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Understanding Profitability of Small-Scale Agriculture in Utah

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UNDERSTANDING PROFITABILITY OF SMALL-SCALE AGRICULTURE IN UTAH

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Abstract

Small-scale agriculture production has increased in Utah. Utah has lost much of its farmable land due to increased development. The increased development and influx of people has increased the demand for food supply, resulting in many beginning to producing their own food. This increase in individuals producing their own food has inherently increased the number of micro farms within Utah. This increase in the number of small-scale operations has left many wondering if these operations are both profitable and worth the effort it takes to operate them. As such, this paper will analyze the budget for three activities: (1) raising a steer for beef, (2) maintaining chickens for eggs, and (3) producing a garden full of mixed vegetables.

Chapter I – Introduction

Utah has been a farming state since it was first settled by Mormon Pioneers in 1847. By 1900 there were over 400 farm towns established (Agriculture, 1994). Although there were many farm towns, the resources within Utah have become limited. According to the United States Department of Agriculture (USDA) National Agriculture Statistics Service in the state of Utah from 2012 to 2017, there has been an increase in the number of 1.0-to-9.9-acre farms in operation. Specifically, it increased from 5,205 farms to 6,181 farms. The 10.0-to-49.9-acre farms in operation also increased between 2012 to 2017 from 5,239 farms to 5,254 farms. Overall, farmland acreage is declining in Utah leading to increased numbers of small urban parcels. The 2017 Agriculture Census conducted by the USDA, reported that from 2012 to 2017, Utah lost 16,792 acres of farmland (Expected, 2021). There has been an influx of people in Utah which has led to two things, people having a desire to run a micro agriculture production and larger farms selling out due to increased development in the area. In Appendix A there are three figures depicting graphs that display the number of farms respectively to the number of acres.

Salt Lake County has seen a decrease in micro farms from 2012 to 2017. which is due to the rapid growth in the heart of the county. There has been an increase in housing to provide for the increase in population. According to the 2010 and 2020 censuses Salt Lake County has grown from 1,032,997 to 1,186,421 people— a 14.9% change in population. While the U.S. population grew by only 7.3%, the whole state of Utah grew by an astonishing 20.3%.

With an influx of people, comes high demand for houses. In 2011, Governor Gary Herbert created the Utah Agricultural Task Force comprised of state legislators, local government officials, conservation districts, agricultural producers, and other interested parties. They came together to gather and analyze data and information, and to make recommendations

to promote the sustainability of all types of agriculture in Utah. What it found is that "[U]rban farms are also adding to our local food supply. These are small acreage operations growing vegetables, fruits, eggs, honey, and sometimes meat, for the consumer market. What distinguishes them is that they are in cities, or suburbs, rather than far away in rural areas. The other difference is that they often use different marketing strategies such as farmers markets or Community Supported Agriculture (CSA) subscriptions to sell their products." (Utah, 2012). Thus it is clear micro farms are becoming more prominent in the state and are adding value to their communities by providing food security and boosting the local economy.

With the increased number of micro farms within Utah, there is an increased need for example budgets for Utahns to refer to. Utah State University Extension provides research-based programs and resources with the goal of improving the lives of individuals, families, and communities throughout Utah. In fact, the Utah Agricultural Task Force specifically recommended partnering with USU Extension for these helpful resources. USU Extension operates through a cooperative agreement between the United States Department of Agriculture, Utah State University, and county governments (University, 2022). One of the many resources provided by USU Extension is enterprise[1] budgets, which are available to anyone to reference if they want to participate in growing or raising a small- or large-scale operation. Enterprise budgets include all the costs and returns associated with producing one enterprise in a particular manner. Enterprise budgets are constructed on a per unit basis, such as per acre or per head, to facilitate comparisons among alternative enterprises.

[1] An enterprise is any activity which results in a product used on the farm or sold in the market. Examples of enterprises include an acre of wheat, a cow producing calves, and an acre of summer fallow ground (Importance, 2005).

Many universities publish enterprise budgets with information relevant to their given area. Kansas State University, University of Nebraska-Lincoln, Texas A&M University are just a few of the many universities that update their budgets on a yearly basis. While Utah State has many budgets updated consistently, this paper will analyze budgets either not previously done by USU Extension or that differ in their capabilities. Utilizing USU Extension's budgets, this paper will focus on backyard