur within this business' financial structure as EBITDA reflects day-to-day operational efficiency.

What is Cash on Hand?

In addition to EBITDA, cash on hand is also examined for each scenario. Cash on hand is the total amount of cash available at the end of a month or quarter. Should cash on hand ever dip below zero, the business will have insufficient funds to maintain operations, resulting in the business' failure. These observations will show ownership where additional equity (outside investors, grants, owner's equity, loans, etc.) may be required to sustain operations and allow

them to plan accordingly. This figure will also show how much cash is available for growth and reinvestment into the business.

Scenario: Variation in Product Pricing

Price points in the baseline model are based on industry research and comparisons. Given prices fall in line with those of high-end competitors, and though the consultants consider these prices appropriate and attainable for the operation and believe they allow for accurate profitability projections, market factors could result in a need to lower prices to remain competitive.

The following scenario presents the potential effects such increases or decreases would have on overall profitability. The following table presents a comparison of operating income results based on beer price increases and decreases relative to the baseline price model.

Table 12: Beer Product Pricing Chart

	Wholesale			Retail		
	25% Price Decrease	Baseline	25% Price Increase	25% Price Decrease	Baseline	25% Price Increase
On-Tap (Flights)	N/A	N/A	N/A	$2.00	$2.50	$3.00
Barrels	$225.00	$300.00	$375.00	$600.00	$650.00	$700.00
Bottles (12 oz)	$0.75	$1.00	$1.25	$1.50	$2.00	$2.50

The chart above highlights the different prices used throughout the creation of this scenario and its subsequent variations. On average, prices were increased and decreased by 25%. Flights, which are used solely for the purpose of tastings on-site do not have a wholesale price. These are sold directly to consumers who visit the on-site store and want to try one of the beers prior to purchasing bottles.

Table 13: Variation in Beer Prices

Pricing Scenario Operating Income			
	Year 1	Year 2	Year 3
25% Decrease in Prices	$21,447	($30,804)	($27,044)
Baseline	**$201,182**	**$225,074**	**$245,433**
5% Increase in Prices	$236,564	$264,797	$288,726
10% Increase in Prices	$271,945	$304,520	$332,019
25% Increase in Prices	$413,469	$463,411	$505,191

Pricing Decreases: Product pricing decreases result in total net losses for the three year period. With a (25%) reduction in prices, year one would show a very slight positive operating income of about $21,000. Year one of this variation is positive only through the benefit of the cash infusion that has been previously discussed. As production increases, the differences in price and their ensuing effect on operating income become more pronounced. Years two and three show net losses with ($31,000) and ($27,000), respectively. Total losses for this variation are ($36,000) compared to gains of $672,000 of the baseline model. To reach positive operating

incomes at this price level, management would need to find other means of increasing revenue through increases in production, reduction of expenses, or avoiding lowering prices (if possible).

Pricing Increases: A 5% price increase may be a realistic option for this operation. This 5% increase results in about $120,000 more in operating income over the three year period when compared to the baseline model of $670,000. Total operating incomes for this 5% price increase variation are $790,000. This pricing structure would keep the brewery's prices well within an affordable category for most consumers in a way that a 25% increase in prices may not. The brewery may also need to keep in mind what prices are possible for their particular location. If they face stiff competition in their local market, increasing prices may result in higher sales per unit, but decreased sales overall as consumers will gravitate towards the brewery with more affordable prices.

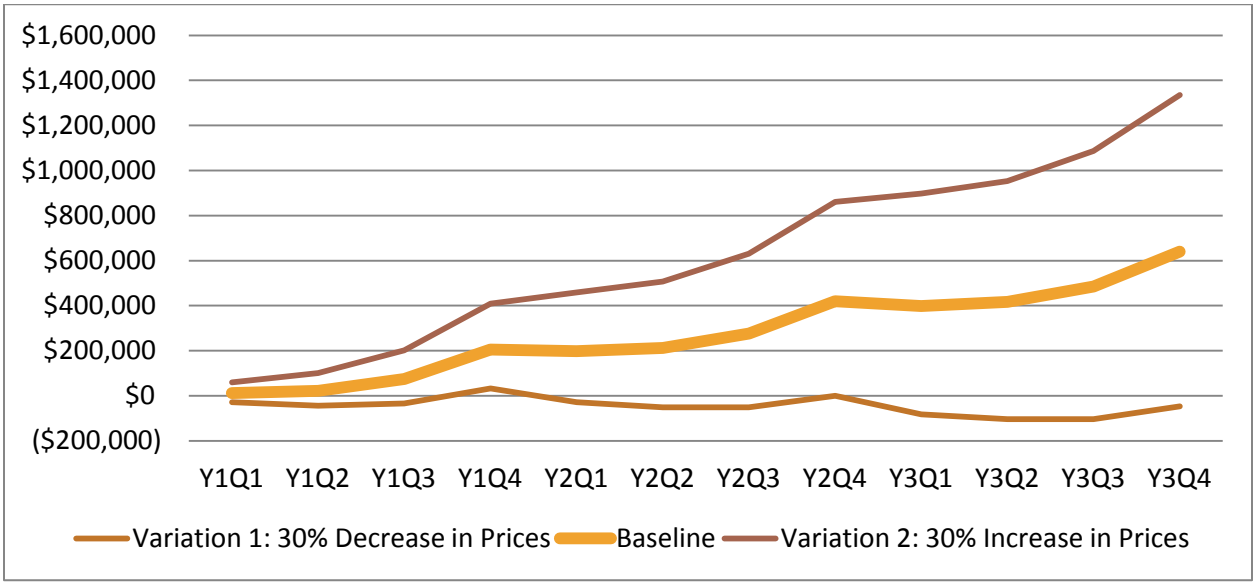
A 10% price increase ensures even greater operating incomes across all three years. Total operating income for this price increase is about $910,000, more than $235,000 higher than the baseline model. This pricing structure would put the brewery's prices into the above average price category. Beyond the scope of this study, this may result in some consumers being turned off from purchasing the brewery's products due to monetary concerns. However, should the brewery be able to attain these prices, it would allow for significant amounts of profit for the operation.

With a 25% increase in prices, operating incomes are greatly increased, however, this price increase may not be attainable. The brewery's prices are already average to slightly above average and a 25% increase would result in prices that are beyond what consumers may be willing to pay. Operating incomes are more than $200,000 higher each year of the model at these price levels as compared to the baseline model. Total operating incomes for this variation are about $1.38 million. Should the brewing operation be able to obtain prices at these levels, growth and reinvestment should be the number one priority of ownership. Significant growth can be attained through increases in production, additional/updated facilities, or the addition of new employees.

Pricing Effects on Brewery: The above scenario is a reflection of how volatile the business' financial situation is regarding price changes. A 25% decrease in prices results in negative operating incomes, while a 25% increase in prices shows more than $1.38 million in operating income. While this operating income is remarkably high, the prices that the products would need to sell for puts them well above what the market will bear. The current prices for the brewery's products in the baseline model are considered average to slightly above average. With a 25% increase, it's unlikely the brewery would be able to sell their products except to a very select high-income clientele. Most consumers would be unwilling to pay these prices. Out of all four scenarios examined here, price changes are the most varied.

Pricing variations will also affect cash on hand over the first three years. The following figure depicts cash on hand for the first three years under each variation for this scenario.

Figure 13: Beer Prices Scenario Cash on Hand Years 1-3

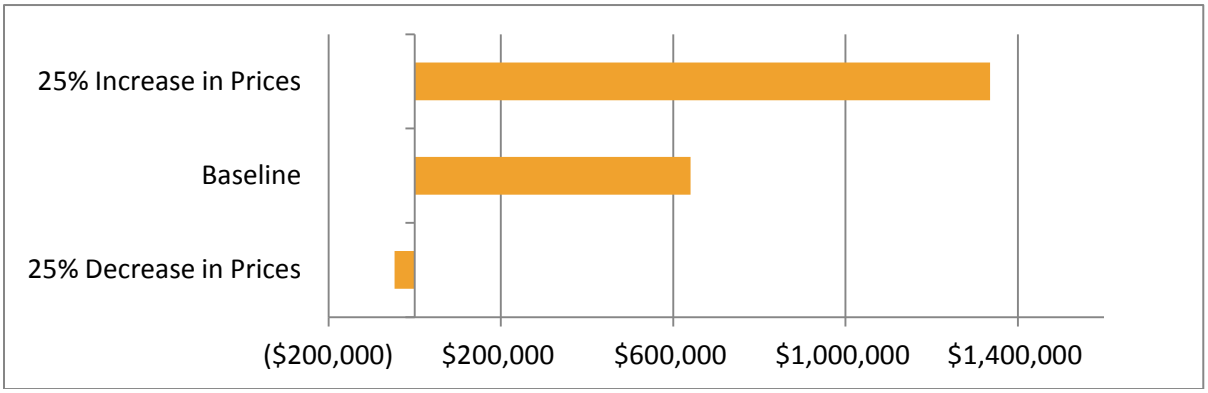


Cash on hand fluctuates greatly in each variation but follows a general pattern of falling in the first half of the year and increasing in the second half of the year. This cash dips in the beginning of each year as only 25% of sales are conducted in this time while expenses are still incurred. As the bulk of product is sold, particularly in quarter four, cash on hand rises. Similarly to the operating income analysis, the differential between variations' cash on hand is the largest among all four scenarios.

Cash on hand remains below zero for 10 out of 12 quarters in the 25% price decrease scenario. The two positive quarters within this variation are year one quarter four and year two quarter four. All remaining quarters range from ($27,000, year two quarter one) to ($104,000, year three quarter two). With a 25% decrease in prices, the brewing operation would need additional funding to sustain operations. The amount required to keep the operation running would be sizable (approximately $538,000).

With a 25% increase in prices, cash on hand quickly trends upwards and continues to increase throughout all twelve quarters. Beginning with $60,000 in year one quarter one and ending with more than $1.33 million, cash on hand in this variation shows the greatest growth amongst all four scenarios and their subsequent variations. At this price level, management should seriously consider significant growth opportunities as their available cash would allow for more employees, higher quality products, and increased production/sales.

Figure 14: Beer Prices Scenario Cash on Hand End of Year Three



As shown in the above chart, the difference in cash on hand available at the end of year three for each of the three models is significant. With a 25% increase in prices, cash on hand at the end of year three would be more than $1.3 million as compared to the baseline model with about $640,000. With a 25% decrease in prices, the brewery would be unable to continue to operate. With no cash available, bills would not be able to be paid, expense obligations would not be met, etc. A 25% decrease in prices with no change in production totals or reduction of other expenses would mean the business would need to close its doors.

Scenario: Variation in Beer Production Quantities

Production levels assumed for the baseline model represent a medium-sized brewing operation in Virginia. At these levels, personnel should be able to operate the brewery efficiently; changes in production quantities may affect labor in a number of ways, including a need for more production personnel, additional management, or other factors. For the purposes of this scenario, only production number changes are examined and not their ensuing effects on labor needs.

Table 14: Variation in Production Quantities Operating Income

Production Scenario Operating Income			
	Year 1	Year 2	Year 3
Production Decrease 45% (Breakeven point)	($34,219)	($1,063)	$37,222
Production Decrease 15%	$134,872	$161,373	$186,782
Baseline	**$201,182**	**$225,074**	**$245,433**
Production Increase 15%	$284,070	$304,699	$318,746

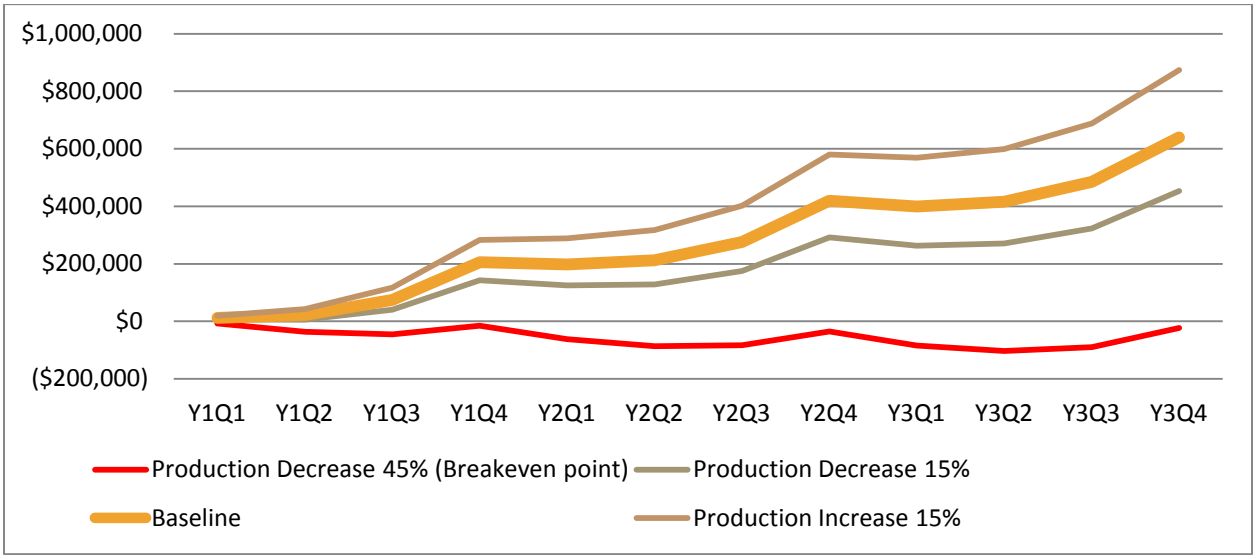
Breakeven Point: A breakeven point for operating income was ascertained within this scenario. As shown above, a decrease in production of 45% from the baseline model would be the lowest point production could go before operating income issues would arise. Losses would occur in years one and two, with ($34,000) and ($1,000), respectively. Year three of this variation shows a net gain of about $37,000. Total net gains for this variation would be about $1,900. On a purely operating income basis, the business would have sufficient income to continue operations. Cash flow issues, however, may arise at this production level and are analyzed below.

Production Decrease: A 15% decrease in production results in decreased operating incomes across all three years of the study. At no point in the 15% production decrease scenario will the business be in financial distress. Should, for whatever reason, production need to decrease (shortage of inputs, lack of sales, etc.) the business would still be in financially viable territory. Production would need to be decreased an additional 30% or more before financial issues would begin to arise. Total operating income with a 15% decrease in production would be about $483,000 as opposed to nearly $672,000 in the baseline model. This decrease is about $189,000. The 15% decrease in production still results in positive operating incomes across all three years, just in smaller quantities than the baseline model. Operations would continue to be viable and profitable at this production level. Income would continue to be available for reinvestment opportunities and growth of the brewery.

Production Increase: A 15% increase in production results in increased operating incomes throughout the model, totaling about $908,000, an increase of $236,000 over the baseline model. Income at this level would allow for significant reinvestment and growth. At this level, income should be used by management for some form of growth or business improvement. Some cash should be held back as a reserve for any financial misfortune, unexpected expenses, or bad debt of sales with the rest going to further growing the business. This increase in production will have an effect on the other aspects of the business such as required labor, an increase in the required inputs, additional storage, etc.

Additionally, changes in production quantities have effects on the cash on hand of the brewery. The figure below details cash on hand for both variation models and the baseline model for all three years of operation.

Figure 15: Production Quantities Scenario Cash on Hand Years 1-3



Cash on Hand Analysis: Cash on hand for all three years of the production quantity scenario are presented above. Cash on hand follows a similar path for three of the four variations, excluding the breakeven variation. Cash on hand for the 45% decrease variation stays below zero throughout all twelve quarters examined here, with a low point in year three quarter two of ($103,000) and a high point of ($7,600) in year one quarter one. At this production level, a cash infusion would be necessary to alleviate cash flow issues of the brewing operation. The business

would be unable to operate with a 45% decrease in production. Increases in prices, reduction of expenses, or cash from owner's equity/loans would be necessary for the business to continue.

Due to sales in year one being similar in all three other variations, cash on hand for the first half of the year does not have a wide differential. This difference becomes more pronounced as the bulk of sales are conducted in the latter half of the year and the production changes begin to take effect. Cash on hand at the end of year one already has a differential of nearly $300,000 between the production decrease and the production increase variations. This difference rises to more than $896,000 by the end of year three. Cash on hand in the 15% decrease, baseline, and 15% increase variations follows a similar path, decreasing in the first half of the year and increasing in the latter half as sales increase. At the end of year three, the production decrease 45% variation shows cash on hand of ($23,000) while the production increase scenario shows cash on hand of $873,000.

Scenario: Variations in Labor Costs

Labor costs are a significant expense faced by the brewery throughout all three years of the plan. Managers, part-time production help, tasting room staff, and administrative staff are employed throughout the model. Salaried labor and variable labor are included in this cost. While labor costs are significant, they decrease in terms of percentage of sales as the plan goes on due to more efficient labor and an increase in sales numbers. An examination of the effects of increasing and decreasing labor costs is presented below.

Increases and decreases to salaried and variable labor can be completed by businesses through a variety of means including:

- Increases in wages
- Decreases in wages,
- Increases in employee hours
- Decreases in employee hours
- Hiring additional employees
- Minimizing the company's workforce

For the purposes of this scenario and model, increases/decreases in wages are the method used to vary and observe labor costs effects.

Effects of Labor Changes on Production Output: It is important to note that changes in wages can and will likely affect the output of the business. The consultants have attempted to quantify this effect in terms of dollar value. The baseline model has labor costs across all three years totaling about ($575,000) and sales of about $2.7 million. It is assumed based off of these figures that for every dollar invested into labor, the business receives $4.63 in sales ($2,674,121 sales /$575,000 labor). Though each business is different, the consultants believe this to be a tangible measure of how important and significant labor costs are on operations. This scenario will examine what happens to the financial status of the operation should labor costs be increased by 10% and 25% as well as decreased by 10% and 25% and its ensuing effect on sales and operating income.

For example, management cannot expect the same level of commitment and motivation from a tasting room associate receives $9.00 an hour vs. an associate paid $11.25 per hour. Production, sales, marketing, etc. will all be effected by changing wages.

A company that pays higher wages is likely to retain higher skilled employees longer, thus facing less employee turnover. This would result in less capital invested into training and a lower learning curve for new employees as they are likely to be taught by long-term employees with practical experience. The business will also save money on staff searches/interview time as they will not need to conduct them nearly as often as a business that faces high employee turnover.

The location of the brewery can impact the salary and hourly pay levels the brewery is able to offer. A variety of factors including: education level, population, rural vs. urban areas, and cost of living will all play a role in the wages the business can pay. Locations with higher levels of education (college and up) are likely to see higher wages than locations with less educated populations.

Population of the location in question will also play a role in the quality of labor available. A brewery located in a small town or rural area will not have access to as big a labor pool as a more urban location like a city. The trade off for these lower population locations is the ability to pay less.

Typically, more rural areas have a lower cost of living than urban areas, thus allowing for lower wages. Take for example, what $35,000 in income will attain in Martinsville, Virginia vs. Leesville, Virginia. Assuming for simplicity sake that it costs $35,000 for all of a business's expenses in Martinsville, relocating to Leesville, where the cost of living is $33,000, frees up about $2,000 in income per year for personal use.

In essence, there are significant contributing factors that play into what wages the brewery should pay its employees and all of these factors should be considered prior to hiring. Location, demographics, qualifications, and more all effect what wages are necessary.

Table 15: Labor Changes and Sales Effects

	Sales	Labor Cost	Operating Income
25% Labor Decrease	$2,007,100	$432,194	$177,342
10% Labor Decrease	$2,407,312	$518,633	$473,950
Baseline	**$2,674,121**	**$576,259**	**$671,689**
10% Labor Increase	$2,940,924	$633,884	$893,592
25% Labor Increase	$3,341,137	$720,323	$1,166,031

25% Labor Decrease: As shown in the chart above, variations in labor costs have profound effects on both the operating income and the sales of the business across the three year period. Any change in one dollar spent on labor will see its effects magnified by $4.63 change in sales. The 25% labor decrease variation will see labor costs fall by $144,000 to about $430,000; however operating income and sales fall by significant amounts as well to $177,000 and $2.0 million, respectively. On a dollar basis, operating income falls by almost $500,000 and sales fall by more than $677,000. At this level of labor costs, operating income, while remaining positive, would not be recommended for the operation comparatively to the baseline model. Simply put, the reduction in labor costs would not be worth the drop off in sales and operating income.

10% Labor Decrease: The 10% labor decrease variation sees operating income and sales lowered, but not nearly as severely as the 25% labor decrease variation. Labor costs falls by nearly $58,000 with operating income and sales falling nearly $200,000 and $267,000, respectively. Total labor costs for this variation are about $518,000. Operating income of nearly $475,000 and sales of more than $2.4 million will be attained during this three year period. This three year period with decreased labor costs would provide sufficient income for operations, while still allowing for some measure of growth and reinvestment into the business. This variation provides an adequate and stable financial position and meets the business' goals.

10% Labor Increase: A 10% increase in labor costs results in much higher operating income and sales. Labor costs in this variation will rise by about $58,000 to more than $634,000 for the three year period. Operating income would rise by nearly $222,000 to $894,000 while sales would rise by nearly $267,000. Total sales for the three year period with a 10% labor increase would be $2.9 million. An investment into higher paid labor will result in sales growth. It is recommended that the business, if deemed acceptable by ownership, pay their employees approximately 10% higher wages than the baseline model. The increase in sales is worth more than the increase of the cost of wages.

25% Labor Increase: A 25% increase in labor costs results in significant increases to both sales and operating income as compared to the baseline model. This investment in higher quality labor and wages results in operating income of more than $1.1 million for the three year period. This is a nearly half million dollar increase over the baseline model for an investment of only $144,000. Sales will also see a large increase, to more than $3.3 million. At this level of sales and labor, management would need to ensure that no facility or production constraints arise. Sourcing inputs, facility size, storage options, etc. may all present problems at this level of sales. Additional labor may also be needed at this level to combat rising production and sales time.

The amount of dollars management is willing to invest into labor has a large effect on the sales and income of the operation. As shown above, every dollar of labor is equivalent to $4.63 in sales. Thus, all labor decisions should be discussed and not be taken lightly. If management is willing to pay higher wages, especially higher than that of competitors, it will likely result in an improvement on the operation's financial position. This position can be used as a springboard into better facilities, increased production, new products, etc.

Changes to Salaried and Variable Labor: Individual changes to salaried labor only and variable labor only were also conducted to further highlight how changing labor costs affect the sales of the brewery. The same methodology for sales increases and decreases is used. A dollar change in labor is expected to change sales by $4.63. The chart below highlights the changes in salaried labor costs, sales, and operating income.

Table 16: Salaried Labor Changes and Sales Effects

	Salaried Labor Cost	Operating Income	Sales
25% Salaried Labor Decrease	$197,110	$495,553	$2,369,915
10% Salaried Labor Decrease	$236,532	$601,235	$2,552,438
Baseline	**$262,813**	**$671,689**	**$2,674,121**
10% Salaried Labor Increase	$289,094	$742,143	$2,795,803
25% Salaried Labor Increase	$328,516	$847,825	$2,978,327

Salaried Labor Decrease: Similarly to the changes in total labor costs, increasing and decreasing salaried labor results in changes to sales and operating income. A 25% decrease in salaried labor saves the business $65,000 in labor costs but results in decreased sales of nearly $305,000, falling to about $2.37 million. While operating income would still total nearly a half million dollars, it is significantly decreased from the baseline model and is not a recommended level, if possible. A 10% decrease in labor costs sees less dramatic changes. The brewery would save about $26,000 in labor costs and sales would only drop about $120,000. Should the brewery pay salaried labor at this level, sales and operating income would still be within acceptable distance from the baseline model.

Salaried Labor Increase: Salaried labor increases result in increased sales and operating income. A 10% increase in these costs sees sales rise more than $120,000 to nearly $2.8 million for the three year period, operating income rise by about $70,000 to $740,000, and salaried labor costs increase only $26,000 to just under $290,000. It is likely that at this level of sales and costs there would be no facility/production constraints. Ownership should strive for this financial position, if possible.

A 25% increase of salaried labor costs sees these numbers grow even further. Total sales for the three year period grow by more than $300,000, reaching just under $3.0 million. Operating income grows as well by about $175,000, reaching just under $850,000. Salaried labor costs only grow to about $325,000. At this level of sales, ownership would need to carefully ensure no facility/production constraints exist. These constraints could include the need for additional equipment, storage space, or new sources of input ingredients. Should no such constraints exist, this level of sales should be a goal of management.

Table 17: Variable Labor Changes and Sales Effects

	Variable Labor Cost	Operating Income	Sales
25% Variable Labor Decrease	$137,187	$504,568	$2,462,395
10% Variable Labor Decrease	$164,624	$604,840	$2,589,431
Baseline	**$182,916**	**$671,689**	**$2,674,121**
10% Variable Labor Increase	$201,208	$738,537	$2,758,811
25% Variable Labor Increase	$228,645	$838,810	$2,885,846

Due to the lower total cost of variable labor for the brewery, overall effects of changing costs on sales and operating income are less significant than the salaried labor changes.

Variable Labor Decrease: A 25% decrease in variable labor (total cost savings of $45,000), results in reduced sales of about $210,000. Total sales for the three year period fall from $2.67 million to $2.46 million. Operating income also falls by about $167,000 to just over $500,000. The effects of changing variable labor are less pronounced than that of salaried labor. The 25% decrease in variable labor is still within acceptable ranges of the baseline model, however, management should strive to increase labor costs rather than cut labor costs.

The 10% decrease in variable labor again shows decreases in sales and operating income. Sales fall only slightly, about $85,000, to $2.5 million for the three year period. Operating income decreases as well by about $66,000. Total operating income for this model is just over $600,000 as compared to $670,000 in the baseline.

Variable Labor Increases: A 10% increase in variable labor costs sees sales and operating income both rise but the changes are not as drastic as that of salaried labor, or overall labor. Labor costs with a 10% increase rise by about $18,000, totaling $201,000 for the three year period. Sales and operating income also increase by $85,000 and $66,000, respectively. Total sales for this model with a 10% increase in variable labor are about $2.75 million.

A 25% increase in variable costs results in much larger changes to operating income and sales. Variable costs increase by about $46,000 and will total just under $230,000 for the three year period. Within this model, sales will increase by about $210,000, totaling nearly $2.9 million. Operating income also rises significantly by about $167,000. Total operating income in this model will be just under $840,000.

While it is assumed that an increase in wages results in a better financial position for the business, at a certain point other constraints come into play such as production constraints. For example, paying your general laborer an additional $1.00 per hour will not make your beer brew any faster than it was when the laborer was making $1.00 per hour less. An additional marketing employee may not increase sales if you've reached your maximum saturation of the local market. Ownership should strive to hire quality labor and pay them more than competitive wages while making sure they also do not *overpay*. These intangibles should be evaluated and discussed among management.

Scenario: Variation in Wholesale and Retail Sales

The following scenario highlights the possible range of operating incomes should the brewery change their wholesale/retail sales distribution. The baseline model assumptions state that by the end of year three, the wholesale/retail distribution of sales will be 65% retail and 35% wholesale. Year one of the baseline model has 100% retail sales and wholesale accounts are brought in during years two and three.

During the creation of the model, it was discovered that moving to too many wholesale accounts too quickly resulted in negative or lowered operating incomes and cash on hand for the business. If the business intends to sell wholesale, ownership's goal should be to gradually move towards increased wholesale accounts over time rather than any early and abrupt sales distribution changes.

This scenario will examine operating incomes, sales, and cash on hand should this distribution change to 100% retail, 50% wholesale/50% retail, 65% wholesale/35% retail, and 100% wholesale.

Table 18: Sales Levels for Wholesale vs. Retail Percentages

	Year 1	Year 2	Year 3
0% Wholesale 100% Retail	$798,434	$1,010,810	$1,216,870
Baseline 35% Wholesale 65% Retail	**$798,434**	**$897,510**	**$978,176**
50% Wholesale 50% Retail	$712,449	$812,536	$875,879
65% Wholesale 35% Retail	$647,960	$727,561	$773,582
100% Wholesale 0% Retail	$368,508	$444,312	$534,888

Volatility of Changing Percentages: The above chart highlights how volatile sales levels can be with changes to wholesale vs. retail percentages. In year one alone, changes in wholesale/retail percentage can result in sales as high as $800,000 (100% retail) and as low as $370,000 (0% retail), a difference of nearly $430,000. The baseline model and the 100% retail model have the same sales levels in year one. This is due to the baseline model gradually moving towards the addition of wholesale sales. These differences become more pronounced as the model moves forward. The 100% retail variation has sales of more than $1.2 million in year three while the 100% wholesale has sales of only $535,000, a difference of more than $680,000.

This scenario does not account for differences in labor resulting in distribution changes. There are a number of intangible items to account for when discussing wholesale vs. retail sales that are significantly more nuanced than the simplistic numbers analysis presented herein. For example, an increase in the number of wholesale accounts generally requires more production help/general labor/managerial staff while an increase in retail sales requires more sales employees, and significantly more marketing as the number of individual consumers needed increases.

Location: The business's location is also a factor for its ability to conduct wholesale vs. retail sales. Wholesale sales operations need to be in a central location to their clients to ensure punctual delivery/pickup of products as well as sufficient room in the target market. An operation that is established in a rural area with no potential nearby wholesale clients will struggle more than a similar operation located near a major city or tourist destination. The location of the operation also affects the labor available for hire. More urban areas will have higher population numbers and an increased chance of skilled labor while more rural areas may not have the same labor pool.

Major wholesale operations typically require an increased sales volume compared to retail operations as the prices they are able to receive for the same products are lower. However, wholesale accounts tend to be more stable than retail as a contract is usually required and the sale is conducted at the same time every month/quarter.

Table 19: Variation in Wholesale vs. Retail Sales

Wholesale vs. Retail Sales Scenario Operating Income			
	Year 1	Year 2	Year 3
0% Wholesale 100% Retail	$201,182	$324,686	$432,731
Baseline: 35% Wholesale 65% Retail	**$201,182**	**$225,074**	**$245,433**
50% Wholesale 50% Retail	$63,369	$151,571	$166,123
65% Wholesale 35% Retail	($33,262)	$78,069	$77,077
100% Wholesale 0% Retail	($359,883)	($170,942)	($124,473)

As expected, an increase in percentage of wholesale sales results in lower operating incomes across all three years of the study while an increase in retail percentage results in significantly increased income. Wholesale accounts, while being steadier than retail sales with the creation of contracts and agreements, results in significantly lowered prices. To offset the lowered prices of wholesale contracts, additional sales and production are required to maintain similar revenue numbers. While production numbers remain the same, the price received for those products is lower.

100% Retail: By lowering the percentage of wholesale sales to 0% and increasing retail sales to 100%, the business experiences increased operating income in years two and three of the study. Operating income remains the same in year one of this variation as the baseline model assumes 0% wholesale 100% retail in year one, moving to 35% wholesale 65% retail as time goes on. Year two of the 100% retail variation has increased operating income of nearly $100,000. This difference further increases in year three, with the 100% retail variation being nearly $190,000 higher than the baseline model. Increased retail sales directly result in increased operating incomes. While these numbers do increase, there are a number of factors to consider in a business that is 100% retail.

Additional employees would be needed, particularly in the tasting room and other selling locations to handle the added workload. Increased retail sales means more bottles will be need to be purchased, more storage space will be necessary, an increase in advertisements and other marketing efforts, and maybe even a second location in a different area to conduct sales. Furthermore, a significant increase in the number of customers would be necessary to maintain sales levels. While wholesale sales do result in lower prices, the nature of contracts and regular buying intervals from wholesale accounts are more stable than the oft-varied buying frequency of retail consumers. These factors should all be considered by management before a change to 100% retail may be analyzed.

50% Wholesale 50% Retail: With an even split of 50% wholesale 50% retail, operating incomes remain positive but are drastically lower throughout all three years. The largest difference between the baseline and this variation is in year one, with about the 50% split being about $140,000 less than the baseline model. The increase in production in years two and three slightly offset the loss of income from increasing wholesale percentage. Total operating incomes for this variation are about $380,000, a decrease of more than $290,000 from the baseline model. Nearly half of this income difference occurs in year one. The loss cause by an increase in wholesale percentages can be countered with an increase in production. Care should be taken,

however, to ensure incomes are kept high as possible and management should consider slowly increasing wholesale accounts, rather than the aggressive increase shown here.

65% Wholesale 35% Retail: Operating income falls further with a distribution of 65% wholesale and 35% retail, totaling only $122,000 over the three year period. This is nearly $550,000 less than the baseline model, a decrease of more than 450%. Year one shows losses of about ($33,000), while years two and three show gains of only $78,000 and $77,000, respectively. While total income is positive for this three year period, it is far lower than the other variation and the baseline model. Any further increase in wholesale accounts beyond 65% wholesale is not recommended as operating incomes would fall even further.

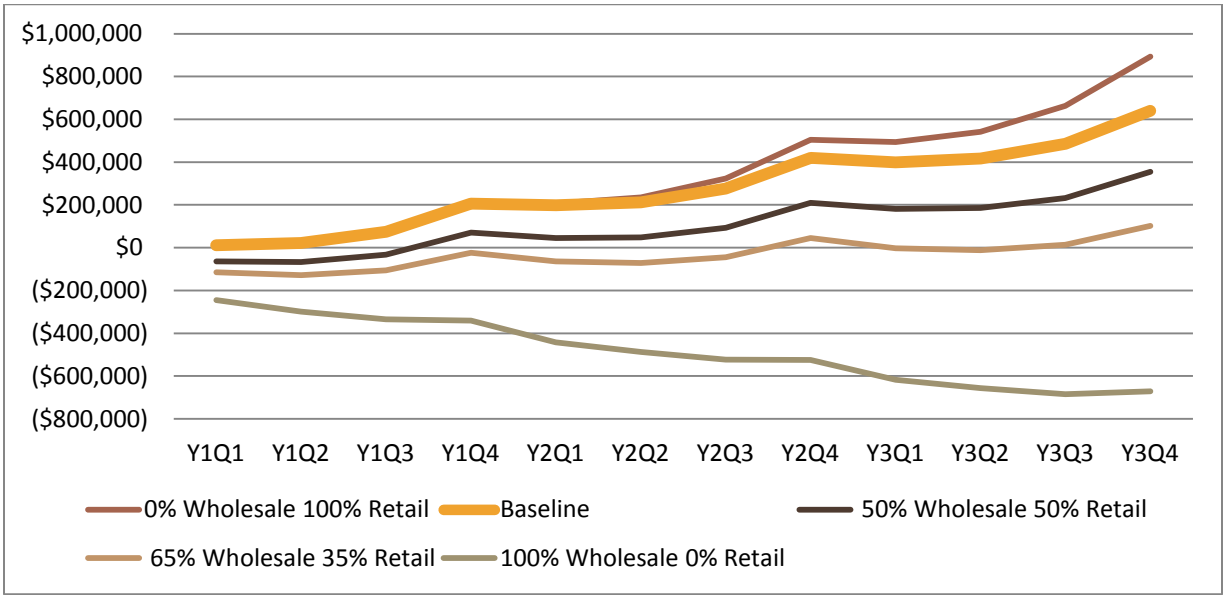
100% Wholesale: To illustrate the point that at current production levels, increased wholesale percentages would not be sustainable, a scenario variation with 100% wholesale sales was conducted. Operating losses in year one would be more than ($370,000). Total operating losses for the three year period would be more than ($655,000). *Drastic* increases in production (upwards of 300%) would be necessary for this operation to ever reach financial viability with 100% wholesale sales.

This scenario analysis highlights the sensitivity of operating incomes to changes in wholesale/retail distribution. The higher wholesale percentages (and the ensuing decrease in price received), the lower operating income becomes. Management should carefully consider this distribution. If ownership desires a further increase in wholesale accounts, it should be done slowly and with close observation of the numbers herein.

Management should also take the brewery's brand and image into account when considering these wholesale/retail splits. In terms of long-term business operations, they will need to determine whether they want to maintain a retail image, dealing mainly in face-to-face consumer interaction, or whether they want to pursue a wholesale focus, aiming to supply grocery stores, restaurants, etc. Increases in wholesale accounts can be offset with increases in production. These production increases become significantly higher the higher that wholesale sales percentage goes.

The distribution of retail/wholesale sales will affect the cash on hand of the operation. These effects are detailed and discussed in the following section.

Figure 16: Wholesale vs. Retail Sales Cash on Hand



100% Retail: The 100% retail model shows the highest cash on hand across all four scenario models. Wholesale beer is sold for a lower price than retail beer. As the percentage of wholesale beer sales increases, overall cash on hand diminishes due to lower sales revenue while increases in retail sales results in higher sales revenue. Increased levels of sales are usually required to offset the decreased price effect of wholesale sales. Cash on hand does not dip below zero at any point during the baseline model or the 100% retail model.

The 100% retail variation shows increased cash on hand across years two and three of the model. There are no changes to cash on hand in year one of this variation as the baseline model assumes 100% retail sales in this year. Cash on hand begins to differentiate from the baseline in quarter three of year two and further increases in difference as the project moves forward. At the end of year three, there is a more than $790,000 difference in cash on hand between the 100% retail variation and the 65% wholesale 35% retail variation.

50% Wholesale 50% Retail: In the 50% split variation, cash on hand falls below zero for the first three quarters of year one with ($64,000), ($67,000), and ($33,000), respectively. Cash on hand achieves positive levels in quarter four of year one and, while fluctuating, does not fall below zero again at any point in the rest of the study. While cash on hand would be positive later in the study, a cash infusion in the form of equity, grants, etc. or an undertaking of debt would be required to sustain operations in year one. To ensure cash on hand never falls below zero, initial equity for a cash reserve of about $160,000 would be required at the beginning of the project. Cash on hand at the end of year three for this variation would be about $354,000, about $285,000 lower than the baseline of $640,000.

65% Wholesale 35% Retail: Should the operation move to a 65% wholesale 35% retail sales distribution, cash on hand would remain below zero in 9 out of the 12 quarters examined here. This presents a significant problem for the brewing operation as large amounts of cash would be required to maintain operations until a point is reached where the business could sustain itself. Cash on hand is negative in all of year one, the first three quarters of year two, and the first two quarters of year three. At this level of wholesale sales, the operation would be unable to meet its

expense and cash flow obligations. It is recommended that the operation not increase wholesale sales beyond 50% at any point in time in the three years of the model. Cash on hand reaches its lowest point in year one quarter two at ($128,000) and its highest point in year three quarter four at $102,000.

100% Wholesale: The scenario variation of 100% wholesale 0% retail shows negative cash on hand throughout all twelve quarters examined here, with these losses steadily increasing as the project moves forward. At *no* point would the operation be able to sustain operations with a 100% wholesale business. Cash on hand starts out negative in year one quarter one with ($245,000) and continues to trend downward, ending at ($617,000) in year three quarter four.

Scenario: Variation in Hops and Barley Prices

A concern often expressed by potential entrants into the brewing market is the costs of input ingredients, particularly hops and barley. This scenario examines the current hops and barley prices in the United States and the effects on operating income and cash flow should those prices greatly increase/decrease. The baseline model assumes a price per pound of hops of $4.38 and barley of $2.88 per bushel. These prices were taken from a USDA report on crop prices for 2015. For this scenario, hops prices are decreased by 50% and 90% ($0.44 and $2.19 per pound, respectively) as well as being increased by 50% and 90% ($6.57 and $8.32). Approximately 26,500 pounds of hops will be necessary over the three years of this project. Total cost of these hops in this scenario range from ($11,660 in the 90% price decrease variation) to ($220,480 in the 90% price increase variation). This is a sizeable difference in costs to the operation over a three year period.

Barley prices were also varied by the same percentages as hops (50% increase/decrease and 90% increase/decrease). Total costs of the barley in this scenario range from ($18,287 in the 90% price decrease variation) to ($347,459 in the 90% price increase variation). Even more so than hops, barley prices have an effect on the operating income of the business.

Table 20: Variation in Hops Prices

Input Pricing Scenario Operating Income			
	Year 1	Year 2	Year 3
90% Decrease in Hops Prices ($0.44 per pound)	$230,666	$260,865	$287,884
50% Decrease in Hops Prices ($2.19 per pound)	$217,534	$244,924	$268,976
Baseline ($4.38 per pound)	**$201,182**	**$225,074**	**$245,433**
50% Increase in Hops Prices ($6.57 per pound)	$184,830	$205,224	$221,889
90% Increase in Hops Prices ($8.32 per pound)	$171,782	$189,384	$203,103

Hops Price Decrease: A 90% decrease in hops prices ($0.44 per pound) results in higher operating income across all three years of the study, ranging from $230,700 in year one to $287,900 in year three. Total operating income for the three year period with a 90% decrease in prices is just under $780,000, an increase of nearly $108,000 over the baseline model. A price decrease of 50% ($2.19 per pound) results in higher operating incomes, though the gains are not

as large the as 90% decrease variation. Total operating income is about $730,000, which is about $60,000 higher than the baseline model.

It should be noted that hops prices are unlikely to decrease by these amounts. This analysis was done to show the effects *should* the hops market fall significantly. If hops are able to be sourced for this price, their quality is likely to be significantly lower than that which the brewery is willing to use for their products.

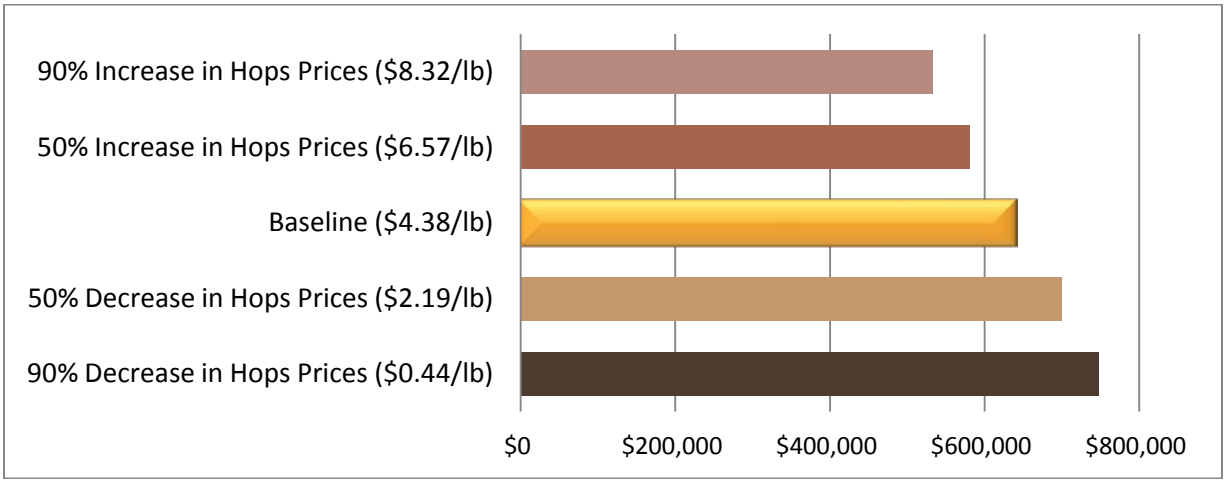
Hops Price Increase: An increase in the prices of hops by 50% (Approximately $6.57 per pound) results in lower operating incomes across all three years of the study, beginning with $185,000 in year one and rising to only $222,000 by the end of year three. This is approximately $23,000 less than the baseline model. Total operating income is about $612,000, nearly $60,000 less than the baseline model. At this level of hops prices, the business would still attain positive incomes and have significant money for reinvestment and growth.

With a 90% increase in hops prices ($8.32 per pound), operating income falls even further, but still maintains very positive levels. Total operating income for the three year period of the model with a 90% increase in hops prices is $564,000, about $107,000 less than the baseline model over the same three year period.

Operating income reaches its highest point in the 90% price decrease variation, with about $288,000 and its lowest point in the 90% increase variation with just over $203,000. This scenario shows the lack of volatility associated with hops prices. There is a difference of only $85,000 from the lowest to the highest point, despite hops prices being increased more than 18 times over. While an increase in prices does result in lower operating incomes, the differences are small in the overall business operations of this brewery. Prices of input ingredients can and should be monitored by ownership with the goal of attaining the lowest price while maintaining high quality. However, the prices paid for hops can increase significantly with no real effect on the financial viability of the business.

The price paid for hops will affect the cash on hand of the operation. Cash on hand at the end of year three is shown and discussed below.

Figure 17: Hops Price Variations Cash on Hand End of Year Three



Hops Price Increase Ending Cash: As shown in the chart above, cash on hand does not vary significantly across all five scenario variations. The baseline model of $4.38 per pound shows ending cash on hand of about $640,000. A 90% increase in hops prices ($8.32 per pound) sees ending cash on hand of $532,000, a reduction of only $108,000. The 50% increase in hops prices ($6.57 per pound) shows even less varied cash on hand, ending with about $580,000.

Hops Price Decrease Ending Cash: Decreasing hops prices results in higher cash on hand for both variations. Prices of $2.19 per pound shows ending cash of just under $700,000, an increase of just $60,000 from the baseline model. Hops prices of $0.44 per pound (90% decrease) shows the highest end cash of all five variations examined here with just under $750,000.

This examination of ending cash on hand shows that hops prices do not vary significantly from variation to variation. As explained above, prices of hops are not a large factor in the overall cash on hand position of the brewery. Prices would need to triple or even quadruple before significant effects to ending cash on hand may be observed.

Table 21: Variation in Barley Prices

	Total Barley Cost	Operating Income
90% Decrease in Barley Prices ($0.29 per bushel)	$18,287	$836,275
50% Decrease in Barley Prices ($1.44 per bushel)	$91,437	$763,126
Baseline ($2.88 per bushel)	**$182,873**	**$671,689**
50% Increase in Barley Prices ($4.38 per bushel)	$274,310	$580,253
90% Increase in Barley Prices ($5.47 per bushel)	$347,459	$507,103

Barley Price Decrease: A 90% decrease in barley prices ($0.29 per bushel) results in increased operating income across the three year study as compared to the baseline model. Total barley cost would fall from the baseline of $183,000 all the way down to just over $18,000. This reduction would flow directly into operating income, directly resulting in an operating income increase of nearly $165,000. Total operating income for the three year period with a 90% decrease in barley prices would be about $836,000. While it is unlikely barley prices are ever going to fall this low, extreme ranges were used to show what effect changing prices would have on the business. Management should strive to attain the highest quality of barley for the lowest price and should carefully consider all possible growers.

A 50% decrease in barley prices results in less substantial gains than the 90% price decrease variation. Total cost of barley would fall by about $91,000 and this decrease would flow directly into operating income. Total operating income for this variation would be about $763,000. The business would stand to gain nearly $100,000 alone off of falling prices. This additional income could be used in a variety of ways whether it is through additional employees, increased marketing levels, updated facilities, etc.

Barley Price Increase: An increase in the price of barley by 50% (approximately $4.38 per bushel) results in lower operating incomes across the board. At a price of $4.38 per bushel, barley costs would increase about $91,000 from the baseline model of $183,000. Total barley cost with a 50% price increase would be just over $274,000. Operating income would

subsequently be lowered by $91,000, falling to $580,000 for the three year period. This would still leave the business in a more than suitable financial position, but less income would be available for growth.

An increase in the price of barley by 90% ($5.47 per bushel) would see operating income fall by more than 25%. Total cost of barley for the three year study would increase by about $165,000. Subsequently, operating income would fall by the same amount. Total operating income for this variation with a 90% increase in barley prices would be about $507,000. Again, the business would still be in a state of financial viability, but operating income would be decreased by more than 25%.

Similarly to the hops price scenario, barley price changes cause operating income to fluctuate but not enough to cause any financial concerns. Barley prices would need to change orders of magnitude greater than examined here for the business to be put into any financial distress.

OBSERVATIONS

I. United States Malting and Brewing Industry

The industry for beer and its inputs in the country is growing overall. As an increasing number of entrepreneurs and consumers become invested in the industry, both production of and demand for craft brewed beverages has grown, resulting in an 11 percent share of the total beer market. While larger commercial brewers are experiencing minimal growth, these craft brewers are enjoying more substantial growth due to conversion of customers who previously only purchased commercial beers.[73]

With this success, the demand for inputs, such as barley for malting and hops has increased as well. Having previously been grown primarily for animal consumption, use of barley as feed has declined while food and industrial uses have seen continued growth. Presently, most barley grown is intended for malting, thanks to the high premium malts command. The National Barley Growers Association reports that most barley grown in the country is dedicated for malting as it commands a premium price.[74]

Similarly, other inputs such as hops are also growing, with hops production growing 13 percent from 2012 to 2013, and overall value of the crops increasing 28 percent for the same years. The Beer Institute reports US brewers overall purchase more than 15 million pounds of hops every year, although the demand for hops seems to outweigh the country's current production. For example, The AP reports on the shortage of locally produced hops in Milwaukee, especially in areas where craft breweries are springing up: "Craft brewers eager to capitalize on the local food movement have created a strong demand for hops to flavor their all-local beers, but farms in most states have grown slowly."

Overall, craft brewing in the United States has experienced continued growth over the years, capturing an increasing segment of the overall commercial market. As of 2015, the country reported over 4,144 breweries, and Virginia reported over 100 at the end of the year. The growing demand for differentiated, local, and artisan malted beverages is ready for a venture such as the one proposed.

II. Virginia Malting and Brewing Industry

While the country is showing strong growth, these industries are still comparatively small in Virginia. This does not, however, mean that the state does not show potential for a facility such as the one proposed in this study. Barley production placed Virginia 12th in the nation, establishing a ready market for craft brewers who want to produce beers with locally sourced inputs. Virginia Tech is also conducting a barley-breeding program to develop hearty, high-yield varieties for use in a variety of applications including craft brewing. They have released two varieties for production and hope to have an additional type available this year.[75] Similarly, Malting facilities are also springing up throughout the commonwealth, growing and supplying other breweries with their locally grown and processed malts and hops. Despite the unique challenges that growing such a humid-sensitive crop can present, many farmers who currently grow barley for animal feed are exploring converting some of their crop sales to malting for beer

[73] http://fortune.com/2015/03/16/craft-beers-volume-rising/
[74] http://nationalbarley.com/
[75] www.craftmalting.com/cereal-4-of-6-southeast-winter-barley-at-virginia-tech/

The state is not considered a powerhouse when it comes to hop production, and only a minute portion of the overall industry is located in the mid-Atlantic. Even with a substantial increase to the hops industry within Virginia, the state would still represent only a small amount of production nationwide. According to the Virginia Hops Grower Survey, over 8,100 pounds of hops were harvested in Virginia in 2014. Because so many growers are using less than an acre to grow their hops, however, it can be difficult to quantify the amount grown by land. The report states that approximately 65 percent was sold wet, which can affect the total weight. Overall, the majority of farmers surveyed stated that they had been growing for less than three years, showing the recent growth of farmers investing in hops.[76]

Craft beer is also quickly growing in Virginia, creating a huge economic impact for the state at $1.6 billion in 2014 and rating 19th in the country for sales. The Brewer's Association reports nearly 196,000 barrels of beer produced for the year, averaging a gallon consumed per 21+ adult annually.[77] The state reported 78 craft breweries for the year, although more recent reports show over 100 breweries in 2015.[78] Virginia is also encouraging the growth of agritourism within the state, and a brewing facility presents an ideal destination for locals within the state and visitors from afar. Caroline Gibson, director of corporate communications for the Virginia Tourism Corporation, comments, "The craft beer movement is providing good jobs for Virginians, an authentic sense of place for visitors and exciting marketplace for emerging entrepreneurs and tastemakers."[79]

III. Production and Operations

While the industry is showing significant growth, there is still a small amount of inherent risk in selling only one type of product. While evidence shows that beer has been and will continue to be popular, a number of risks remain: if projections fail to be met, demand decreases, or other unforeseen circumstances occur, the brewery would be hard-pressed to maintain operations. Conversely, should unanticipated high-growth occur, equipment and facility constraints may become an obstacle and steps would need to be taken to cover the increase in demand, such as obtaining additional inputs or supplies for production.

Certain production losses are typically assumed to occur with respect to brewery operations. Expected production efficiency is about 85%, which includes losses from batch errors, contamination, human error, damage in transport or packaging, and other unforeseen circumstances. This loss is accounted for in the financial model.

While some breweries are large enough to sell their waste for a secondary source of income, this operation will only seek to create revenue-neutral waste opportunities. The goal for this waste will be to have it picked up and disposed of in an environmentally responsible manner by a trash service or distribute to an individual, such as a farmer who can make use of the waste. This practice would support a sustainable practices marketing campaign, which would appeal to the facility's target age group.

A key factor for success will be the location of the operation. While beer has the ability to be transported over distances, transportation costs can reach unsustainable levels should local sales

[76] www.agriculture.vsu.edu/files/docs/2014-virginia-hops-grower-survey-summary-final.pdf
[77] www.brewersassociation.org/statistics/by-state/
[78] www.virginia.org/craftbeer/
[79] http://www.fredericksburg.com (Complete address available in Reference List)

prove less than an ideal. Also, if the owners of the facility intend to use agritourism as a method for capturing their customer base, it will need to be in relatively close proximity to a larger city and/or interstate to encourage visits. Ideally, a malting facility would be adjacent to the brewing facility, to save on transportation costs, although this may not be the case for every venture.

The marketing strategy of the operation, especially with respect to gaining wholesale clients, is of paramount importance. As it is assumed the brewery already specializes in retail sales, gaining wholesale clients and the benefits that come with it will be important for this project. Ensuring expenses are kept as minimal as possible will be essential for the operation's success both initially and long-term.

The expected seasonality of sales will effect cash flow year-to-year. As the majority of sales (70%) are conducted in the second half of each year, cash flow issues may arise in the first half of each year.

The cost paid for barley and hops for this brewing operation could increase significantly and the brewery would still have large amounts of operating income with which to reinvest and put towards growth.

RECOMMENDATIONS

This report is intended for the use of a future board of directors and its advisors in planning for a successful malting operation. Much work still remains to be done to increase the chances of success for the venture. It is recommended that brewery leadership review this report and decide whether or not to continue with the project. If the future board of directors decides to proceed with the project, the consultant provides the following specific recommendations:

I. Production Capacity and Supply

It is recommended that ventures choosing to grow their own inputs still consider a plan of alternative supply in the event of crop failure or extenuating circumstances. If the owners of the venture do not have previous experience in growing and producing inputs, the business may experience a learning curve in which shortages and/or overages are experienced. Developing relationships with other producers, both within the state and the region, can help prevent situations in which production is hindered. If the venture does not have an experienced employee who can oversee operations, obtaining the help of a consultant or peer will also provide valuable advice in farming practices and operations.

The current estimated malting equipment will be able to provide room for some growth; however, growth that exceeds projections will result in the need for additional production equipment. Ideally, the venture will have equipment that accommodates both current levels of production as well as for future growth. Depending on current capacity, the owners may decide to purchase equipment with capacity that exceeds current production levels, to allow for long-term growth.

II. Keep Seasonal Varieties Fresh.

The brewery will offer multiple varieties of beer year-round, in addition to several seasonal varieties. Seasonal beers have been proven to be quite popular as consumer interest in seasonal varieties, such as a fall or winter offering, tends to grow around holidays. The brewery should choose beers that do well with consumers and seasonal beers that underperform should either be replaced or modified depending on customer feedback.

III. Complete a Business Plan.

Once the venture has been deemed feasible, the owners should complete a business plan that is more targeted to the specific needs of the business. A useful business plan should include:

- ***a strategic plan,***
  With a 3-5-year outline of the brewery's goals and steps for accomplishing them.
- ***identification of markets and customers for the facility,***
  - targeting the upper demographic segment of the identified market

  Including a comprehensive strategy to determine a potential customers. These should be identified as to their demand, as well as possible pricing points for the products.
- ***3-5 year pro forma financial projections,***
  These forecasts are necessary to project the venture's operating results, cash flow needs, loan repayment schedules, and other items. They can be used to compare results as well, and lenders will need this information to evaluate the project's merits.

- ***operating plans and policies,***
  These plans include details of payments, transportation costs, deductions for quality concerns, work schedules, number of employees, hours of operation, production quality management, accounts receivable policies, interaction between the manager and board of directors, and other items.
- ***a site analysis for the proposed facility,***
  The owners will evaluate the preliminary site location determined by the committee for suitability, analyzing details such as proximity to roads and customers, facility design, and cost of real estate, plant, and equipment. *County/city zoning will need to be addressed.*
- ***plans for receiving the required operational permits,***
  Federal, state, and local regulations need to be met and proper permits obtained to comply with all pertinent laws, which can be a time consuming procedure for the facility.
- ***financing and capital requirements,***
  Including a loan schedule, financial structure, investment schedule and other items. If a joint venture arrangement is finalized, details of this are necessary for the business.
- ***job descriptions,***
  The malting operation will need to hire facility and administrative personnel. The owners and/or committee members will develop a job description for each position or role, which also includes how they will be evaluated and rewarded for performance.
- ***a plan for hiring expert management,***
  The board of directors is responsible for the long-term management of the venture; however, a manager will oversee day-to-day operations. This person should know how to run the facility, as well as how to coordinate the flow of product to the facility and finished product to buyers, as well as how to supervise other employees.
- ***plans for implementing an accounting system,***
  This will provide information to the board of directors for evaluating financial performance and should adhere to generally accepted accounting principles (GAAP).
- ***and plans for securing capital.***
  A detailed plan for obtaining start-up funding and capital, whether from traditional lending sources or from community and non-traditional program sources such as the ones outlined in this study, provides a framework for efficient acquisition of capital.

IV. Find a Facility Location.

The leadership of the venture should ensure the facility's location is accessible for processing and transportation purposes, as well as in proximity to a larger city or interstate. Until a central location is identified, it will be difficult to establish reliable estimates of sales and product popularity, as these factors will change from region to region.

The expansion's location is a critical factor in its daily operations, as relative costs are directly related to factors related to its position in the state. Labor, transportation, utilities, waste disposal, and other components of operations will be affected by the location of the malting facility. From a marketing point of view, a good location is essential to establishing a successful business, and the facilities would ideally be visible from a major roadway.

The facility must be safe, clean, and follow all the requirements by all relevant regulatory entities. The building must be regularly inspected to ensure compliance, and the owners may find it helpful to begin assessments as early as possible in order to prevent any delays in opening the business.

V. Pursue Financial Stability.

As the malting venture of this brewery is new, it should ensure it is generating sufficient cash flow to cover known expenses as well as any unforeseen costs. To generate sufficient revenue, ownership should consider an operation like a beer club or membership function, where contracts are generated with customers who agree to buy a certain number of bottles per month or quarter. This method would drive a segment of reliable sales, generate interest in existing and new product, and ensure at least some revenue will be accurately forecasted.

The brewery should initially focus on maintaining cash flow and not necessarily maximizing profits. Building a solid malting foundation with customers, both wholesale and retail, will do more long-term for the business than simply maximizing profits in the early stages.

VI. Comply with Food Safety Regulations.

Businesses must consider state Department of Health regulations. These regulations, designed to protect the health of employees as well as the environment, must be considered if the business handles food of any kind, or sewage or drainage. Typically, specific licenses or permits are required depending on the nature of the venture.

Any individual who handles food or other consumables must be aware of current food legislation. The primary enabling legislation states the aims and objectives of the law. This provides the power to the relevant U.S. Departments of State to introduce specific regulations. For example, the Food Safety Modernization Act is a legislation approved by Congress and later allows the Food and Drug Administration to write a regulation/s for that particular law. The owners should ensure that all employees involved in production are properly trained in handling items intended for human consumption.

VII. Trademarks and Branding

Management should consult with a trademark attorney, who can propose methods of obtaining a trademark, as well as help the business work through any associated issues that may arise. Nationally registered trademarks are generally considered to reduce business risk. Ownership should also contact a marketing expert to help create a brand identity for the proposed malting operation. Brand recognition should be a goal of the organization.

If the venture already has a registered logo or brand, the owners should ensure that any new product shares the general theme, to capitalize on existing customer recognition. Alternately, they may also opt for a full brand remodel to introduce the new product. Ultimately, the owners will decide the most productive options for the business depending on individual factors unique to each business.

VIII. Establishing Procedures

Consistent schedules of employees, production, sales, marketing, and other general business procedures should be well-established and a hierarchy of decision-making firmly in place before operations begins. Modifications to these procedures may be made as efficiency, sales, and other factors change, but pre-existing policies will help all involved with this operation. Labor schedules, work hours, shifts, employment policies, and more should also be created and established.

Labor

It is critical to choose the right method for recruiting, selection, and employee retention that best adapts to a business venture. Having clear and defined objectives, duties, and responsibilities for each position will ensure the proper selection and allocation of personnel, as well as avoid costly lawsuits related to discrimination and sexual harassment.

As the business grows, many additional labor laws and regulations will begin to affect the business, if the staff approaches 50 employees. It is important to monitor operations carefully to determine if the extra labor is feasible given the additional cost that new regulations may carry. Affirmative Action, Equal Employment Opportunity, the Family and Medical Leave Act, and the Affordable Care Act all have provisions and regulations that are triggered once a business reaches the "50 or more" employee mark.

Production

Food safety in production begins with clean practices through the entire supply chain. Good agricultural practices, an understanding of microbiology, adequate manufacturing practices, safe procedures for cleaning and sanitizing, and a thorough understanding of the principles of Hazard Analysis and Critical Control Point (HACCP) development are all critical to the project's success.

A Good Manufacturing Practice program, for example, includes sanitation and pest control policies, and documentation, along with information about cleaning chemicals used in the plant, how effectively they are handled and stored, and how the Material Safety Data Sheets (MSDS) are maintained. The sanitation program typically details weekly, monthly, and periodic cleaning schedules and how cleaning is conducted, monitored, and recorded.

A HACCP system is another effective way to address food safety requirements for third party audits, federal and state inspections, and wholesale customer requirements. Providing this type of written analysis documentation can address the food safety requirements outlined by these various agents, and serve as a benchmark for quality assurance. A HACCP program is not designed to compensate for generally poor practices, but rather to use solid practices as a basis for a food safety program that can provide the highest assurance of safety.

IX. Quality Control

Quality control procedures should be implemented before the beginning of malting operations. Selling high-quality beer is a cornerstone of success and customer loyalty. Lower quality beer is quickly found out and develops a reputation among consumers and this should be avoided at all costs. A damaged reputation, especially early in the malting operations, could prove disastrous for the long-term prospects of the business. Care should be taken to ensure high-quality products are sold.

X. Financial Recommendations

Prices used in this study are considered slightly above average but still within industry standards. Price adjustments may need to be made as the brewery moves forward. Management should carefully monitor direct competitors, other industry participants, and local markets to ensure pricing structure is optimal and provides the highest chance of success.

Production costs are a large portion of expenses incurred by the brewing operation. Finding ways to cut production costs without effecting quality can be difficult but should be examined by ownership whenever possible.

General management should reassess current labor workload and positions on a timely basis. This may be done monthly, quarterly, or biannually. Positions, hours, and wages should all be observed and changes made accordingly. However, cost-cutting, particularly where skilled labor positions are involved is not always the best course of action. Quality wages attract quality workers.

It is assumed equipment and building updates will be financed. A number of financing options are available for use to operations like this brewery including private investors, banking institutions, and grants, among others. All methods should be considered.

Upon completion of the scenario analysis, the pricing change scenario revealed itself to be the most volatile of the four scenarios conducted. These increases and decreases in price had a profound effect on both the operating income and the cash on hand of the operation. These decreases in prices resulted in net losses for year one, and severely diminished income in years two and three.

In addition, price decreases resulted in sizable cash flow issues throughout all three years of the model. Caution should be exercised by management when considering pricing changes, particularly decreases.

Within the wholesale/retail distribution scenario, the increasing wholesale resulted in decreased incomes across all three years of the study. Implementation of these changes in distribution should be discussed thoroughly. While wholesale accounts may be more reliable at times than retail sales, the decrease in income is significant enough to be a concern. At no point during the three years examined herein should wholesale sales account for more than 50% of sales.

A serious problem can result if efforts fall short of projections. Unplanned operational expenses over long time periods could result in failure for the proposed venture. These should be closely monitored and issues that may arise should be dealt with quickly and efficiently or risk of failure is high.

APPENDICES

APPENDIX A: Business Organization

The following is a brief overview of potential legal organizations excerpted from "Virginia Business Legal Structures" created by VA FAIRS, and available on their website at www.vafairs.com. More information is available from numerous other resources as well, including the Small Business Association (SBA) at www.sba.gov and SCORE at www.score.org.

Sole Proprietorship

Sole proprietorship is the simplest and least regulated business structure. Establishing a sole proprietorship will likely involve fees to obtain business name registration, a fictitious name certificate, and other necessary licenses. Any potential attorneys' fees for starting the business, however, will be less than other business forms as less preparation of documents is required. To finance the sole proprietorship, the sole owner must contribute or borrow all of the capital needed to start the business. Any outside funding sources must be in the form of loans.

Advantages and Disadvantages of Sole Proprietorships

- As a sole proprietorship, the business itself does not pay income tax
- The profit or loss of the business is taxed as personal income and is included on the owner's individual tax return
- The sole proprietor has total control of the business and receives all profits
- An individual who is responsible for all aspects of the business, including any debts, even in excess of the amount invested, owns it
- In addition to potential personal liability for the owner, there is the possibility of dissolution of the business upon the owner's death

Partnership

A general partnership (sometimes simply referred to as "a partnership") is an association of two or more persons to carry on as co-owners of a business for profit. Each partner contributes money, property, and/or services, and agrees to share in the profits or losses of the business. Ordinarily, each partner is liable for all obligations of the partnership.

To form a partnership, two or more persons sign and file partnership agreements (Statement of Partnership Authority –with the appropriate state office; this agreement states the exact contributions and returns of the members). The two most common types of this business structure are general partnerships and limited partnerships.

Advantages and Disadvantages of Partnerships

- A partnership allows for additional financial resources
- A partnership allows members to escape double taxation
- The requirements and procedures for formation are fairly simple
- All partners are personally liable for business debts and liabilities

Limited Liability Company

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. (Any profits/losses pass through to the individual investor and appear on the individual's tax return). 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.

LLC formation and liability characteristics are similar to that of a corporation. To form a corporation or LLC, the necessary documents are filed with the designated state agency. Unlike a general partnership, shareholders are not personally liable. 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.

Advantages and Disadvantages of LLCs

- Provides its members limited liability and 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
- More regulations on transferring ownership
- Uncertain tax status
- Drafting the agreement can be fairly complex
- When applying for federal licenses, all members must provide personal information, such as band reference, personal references, credit rating, residence for past 10 years, and sources of invested funds

C-Corporation

C-Corporations are the most common structure for large businesses in the United States. The structure offers the investor (stockholder) limited liability protection – any liability is limited to the value of the stock held in the corporation. Businesses formed under this structure require oversight by state regulatory boards at a minimum and in some cases by the Federal Security and Exchange Commission. A Corporation has a perpetual existence. Owners can routinely sell or reassign stock (or ownership) without disrupting ongoing operations.

Advantages and Disadvantages of C-Corporations

- The corporation is the most complex of business structures because it acts as a legal entity that exists separately from its owners
- Control depends on stock ownership
- Stockholders are at risk only for money they have invested in the stock of the corporation
- When applying for federal licenses, the only members required to provide personal information are officer, directors, and shareholders with more than 10 percent ownership
- Allows capital to be raised more easily through the sale of stocks or bonds
- Can continue to function even without key individuals
- Double taxation occurs because the business exists as a separate entity

S-Corporation

The S-corporation is a special tax designation applied for and granted by the IRS to corporations that have already been formed. To become an S-corporation, the business first must form a general or professional corporation, and the company must complete Form 2553, Election by a Small Business Corporation, and file it with the IRS.

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

Advantages and Disadvantages of S-Corporations

- Restrictions on the number and type of ownership
- S-corporations have the same basic advantages of the general corporation

APPENDIX B: Human Resources & Staff Descriptions

As with any other type of business, efficient brewery operations hinge on adequate fulfillment of various roles. Ideally, the venture would employ highly qualified and experienced staff to operate the business as it grows. For optimum efficiency, it is necessary for a business to clearly define necessary roles, positions and responsibilities, and seek to hire qualified individuals to perform necessary labor functions of the business.

During initial years of operation, single individuals (often the owners) may fulfill multiple roles, while the responsibility of a single role may be assigned to multiple employees as the business grows in subsequent years. Periodic wage increases will become necessary to retain qualified and experienced employees. At points when individuals take on additional responsibility or when they acquire additional knowledge, skill, or training, the owners may also consider pay increases to reflect such change in qualification.

For more efficient and consistent operations, it is helpful for a business to clearly define the necessary roles, positions, and responsibilities of their employees and ensure they are hiring qualified, motivated individuals. The following is a list of general staff descriptions that may be fulfilled by one or more people as the business grows.

Maltster
Full-time position

Depending on the brewery's supply arrangement and production levels, the maltster may either oversee barley growing operations as well as processing, or supervise barley purchasing decisions and processing operations. This individual will work in cooperation with the Owners and the Master Brewer in selection of barley varieties and processing operations that will best suit the product lineup. The Maltster reports directly to the Owners.

Duties and responsibilities:

- Oversee efficiency of facility processes: establish, operate, and/or maintain processing equipment, monitor malting facility operations, and supervise direct reports
- Effectively communicate and coordinate with wide variety of contacts
- Supervise/train production staff and delegate tasks as needed
- When necessary, must be able to lift up to 50 lb. units

Qualifications and experience:

- B.S. or equivalent in a science/technological area
- Training is malting operations
- 2+ years of relevant experience
- Superior organizational, time management, and prioritization skills
- Ability to develop and implement clear action plans and drive processes with multiple interdependencies
- Excellent written and verbal communication skills
- Strong computer skills (MS Office)

Assistant Maltster
Part-time position

This person provides assistance to the Malster in all production and processing activities, also managing some limited tasts as needed. This role requires at least an adequate working knowledge of the industry and can be considered a "Maltster in Traning" position. The Assistant Malster will be intimately involved with producing the facility's products. Intially, this position will most likely be part-time, but can be increased to full-time as business grows. The Assistant Maltster reports to the Maltster.

Duties and responsibilities:

- Participates in day-to-day operations at the malting facility
- Assist in the creation of malting common practices, ensuring that operations are run safely and efficiently
- Track production information and product quality testing
- Effectively communicate and coordinate with wide variety of contacts
- Supervise/train production staff and delegate tasks as needed
- When necessary, must be able to lift up to 50 lb. units

Qualifications and experience:

- Four year degree or equivalent
- Proven ability to manage various aspects of production, including leading and coaching general staff involved in the malting process
- General knowledge of malting production practices, and some agricultural experience
- Ability to develop and implement clear action plans and drive processes with multiple interdependencies
- Excellent written and verbal communication skills
- Strong problem solving skills, analytical capabilities, and collaboration skills
- Strong computer skills (MS Office)

Master Brewer
Full-time position

The Master Brewer's foremost responsibilities are production, safety management, and quality control of malting and/or brewing operations. Once the venture has determined the consumers' taste preferences for beer varieties, the Master Brewer will apply his/her science and technological knowledge to meet the demand. The Master Brewer is a full-time employee who reports to the Owners.

Duties and responsibilities:

- Oversee efficiency of brewing processes: developing and implementing product recipes; utilizing, maintaining, and/or establishing brewery equipment; manage direct reports including Assistant Brewer and General Labor; ordering and monitoring inventory of brewing supplies; oversee product quality testing
- Collaborates with Maltster for product input quality and quantity needed
- Oversee bottling operations
- Participate in sales, marketing, and public relations efforts to promote products
- Effectively communicate and coordinate with wide variety of contacts

- Supervise/train brewing staff and delegate tasks as needed
- When necessary, must be able to lift up to 50 lb. units

Qualifications and experience:
- B.S. or equivalent in a science/technological area
- 2+ years of brewing experience
- Superior organizational, time management, and prioritization skills
- Strong computer skills (MS Office)

Assistant Brewer
Part-time position

This individual assists the Master Brewer in all production activities, supervising some tasks so the Master Brewer can take on other responsibilities related to general business management and operations. This role will require significant knowledge and can be thought of as a "Master Brewer in Training" or apprentice role with significant involvement in producing the brewery's products. Much like the Assistant Maltster position, this may initially be a part-time position that later becomes full-time as business grows. The Assistant Brewer reports to the Master Brewer.

Duties and responsibilities:
- Assist in implementing and oversee brewing processes: developing and implementing product recipes; utilizing, maintaining, and/or establishing brewery equipment; manage direct reports including General Labor; ordering and monitoring inventory of brewing supplies; oversee product quality testing
- Manage bottling operations
- Participate in some sales, marketing, and public relations efforts to promote products
- Effectively communicate and coordinate with wide variety of contacts
- Supervise/train brewing staff and delegate tasks as needed
- When necessary, must be able to lift up to 50 lb. units

Qualifications and experience:
- Four year degree or equivalent
- Proven ability to manage various aspects of production, including leading and coaching general staff involved in the brewing process
- General knowledge of production practices
- Ability to develop and implement clear action plans and drive processes with multiple interdependencies
- Excellent written and verbal communication skills
- Strong problem solving skills, analytical capabilities, and collaboration skills
- Strong computer skills (MS Office)

Retail & Tasting Room Manager
Full-time position

The Retail & Tasting Room Manager provides leadership of the retail store at the brewery. This person works to develop and implement retail store operating policies and principles. He/she is accountable for executing an operating plan consistent with the Owners' direction and monitoring retail store operations against goals. This person is responsible for store profit and loss, which includes driving revenue growth and market growth/market share, and effectively manages expenses and profitability. This employee is responsible for organization and function of tasting room activities. The Retail & Tasting Room Manager reports to the Master Brewer.

Duties and responsibilities:

- Organization and functioning of tasting room activities
- Provides leadership and training/coaching for the store staff and establishes performance goals for all retail/tasting room employees, monitoring performance on a continual basis
- Selects, develops and evaluates team members and is accountable for their success.
- Develops and implements consistent operating processes that are aligned with the overall retail strategy
- Accountable for meeting or exceeding sales, margin and profitability goals
- Develops and implements a merchandising and product strategy for the store
- Organizes and updates inventory to maximize returns on our inventory investment
- Provides an annual operating and sales plan and providing quarterly updates, revisions and modifications to the plan
- Proposes and manages all expense budgets to meet or exceed plan objectives
- Obtains competitive intelligence by gathering and analyzing information from human and published sources about market trends and industry developments and the capabilities, vulnerabilities and intentions of business competitors that allow for advanced identification of risks and opportunities to the business
- Responsible for store P&L: driving revenue growth; market growth and market share; and for effectively managing expenses and profitability

Qualifications:

- 4 year degree or equivalent
- Proven ability to manage all aspects of a retail operation, including experience leading, coaching and developing a retail staff
- Experience managing financial acumen
- Budget management experience
- General knowledge of all products and systems
- Ability to develop clear action plans and drive processes with numerous interdependencies
- Successful track record of working with retail store staff to create an excellent customer experience
- Excellent written and verbal communication skills
- Strong problem solving skills, analytical capabilities and collaboration skills
- Must show attention to detail, a commitment to quality and be results driven and customer focused

Tasting Room Associates
Part-time positions

These associates work part-time under the supervision of the Retail &Tasting Manager. They help in beer and non-alcohol items sales, help promote the brewery's products, greet visitors, guide people through the facility, give presentations, and recruit/organize groups of visitors to the brewery for tours.

Duties and responsibilities:

- Greet all visitors to the facility, pour tastings, and provide product knowledge
- Be able describe beer varieties, brewing techniques, and brewery history, as well as answer visitor's questions
- Effectively suggest and sell products to customers
- Accurately handle routine purchasing transactions, which include operating cash register and accounting of daily sales; process returns, discounts, etc.
- Assist customers with carrying purchases to their vehicles when/if necessary
- Conduct guided tours as needed
- Assist with hospitality special events as needed
- Represent the brewery at outside functions as needed

Qualifications and experience:

- Retail experience preferred
- High school diploma or equivalent
- Ability to effectively communicate with diverse client group
- Previous knowledge of beer and brewing practices desired
- Commitment to excellence and high standards
- Strong organizational, problem-solving, and analytical skills
- Flexibility and ability to manage constantly changing priorities with enthusiasm
- Knowledge of commonly used practices and procedures used in merchandising
- Must be able to work weekends and holidays as necessary
- Fluent in English, multiple language skills a plus
- Must be at least 21 years old
- Basic computer skills
- Ability to stand and walk for long periods of time
- Must be able to lift up to 50 pounds.

General Labor
Part-time positions

General Labor employees represent other roles and duties that need to be filled on an as needed basis, and may or may not include skilled labor positions related to marketing, giving tours, production, or general maintenance and clean-up. These positions may be full or part time depending on the needs of the business. General Labor may report to one or more Managers, depending on the specific area they work in.

These employees' duties and responsibilities may also vary depending on the specific tasks they are performing.

APPENDIX C: Record-Keeping and Organizational Documents

Record-Keeping and Organizational Documents

Accurate record-keeping can be a time-consuming but necessary task, especially for businesses in the alcohol industry. Various federal and state level entities require periodic reports for both tax and regulatory compliance purposes. Some documents are required by law to be maintained indefinitely, and establishing a record-keeping protocol during the start-up of a business can save time and money later in the business's development.

Maintaining well-organized files on basic business organizational documents, such as articles of incorporation and business bylaws, can often save frustration when faced with various applications or reporting deadlines. Guides for record-keeping related to major business documentation can be found at several online sources, including the IRS website at www.irs.gov, which also provides basic information for small business owners.

Business Documents

Thinking through the preceding sections and standardizing a strategy and approach to each of the major factors of operations, production, sales, and marketing can be a valuable exercise and reveal additional opportunities or concerns for a business owner. Information and insights gleaned throughout the process can serve as a solid foundation for construction of many major business documents, including a business plan, marketing plan, feasibility study, and other pertinent documents.

- **Business Plan**

A written business plan document is an essential management tool. This document includes information about the implementation of the business idea, including guidelines to measure profitability and provide action-oriented steps to take both during and after project implementation. Major sections of the business plan often include Background Information, a Description of Products and/or Services, Governance and Organizational Matters, Marketing Strategy, and a Financial Plan with *pro formas*.

- **Marketing Plan**

A marketing plan is often more flexible than a business plan, in that content is more diverse and is driven by the unique aspects and approach of a particular business. The information it contains is highly customizable to suit various entities and marketing strategies, but often includes information such as intended target customers and markets, competitive analysis and comparisons, goals and desired market positions, strategies for differentiation, and promotional activities and budgets.

- **Feasibility Study**

A feasibility study is a detailed, objective analysis of a business idea or proposed project to determine its potential impact or outcome. It provides a visual aid for a new venture by putting an idea on paper so that potential problems can be more easily identified and solved before the implementation, saving investors' time and money in the future. Feasibility studies reveal the positives as well as the negatives of an idea, allowing the owners to determine what will work, what can be fixed, and what resources will be needed in order to bring an idea to life. Lenders and investors requiring feasibility studies generally expect them to be created by an independent, third-party consultant or entity to avoid conflicts of interest and unbiased content.

- **Other Documents**

Throughout the course of start-up and subsequent growth, a business such as the brewery examined in this study may find it necessary to create and utilize a variety of other business documents, from grant and loan applications to content for new stories or industry reports. Much of the written content contained in a business or marketing plan can also be used to needs in these areas, but certain documents may require the development of additional information.

There are numerous examples of business document formats and outlines available through credible online sources. The Virginia FAIRS website includes access to a "Virtual Business Center" with numerous tools to help in constructing a business plan. The U.S. Small Business Association (www.sba.gov) also offers information to help in writing a well-designed business plan and marketing plan documents, as well as advice and training materials on a variety of other business topics.

APPENDIX D: Tax Information

Federal Taxes

For specific information regarding federal tax requirements, contact the Internal Revenue Service (IRS) to obtain a copy of the Small Business Resource Guide. This guide contains information on federal tax obligations as well as various publications for starting a business.

Required Federal Employment Taxes

- Federal Income Tax Withholding
- Social Security and Medicare Taxes (FICA)
- Federal Unemployment Tax (FUTA)

Forms and Employees

It is required that all employers have their employees fill out a Form I-9 and Form W-4. More information explaining employers' Federal tax responsibilities can be found in the IRS' Publication 15, Circular E, Employer's Tax Guide.

- **Form I-9**, Employment Eligibility Verification. This document is available from the Immigration and Naturalization Service by calling 800-357-2099 or online at www.bcis.gov.

- **Form W-4**, Employee's Withholding Allowance Certificate. This form is available from the Internal Revenue Service. Call FORMS/PUBLICATIONS at 800-829-3676, or INFORMATION at 800-829-1040. The form can also be downloaded by visiting www.irs.gov.

Certain agricultural employers are required to fill out specialized forms depending on their type of work or they may be exempt from certain laws. For more information, see www.irs.gov.

State and Local Taxes

In addition to business taxes required by the federal government, some state and local taxes typically have to be paid as well. Having knowledge of each state and locality's specific tax laws and requirements can help avoid problems and save money.

- **Tax Permit**
  In most states, business owners are required to register their business with a state tax agency and apply for certain tax permits. For example, in order to collect sales tax from customers, many states require businesses to apply for a state sales tax permit.

- **Income Taxes**
  Nearly every state levies a business or corporate income tax. The tax requirement depends on the legal structure of the business. For example, if the business is a Limited Liability Company (LLC), the LLC is taxed separately from the owners, while sole proprietors report their personal and business income taxes using the same form. Consult a tax advisor/CPA for specific requirements for the business.

- **Employment Taxes**
  In addition to federal employment taxes, business owners with employees are also responsible for paying certain taxes required by the state. All states require payment of

state workers' compensation insurance and unemployment insurance taxes. In addition, some states require a business to pay for temporary disability insurance.

- **Sales Tax and Resellers**
  In the case of a business purchasing items that are intended for resale, many states that collect sales taxes allow a business to purchase resale items tax-free. The requirements and guidelines vary from state to state; check with the locality for specific information.

Beer and Excise Taxes
In addition to income, business, and sales taxes, the malting/brewing facility's products may be subject to both state and federal taxes. Besides these taxes, the owners must also obtain label approval from the Virginia Department of Alcoholic Beverage Control (VDACS) and the Alcohol Tobacco Tax and Trade Bureau (TTB).

Bonds
The bond's price is determined by the amount of product the brewery produces and how much product on average the business has on-site for two weeks. This amount can include product in tanks, barrels, bottles, etc. The bond helps secure the business' excise tax (there is no federal sales tax).

APPENDIX E: Malting Barley Breeding Guidelines

American Malting Barley Association, Inc.

November, 2010

MALTING BARLEY BREEDING GUIDELINES
IDEAL COMMERCIAL MALT CRITERIA

Barley Factors	Two-Row Barley	Six-Row Barley
Plump Kernels (on 6/64)	> 90%	> 80%
Thin Kernels (thru 5/64)	< 3%	< 3%
Germination (4ml 72 hr. GE)	> 98%	> 98%
Protein	≤ 13.0%	≤ 13.5%
Skinned & Broken Kernels	< 5%	< 5%
Malt Factors		
Total Protein	≤ 12.8%	≤ 13.3%
on 7/64 screen	> 70%	> 60%
Measures of Malt Modification		
Beta-Glucan (ppm)	< 100	< 120
F/C Difference*	< 1.2	< 1.2
Soluble/Total Protein*	40-47%	42-47%
Turbidity (NTU)	< 10	< 10
Viscosity (absolute cp)	< 1.50	< 1.50
Congress Wort		
Soluble Protein	4.4-5.6%	5.2-5.7%
Extract (FG db)	> 81.0%	> 79.0%
Color (°ASBC)	1.6-2.5	1.8-2.5
FAN	> 190	> 200
Malt Enzymes		
Diastatic Power (°ASBC)*	> 120	> 140
Alpha Amylase (DU)*	> 50	> 50

Source: American Malting Barley Association, Inc., “MBAA Annual Meeting-October 8, 2015” http://ambainc.org/content/55/presentations

APPENDIX F: Reference List

The full web addresses for abbreviated footnotes referenced in the document are provided below.

(5) *2012 Agricultural census data on Virginia:*
www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/Virginia/st51_1_037_037.pdf

(6) *Acreage of Virginia barley grown for malting:*
www.americanfarm.com/publications/the-delmarva-farmer/special-sections/2351-growers-eager-to-contribute-to-va-micro-brewing-industry

(7) *USDA NASS Report for hops production:*
www.outsideonline.com/news-from-the-field/Hops-Shortage-Threatens-Craft-Brewers.html?utm_source=facebook&utm_medium=social&utm_campaign=facebookpost

(12) & (36) *2014 Gallup poll on Adult Beverage Choices*
www.gallup.com/poll/174074/beer-americans-adult-beverage-choice-year.aspx?g_source=beer&g_medium=search&g_campaign=tiles

(14) *Craft beer's volume share of US Market*
www.brewersassociation.org/press-releases/craft-brewer-volume-share-of-u-s-beer-market-reaches-double-digits-in-2014/

(19) *Virginia Tourism Corporation, Virginia destination*
www.fredericksburg.com/business/craft-breweries-catch-on-in-virginia/article_2035361f-dca3-5d02-9d5a-af490bef4578.html

(26) *Virginia Grain Producers Association, barley production*
http://americanfarm.com/index.php?option=com_content&view=article&id=2622:barley-growers-brewers-gather-to-share-info&catid=2

(27) *Craft Brewing Business, Hops demand*
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(29) *USDA NASS reporting on hops production*
www.outsideonline.com/news-from-the-field/Hops-Shortage-Threatens-Craft-Brewers.html?utm_source=facebook&utm_medium=social&utm_campaign=facebookpost

(35) & (44) *Brewers Association, characteristics of Millennial drinkers*
www.brewersassociation.org/communicating-craft/6-characteristics-of-millennial-beer-drinkers-you-need-to-know/

APPENDIX G: Expense and Revenue

Year 1 Expense and Revenue	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Y1 Annual Total
Kegs (in barrels)	3	3	3	3	3	3	4	7	7	7	7	9	57
On Tap Flights (in barrels)	11	11	11	11	11	11	16	28	28	28	28	34	230
12 oz. Bottles (in barrels)	43	43	43	43	43	43	60	103	103	103	103	129	861
Income	$	$	$	$	$	$	$	$	$	$	$	$	$
Kegs	$1,866	$1,866	$1,866	$1,866	$1,866	$1,866	$2,612	$4,477	$4,477	$4,477	$4,477	$5,597	$37,310
On Tap Flights	$7,462	$7,462	$7,462	$7,462	$7,462	$7,462	$10,447	$17,909	$17,909	$17,909	$17,909	$22,386	$149,240
12 oz. Bottles	$27,983	$27,983	$27,983	$27,983	$27,983	$27,983	$39,176	$67,158	$67,158	$67,158	$67,158	$83,948	$559,650
Souvenir and Merchandise Sales	$746	$746	$746	$746	$746	$746	$1,045	$1,791	$1,791	$1,791	$1,791	$2,239	$14,924
Food Sales	$1,866	$1,866	$1,866	$1,866	$1,866	$1,866	$2,612	$4,477	$4,477	$4,477	$4,477	$5,597	$37,310
Total Sales All Types	$39,922	$39,922	$39,922	$39,922	$39,922	$39,922	$55,890	$95,812	$95,812	$95,812	$95,812	$119,765	$798,434
Variable Costs													
Catering Costs	(933)	(933)	(933)	(933)	(933)	(933)	(1,306)	(2,239)	(2,239)	(2,239)	(2,239)	(2,798)	(18,655)
Input Costs Per Barrel	($5,880)	($5,880)	($5,880)	($5,880)	($5,880)	($5,880)	($8,232)	($14,112)	($14,112)	($14,112)	($14,112)	($17,640)	(117,600)
Barrel Packaging Cost	($24,108)	$0	$0	$0	$0	($1,205)	$0	$0	$0	$0	$0	$0	(25,313)
Flight Packaging Cost	($30,353)	$0	$0	$0	$0	($1,518)	$0	$0	$0	$0	$0	$0	(31,871)
Bottle Packaging Cost	($45,461)	$0	$0	$0	$0	($2,273)	$0	$0	$0	$0	$0	$0	(47,734)
Souvenir Costs	($149)	($149)	($149)	($149)	($149)	($149)	($209)	($358)	($358)	($358)	($358)	($448)	(2,985)
Beer Tax	($490)	($490)	($490)	($490)	($490)	($490)	($686)	($1,176)	($1,176)	($1,176)	($1,176)	($1,470)	(9,800)
State Excise Tax	($557)	($557)	($557)	($557)	($557)	($557)	($779)	($1,336)	($1,336)	($1,336)	($1,336)	($1,670)	(11,132)
Utilities (Production Facility)	($200)	($200)	($200)	($200)	($200)	($200)	($280)	($480)	($480)	($480)	($480)	($600)	($4,000)
Propane (Production Facility)	($200)	($200)	($200)	($200)	($200)	($200)	($280)	($480)	($480)	($480)	($480)	($600)	($4,000)
Variable Labor	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($3,066)	($36,792)
Total Variable Operations	(110,464)	(10,542)	(10,542)	(10,542)	(10,542)	(15,538)	(13,532)	(21,008)	(21,008)	(21,008)	(21,008)	(25,494)	(291,227)
Total Variable Marketing	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Variable Costs	(110,464)	(10,542)	(10,542)	(10,542)	(10,542)	(15,538)	(13,532)	(21,008)	(21,008)	(21,008)	(21,008)	(25,494)	(291,227)
Variable Margin	(70,542)	29,380	29,380	29,380	29,380	24,384	42,358	74,804	74,804	74,804	74,804	94,272	507,207
Fixed Costs													
Equipment Loan Interest Payments	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(429)	(5,147)
Repair and Maintenance	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(400)	(4,800)
Tools, Dies, Fixtures	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(350)	(4,200)
Total Equipment Costs	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(1,179)	(14,147)

Year 1 Expense and Revenue	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Y1 Annual Total
Facilities													
Facility Loan Int. Payments	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(146)	(1,750)
Propane (Tasting Room)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(4,000)
Pest Control	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(175)	(2,100)
Computer Service	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(75)	(900)
Utilities (Tasting Room)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(333)	(4,000)
Total Facility Costs	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(729)	(8,750)
Promotional Costs	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(23,953)
Total Selling/Marketing Costs	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(23,953)
General/Administrative													
Mgmt./Admin. Support/Fringe and Overhead	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(10,417)	(125,000)
Fringe and Overhead (0.3)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(3,125)	(37,500)
Legal and Accounting	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(833)	(10,000)
Telecommunications	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(250)	(3,000)
Office Supplies and Miscellaneous	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(1,800)
Business Insurance	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(18,000)
Total General/Admin. Costs	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(16,275)	(195,300)
Unforeseen/Contingency													
Unforeseen Expenses (0.05) of Sales	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(1,996)	(2,795)	(4,791)	(4,791)	(4,791)	(4,791)	(5,988)	(39,922)
Bad Debt (0.03) of Sales	(1,198)	(1,198)	(1,198)	(1,198)	(1,198)	(1,198)	(1,677)	(2,874)	(2,874)	(2,874)	(2,874)	(3,593)	(23,953)
Total Fixed Costs	(23,373)	(23,373)	(23,373)	(23,373)	(23,373)	(23,373)	(24,650)	(27,844)	(27,844)	(27,844)	(27,844)	(29,760)	(306,024)
Brewery EBITDA	(93,915)	6,007	6,007	6,007	6,007	1,011	17,708	46,960	46,960	46,960	46,960	64,511	201,182
Tax Credits (may not apply)	-	-	-	-	-	-	-	-	-	-	-	-	-
Equipment Depreciation	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(485)	(5,823)
Building Depreciation	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(236)	(2,833)
Receivables Interest (30 days @ 0.085)	(283)	(283)	(283)	(283)	(283)	(283)	(396)	(679)	(679)	(679)	(679)	(848)	(5,656)
Net Brewery Income	(94,919)	5,003	5,003	5,003	5,003	7	16,591	45,560	45,560	45,560	45,560	62,941	186,871

Years 2 & 3 Expense and Revenue	Y2 Q1	Y2 Q2	Y2 Q3	Y2 Q4	Y3 Q1	Y3 Q2	Y3 Q3	Y3 Q4	Annual Total Y2	Annual Total Y3
Kegs (in barrels)	44	44	90	113	79	79	163	205	290	524
On Tap Flights (in barrels)	33	33	68	85	26	26	54	68	218	175
12 oz. Bottles (in barrels)	142	142	293	368	157	157	325	409	944	1,049
Income	$	$	$	$	$	$	$	$	$	$
Kegs	$17,233	$17,233	$35,616	$44,807	$28,613	$28,613	$59,133	$74,393	114,890	190,751
On Tap Flights	$22,297	$22,297	$46,081	$57,973	$17,895	$17,895	$36,983	$46,527	148,649	119,301
12 oz. Bottles	$92,456	$92,456	$191,076	$240,386	$97,342	$97,342	$201,173	$253,089	616,374	648,945
Souvenir Sales	$2,640	$2,640	$5,455	$6,863	$2,877	$2,877	$5,946	$7,480	17,598	19,180
Food Sales	$6,599	$6,599	$13,639	$17,158	$7,192	$7,192	$14,864	$18,700	43,996	47,950
Total Sales All Types	134,627	134,627	278,228	350,029	146,726	146,726	303,235	381,489	897,510	978,176
Variable Costs										
Catering Costs	(3,300)	(3,300)	(6,819)	(8,579)	(3,596)	(3,596)	(7,432)	(9,350)	(21,998)	(23,975)
Input Costs	($21,414)	($21,414)	($44,255)	($55,676)	($25,398)	($25,398)	($52,489)	($66,035)	(142,758)	(169,320)
Keg Packaging Costs	($20,328)	$0	($1,016)	$0	($20,976)	$0	($1,049)	$0	(21,344)	(22,025)
3 oz. Flights Packaging Costs	($23,109)	$0	($1,155)	$0	($25,538)	$0	($1,277)	$0	(24,264)	(26,815)
12 oz. Bottles Packaging Costs	($53,230)	$0	($2,662)	$0	($59,152)	$0	($2,958)	$0	(55,892)	(62,110)
Souvenir Costs	($528)	($528)	($1,091)	($1,373)	($575)	($575)	($1,189)	($1,496)	(3,520)	(3,836)
Beer Tax	($1,733)	($1,733)	($3,581)	($4,505)	($1,995)	($1,995)	($4,123)	($5,187)	(11,550)	(13,300)
State Excise Tax	($1,968)	($1,968)	($4,067)	($5,117)	($2,266)	($2,266)	($4,683)	($5,892)	(13,120)	(15,108)
Utilities (Production Facility)	(649)	(649)	(1,341)	(1,687)	(702)	(702)	(1,450)	(1,825)	(4,326)	(4,679)
Propane (Tasting Room)	(649)	(649)	(1,341)	(1,687)	(702)	(702)	(1,450)	(1,825)	(4,326)	(4,679)
Variable Labor	(15,183)	(15,183)	(15,183)	(15,183)	(15,498)	(15,498)	(15,498)	(15,498)	(60,732)	(61,992)
Total Variable Operations	(138,790)	(42,123)	(75,692)	(85,227)	(152,803)	(47,136)	(86,167)	(97,757)	(341,832)	(383,863)
Total Variable Marketing	-	-	-	-	-	-	-	-	-	-
Total Variable Costs	(138,790)	(42,123)	(75,692)	(85,227)	(152,803)	(47,136)	(86,167)	(97,757)	(341,832)	(383,863)
Variable Margin	(4,163)	92,504	202,536	264,802	(6,076)	99,590	217,068	283,732	555,678	594,314
Fixed Costs										
Equipment Loan Interest Payments	(1,234)	(1,234)	(1,234)	(1,234)	(1,179)	(1,179)	(1,179)	(1,179)	(4,936)	(4,716)
Repair and Maintenance	(1,236)	(1,236)	(1,236)	(1,236)	(1,273)	(1,273)	(1,273)	(1,273)	(4,944)	(5,092)
Tools, Dies, Fixtures	(1,082)	(1,082)	(1,082)	(1,082)	(1,114)	(1,114)	(1,114)	(1,114)	(4,326)	(4,456)
Total Equipment Costs	(3,552)	(3,552)	(3,552)	(3,552)	(3,566)	(3,566)	(3,566)	(3,566)	(14,206)	(14,264)

Years 2 & 3 Expense and Revenue continued	Y2 Q1	Y2 Q2	Y2 Q3	Y2 Q4	Y3 Q1	Y3 Q2	Y3 Q3	Y3 Q4	Annual Total Y2	Annual Total Y3
Facilities										
Facility Loan Int. Payments	(424)	(424)	(424)	(424)	(410)	(410)	(410)	(410)	(1,697)	(1,642)
Propane (Tasting Room)	(1,082)	(1,082)	(1,082)	(1,082)	(1,170)	(1,170)	(1,170)	(1,170)	(4,326)	(4,679)
Utilities (Tasting Room)	(1,082)	(1,082)	(1,082)	(1,082)	(1,170)	(1,170)	(1,170)	(1,170)	(4,326)	(4,679)
Pest Control	(541)	(541)	(541)	(541)	(557)	(557)	(557)	(557)	(2,163)	(2,228)
Computer Service	(232)	(232)	(232)	(232)	(239)	(239)	(239)	(239)	(927)	(955)
Total Facility Costs	(3,360)	(3,360)	(3,360)	(3,360)	(3,545)	(3,545)	(3,545)	(3,545)	(13,439)	(14,181)
Fixed Sales and Marketing										
Promotional Costs	(6,933)	(6,933)	(6,933)	(6,933)	(7,556)	(7,556)	(7,556)	(7,556)	(27,733)	(30,226)
Total Selling/Marketing Costs	(6,933)	(6,933)	(6,933)	(6,933)	(7,556)	(7,556)	(7,556)	(7,556)	(27,733)	(30,226)
General/Administrative										
Mgmt./Admin. Support/Fringe and Overhead	(32,813)	(32,813)	(32,813)	(32,813)	(34,453)	(34,453)	(34,453)	(34,453)	(131,250)	(137,813)
Fringe and Overhead (0.3)	(9,844)	(9,844)	(9,844)	(9,844)	(10,336)	(10,336)	(10,336)	(10,336)	(39,375)	(41,344)
Legal and Accounting	(2,500)	(2,500)	(2,500)	(2,500)	(2,500)	(2,500)	(2,500)	(2,500)	(10,000)	(10,000)
Telecommunications	(750)	(750)	(750)	(750)	(750)	(750)	(750)	(750)	(3,000)	(3,000)
Office Supplies and Miscellaneous	(450)	(450)	(450)	(450)	(450)	(450)	(450)	(450)	(1,800)	(1,800)
Business Insurance	(4,500)	(4,500)	(4,500)	(4,500)	(4,500)	(4,500)	(4,500)	(4,500)	(18,000)	(18,000)
Total General/Admin. Costs	(50,856)	(50,856)	(50,856)	(50,856)	(52,989)	(52,989)	(52,989)	(52,989)	(203,425)	(211,956)
Unforeseen/Contingency										
Unforeseen Costs	(6,731)	(6,731)	(13,911)	(17,501)	(7,336)	(7,336)	(15,162)	(19,074)	(44,876)	(48,909)
Bad Debt (0.03) of Sales	(4,039)	(4,039)	(8,347)	(10,501)	(4,402)	(4,402)	(9,097)	(11,445)	(26,925)	(29,345)
Total Fixed Costs	(75,471)	(75,471)	(86,959)	(92,703)	(79,395)	(79,395)	(91,916)	(98,176)	(330,604)	(348,881)
Brewery EBITDA	(79,634)	17,033	115,577	172,099	(85,471)	20,196	125,152	185,556	225,074	245,433
Equipment Depreciation	(1,456)	(1,456)	(1,456)	(1,456)	(1,456)	(1,456)	(1,456)	(1,456)	(5,823)	(5,823)
Building Depreciation	(708)	(708)	(708)	(708)	(708)	(708)	(708)	(708)	(2,833)	(2,833)
Receivables Interest (30 days @ 0.085)	(954)	(954)	(1,971)	(2,479)	(1,039)	(1,039)	(2,148)	(2,702)	(6,357)	(6,929)
Net Brewery Income	(82,752)	13,915	111,442	167,455	(88,673)	16,994	120,843	180,694	210,060	229,858

Expense and Revenue Summary	Y1 Monthly Avg.	Y1 Annual Total	% of Revenue	Quarterly Averages Y2 & Y3	Annual Total Y2	% of Revenue Y2	Annual Total Y3	% of Revenue Y3
Kegs	5	57		102	290		524	
On Tap Flights	19	230		49	218		175	
12 oz Bottles	72	861		249	944		1,049	
Income	$	$	$	$	$	$	$	$
Kegs	$3,109	$37,310	4.7%	$38,205	$114,890	12.8%	$190,751	19.5%
On Tap Flights	$12,437	$149,240	18.7%	$33,494	$148,649	16.6%	$119,301	12.2%
12 oz Bottles	$46,638	$559,650	70.1%	$158,165	$616,374	68.7%	$648,945	66.3%
Souvenir and Merchandise Sales	$1,244	$14,924	1.9%	$4,597	$17,598	2.0%	$19,180	2.0%
Food Sales	$3,109	$37,310	4.7%	$11,493	$43,996	4.9%	$47,950	4.9%
Total Sales All Types	$66,536	$798,434	100.00%	$897,510	$897,510	100.00%	$978,176	100.00%
Variable Costs								
Catering Costs	(1,555)	(18,655)	(2.3%)	(5,747)	(21,998)	(2.5%)	(23,975)	(2.5%)
Input Costs Per Barrel	(9,800)	(117,600)	(14.7%)	(39,010)	(142,758)	(15.9%)	(169,320)	(17.3%)
Barrel Packaging Cost	(2,109)	(25,313)	(3.2%)	(5,421)	(21,344)	(2.4%)	(22,025)	(2.3%)
Flight Packaging Cost	(2,656)	(31,871)	(4.0%)	(6,385)	(24,264)	(2.7%)	(26,815)	(2.7%)
Bottle Packaging Cost	(3,978)	(47,734)	(6.0%)	(14,750)	(55,892)	(6.2%)	(62,110)	(6.3%)
Souvenir Costs	(249)	(2,985)	(0.4%)	(919)	(3,520)	(0.4%)	(3,836)	(0.4%)
Beer Tax	(817)	(9,800)	(1.2%)	(3,106)	(11,550)	(1.3%)	(13,300)	(1.4%)
State Excise Tax	(928)	(11,132)	(1.4%)	(3,529)	(13,120)	(1.5%)	(15,108)	(1.5%)
Utilities (Production Facility)	($333)	($4,000)	(0.5%)	($1,126)	($4,326)	(0.5%)	($4,679)	(0.5%)
Propane (Production Facility)	($333)	($4,000)	(0.5%)	($1,126)	($4,326)	(0.5%)	($4,679)	(0.5%)
Variable Labor	($3,066)	($36,792)	(4.6%)	($15,341)	($60,732)	(6.8%)	($61,992)	(6.3%)
Total Variable Operations	(24,269)	(291,227)	(36.5%)	(90,712)	(341,832)	(38.1%)	(383,863)	(39.2%)
Variable Marketing Costs	-	-	0.0%	-				
Total Variable Marketing	-	-	0.0%	-				
Total Variable Costs	(24,269)	(291,227)	(36.5%)	(90,712)	(341,832)	(38.1%)	(383,863)	(39.2%)
Variable Margin	42,267	507,207	63.5%	143,749	555,678	61.9%	594,314	60.8%
Fixed Costs								
Equipment Loan Interest Payments	(429)	(5,147)	(0.6%)	(1,206)	(4,936)	(0.6%)	(4,716)	(0.5%)
Repair and Maintenance	(400)	(4,800)	(0.6%)	(1,255)	(4,944)	(0.6%)	(5,092)	(0.5%)
Tools, Dies, Fixtures	(350)	(4,200)	(0.5%)	(1,098)	(4,326)	(0.5%)	(4,456)	(0.5%)

Expense and Revenue Summary continued	Y1 Monthly Avg.	Y1 Annual Total	% of Revenue	Quarterly Averages Y2 & Y3	Annual Total Y2	% of Revenue Y2	Annual Total Y3	% of Revenue Y3
Total Equipment Costs	(1,179)	(14,147)	(1.8%)	(3,559)	(14,206)	(1.6%)	(14,264)	(1.5%)
Facilities								
Facility Loan Int. Payments	(146)	(1,750)	(0.2%)	(417)	(1,697)	(0.2%)	(1,642)	(0.2%)
Propane (Tasting Room)	(333)	(4,000)	(0.5%)	(1,126)	(4,326)	(0.5%)	(4,679)	(0.5%)
Pest Control	(175)	(2,100)	(0.3%)	(1,126)	(4,326)	(0.5%)	(4,679)	(0.5%)
Computer Service	(75)	(900)	(0.1%)	(549)	(2,163)	(0.2%)	(2,228)	(0.2%)
Utilities (Tasting Room)	(333)	(4,000)	(0.5%)	(235)	(927)	(0.1%)	(955)	(0.1%)
Total Facility Costs	(729)	(8,750)	(1.1%)	(3,453)	(13,439)	(1.5%)	(14,181)	(1.4%)
Fixed Sales and Marketing								
Promotional Costs	(1,996)	(23,953)	(3.0%)	(7,245)	(27,733)	(3.1%)	(30,226)	(3.1%)
Total Selling and Marketing Costs	(1,996)	(23,953)	(3.0%)	(7,245)	(27,733)	(3.1%)	(30,226)	(3.1%)
General/Administrative								
Mgmt./Admin. Support/Fringe and Overhead	(10,417)	(125,000)	(15.7%)	(33,633)	(131,250)	(14.6%)	(137,813)	(14.1%)
Fringe and Overhead (0.3)	(3,125)	(37,500)	(4.7%)	(10,090)	(39,375)	(4.4%)	(41,344)	(4.2%)
Legal and Accounting	(833)	(10,000)	(1.3%)	(2,500)	(10,000)	(1.1%)	(10,000)	(1.0%)
Telecommunications	(250)	(3,000)	(0.4%)	(750)	(3,000)	(0.3%)	(3,000)	(0.3%)
Office Supplies and Miscellaneous	(150)	(1,800)	(0.2%)	(450)	(1,800)	(0.2%)	(1,800)	(0.2%)
Business Insurance	(1,500)	(18,000)	(2.3%)	(4,500)	(18,000)	(2.0%)	(18,000)	(1.8%)
Total General/Administrative Costs	(16,275)	(195,300)	(24.5%)	(51,923)	(203,425)	(22.7%)	(211,956)	(21.7%)
Unforeseen/Contingency								
Unforeseen Expenses (0.05) of Sales	(3,327)	(39,922)	(5.0%)	(11,723)	(44,876)	(5.0%)	(48,909)	(5.0%)
Bad Debt (0.03) of Sales	(1,996)	(23,953)	(3.0%)	(7,034)	(26,925)	(3.0%)	(29,345)	(3.0%)
Total Fixed Costs	(25,502)	(306,024)	(38.3%)	(84,936)	(330,604)	(36.8%)	(348,881)	(35.7%)
Brewery EBITDA	16,765	201,182	25.2%	58,813	225,074	25.1%	245,433	25.1%
Equipment Depreciation	(485)	(5,823)	(0.7%)	(1,456)	(5,823)	(0.6%)	(5,823)	(0.6%)
Building Depreciation	(236)	(2,833)	(0.4%)	(708)	(2,833)	(0.3%)	(2,833)	(0.3%)
Receivables Interest (30 days @ 0.085)	(471)	(5,656)	(0.7%)	(1,661)	(6,357)	(0.7%)	(6,929)	(0.7%)
Net Brewery Income	15,573	186,871	23.4%	54,990	210,060	23.4%	229,858	23.5%

APPENDIX H: Pro Forma Operating Statements

	Y1	Y2	Y3
Revenues (Sales)	$798,434	$897,510	$978,176
Total Variable Operating Costs	($291,227)	($341,832)	($383,863)
Total Variable Marketing Costs	$0	$0	$0
Variable Margin (Loss)	$507,207	$555,678	$594,314
Total Equipment Costs	($14,147)	($14,206)	($14,264)
Total Facilities Costs	($8,750)	($13,439)	($14,181)
Total Selling and Marketing Costs	($23,953)	($27,733)	($30,226)
General and Administrative Expenses	($195,300)	($203,425)	($211,956)
Unforeseen and Contingency Expenses	($63,875)	($71,801)	($78,254)
Brewery Earnings EBITDA (Loss)	$201,182	$225,074	$245,433
Interest Expense	($5,656)	($6,357)	($6,929)
Depreciation Expense	($8,656)	($8,656)	($8,656)
Net Brewery Venture Income (Loss)	$186,871	$210,060	$229,848

APPENDIX I: Cash Flows

Year 1 Cash Flows	Ongoing	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year 1
Operating Activities														Annual
Net Income (Loss)	$0	($94,919)	$5,003	$5,003	$5,003	$5,003	$7	$16,591	$45,560	$45,560	$45,560	$45,560	$62,941	$186,871
Non cash charges to net income (loss)														
Depreciation	$0	$485	$485	$485	$485	$485	$485	$485	$485	$485	$485	$485	$485	$5,823
Tax Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) Decrease in current assets														$0
Accounts Receivable	$0	$55,890	$0	$0	$0	$0	$0	($15,969)	($39,922)	$0	$0	$0	($23,953)	($23,953)
Inventories														$0
Increase (decrease) in current liabilities														$0
Accounts payable and accrued expenses														$0
Accrued interest	$679	($283)	($283)	($283)	($283)	($283)	($283)	($396)	($679)	($679)	($679)	($679)	($848)	($5,656)
Net Cash Provided by (used in) Operating Activities	$679	($38,826)	$5,205	$5,205	$5,205	$5,205	$209	$711	$5,445	$45,366	$45,366	$45,366	$38,625	$163,085
Investing Activities														$0
Purchases of property and equipment	($147,050)													$0
Financing Activities														$0
Member contributions (distributions)	$64,115													$0
Other contributions		$283	$283	$283	$283	$283	$283	$396	$679	$679	$679	$679	$848	$5,656
Grants		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net borrowings (payments) on short-term loans or notes		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Principal payments on long-term loans		($351)	($351)	($351)	($351)	($351)	($351)	($351)	($351)	($351)	($351)	($351)	($351)	($4,207)
Proceeds from long-term debt borrowings	$102,935													$0
Net Cash Provided by (used in) Financing Activities	$20,000	($68)	($68)	($68)	($68)	($68)	($68)	$45	$328	$328	$328	$328	$498	$1,449
Net Increase in Cash	$20,679	($38,894)	$5,138	$5,138	$5,138	$5,138	$141	$757	$5,773	$45,695	$45,695	$45,695	$39,123	$164,534
Cash -beginning of period	$20,000	$40,679	$1,785	$6,922	$12,060	$17,197	$22,335	$22,476	$23,233	$29,006	$74,700	$120,395	$166,089	$40,679
Cash - end of period	$40,679	$1,785	$6,922	$12,060	$17,197	$22,335	$22,476	$23,233	$29,006	$74,700	$120,395	$166,089	$205,212	$205,212

Years 2 & 3 Cash Flows	Y2 Q1	Y2 Q2	Y2 Q3	Y2 Q4	Y3 Q1	Y3 Q2	Y3 Q3	Y3 Q4	Annual Total Y2	Annual Total Y3
Operating Activities										
Net Income (Loss)	($82,752)	$13,915	$111,442	$167,455	($88,673)	$16,994	$120,843	$180,694	$210,060	$229,858
Non cash charges to net income (loss)									$0	$0
Depreciation	$1,456	$1,456	$1,456	$1,456	$1,456	$1,456	$1,456	$1,456	$5,823	$5,823
Tax Credit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
(Increase) decrease in current assets									$0	$0
Accounts Receivable	$74,890	$0	($47,867)	($23,934)	$67,768	$0	($52,169)	($26,085)	$3,089	($10,487)
Inventories									$0	$0
Increase (decrease) in current liabilities									$0	$0
Accounts payable and accrued expenses									$0	$0
Accrued interest	($954)	($954)	($1,971)	($2,479)	($1,039)	($1,039)	($2,148)	($2,702)	($6,357)	($6,929)
Net Cash Provided by (used in) Operating Activities	($7,360)	$14,417	$63,060	$142,498	($20,490)	$17,411	$67,982	$153,362	$212,615	$218,265
Investing Activities										
Purchases of property and equipment	$0				$0				$0	$0
Sale of Property and Equipment					$0				$0	$0
Financing Activities										
Member contributions (distributions)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other contributions	$954	$954	$1,971	$2,479	$1,039	$1,039	$2,148	$2,702	$6,357	$6,929
Grants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Net borrowings (payments) on short-term loans or notes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Principal payments on long-term loans	($1,104)	($1,104)	($1,104)	($1,104)	($1,159)	($1,217)	($1,278)	($1,342)	($4,417)	($4,998)
Proceeds from long-term debt borrowings	$0								$0	$0
Net Cash Provided by (used in) Financing Activities	($151)	($151)	$867	$1,375	($120)	($178)	$870	$1,360	$1,940	$1,931
Net Increase in Cash	($7,511)	$14,266	$63,926	$143,873	($20,610)	$17,232	$68,851	$154,722	$214,555	$220,196
Cash -beginning of period	$205,212	$197,701	$211,968	$275,894	$419,767	$399,158	$416,390	$485,241	$205,212	$419,767
Cash - end of period	$197,701	$211,968	$275,894	$419,767	$399,158	$416,390	$485,241	$639,964	$419,767	$639,964

APPENDIX J: Depreciation

Production Equipment Purchased in Y1

Cost of Equipment	$97,050
Useful Life (years)	15
Salvage Value (%)	10%
Salvage Value ($)	$9,705

Depreciation for Equipment

Annual	$5,823
Monthly	$485

Building Purchased in Y1

Cost of Equipment	$50,000
Useful Life (years)	15
Salvage Value (%)	15%
Salvage Value ($)	$7,500

Depreciation for Equipment

Annual	$2,833
Monthly	$236

APPENDIX K: Balance Sheet

	Y1	Y2	Y3
Assets			
Cash and Equivalents	$205,212	$419,767	$639,964
Accounts Receivables	$66,536	$74,793	$81,515
Inventories	$0	$0	$0
Total Current Assets	$271,749	$494,560	$721,478
Buildings and Equipment, Net of Depreciation	$91,227	$85,404	$79,581
Other Assets, Net of Amortization	$0	$0	$0
Total Assets	$362,976	$579,964	$801,059
Liabilities and Members' Equity			
Current Liabilities			
Accounts Payable and Accrued Expenses			
Accrued Interest	($5,656)	($6,357)	($6,929)
Current Maturities of Long-Term Debt	($5,147)	($4,936)	($4,716)
Total Current Liabilities	($10,802)	($11,294)	($11,644)
Long-term Debt			
Senior Debt	$54,366	$50,539	$46,521
Less Current Maturities of Long-Term Debt	($5,147)	($4,936)	($4,716)
Members' Equity			
Member Equity and Equity Equivalents	$137,689	$335,595	$541,051
Dispersed Member Equity	$0	$0	$0
Retained Earnings (Losses)	$186,871	$210,060	$229,848
Total Liabilities and Current Members' Equity	$362,976	$579,964	$801,059

APPENDIX L: Description of Consultants

Virginia FAIRS, the Virginia Foundation for Agriculture, Innovation and Rural Sustainability, a 501 (c) (5) corporation organized in Virginia, as a business Development Center. With the assistance and support from partners such as the Virginia Farm Bureau Federation (VFBF), the Virginia Department of Agriculture and Consumer Services (VDACS), the Virginia Department of Business Assistance (VDBA) and Virginia Cooperative Extension (VCE), VA FAIRS offers assistance to individuals, Cooperatives, small businesses and other similar entities in rural areas to enable and assist cooperative and business development.

The mission of Virginia Fairs is to assist rural Virginians in developing and advancing their agricultural, economic and social interests to enhance their quality of life. The Center's goals are to facilitate and coordinate technical and financial assistance to provide traditional and innovative solutions that will allow farmers in Virginia to:

- transition from traditional production and marketing into more financially rewarding agricultural enterprises;
- develop value-added and high-value agricultural product and enhanced market opportunities;
- address challenges facing farmer's production and marketing resources;
- address issues affecting the sustainability of rural Virginia;
- establish a centralized resource for farmers to easily access cooperative development and value-added information; and,
- better utilize and coordinate the wide-ranging expertise available in Virginia and as such better facilitate and enhance current and future efforts and programs in these areas.

Christopher I. Cook is the Executive Director of VA FAIRS. He is as an agricultural enterprise development advisor with a broad range of planning, business creation and development skills, as well as strategic expertise. Mr. Cook has thirty years agricultural experience including organizing and developing farmer-owned start-up businesses, with a strong background in facilitating agricultural value added entitles through strategic planning. He has completed numerous feasibility studies and business plans in many areas of the agricultural industry including wine production, renewable fuels and meat processing in Virginia. His work experience covers two continents. He farmed in the United Kingdom on a 1,000-acre farm producing beef and small grains. His education includes a post baccalaureate certificate in accounting, the Certified Economic Development Financial Professional designation from the National Development Council, KY, and a MBA from the College of William & Mary.

How can you reach us?

Phone: (804) 290-1158
Email: info@vafairs.com
Website: http://www.vafairs.com

Profile

Since 2001, Matson Consulting, LLC has provided business expertise to many rural businesses, enabling them to thrive and grow. Located in Aiken, South Carolina, our enthusiastic staff possesses unique industry experience in helping our clients' projects succeed. Some of our clients include individuals, groups, producer cooperatives, state and local government entities, international organizations, and nonprofit foundations, working across the agricultural industry. We also partner with multiple groups including the USDA, the Virginia Foundation for Agriculture, Innovation and Rural Sustainability (VA FAIRS), Winrock International, and NC State University.
James Matson, principle and founder, has assisted hundreds of rural business endeavors for more than a quarter century. He has authored numerous works for scholarly, industry, and popular publications and worked in 18 countries on four continents.

Services

Grant Facilitation - We help clients through the entire grant process -- from identifying funding sources, to developing the grant application, to managing the grant. We specialize in many federal USDA grant programs, including the Value-Added Producer Grant (VAPG), the Rural Cooperative Development Grant (RCDG), and the Farmers' Marketing and Local Food Promotion Program (FMLFPP). We have successfully secured over $50 million in grant funding to help our clients' projects.

Feasibility Studies - We work with clients to evaluate their projects and determine their viability. Our founder wrote the USDA's Cooperative Feasibility Study Guide, which we have used in creating hundreds of feasibility studies for a variety of projects including food hub operations, wineries, cideries, livestock and poultry processing, and value-added fruit and vegetable production.

Business Planning – We transform client ideas and operations into a targeted business plan that can help a business get organized and financed. Our business plans have been praised by financiers for their detailed information and clear presentation.

Industry Publications and Presentations – We strive to develop and share our knowledge within the industry, which we accomplish by creating and publishing multiple articles and reports. Many of our publications expand on industry research or attempt to fill a gap in existing research. Within the past four years, we have published 15 articles, reports and papers on food hubs and local food initiatives. Overall, we have created over 20 documents, published across the nation. We have also presented at multiple conferences to share our work on food hubs. A full list of our work can be found at www.matsonconsult.com/OurWork.html.

How can you reach us?

Phone: (803) 233-7134
Email: jmatson@matsonconsult.com
Website: http://www.matsonconsult.com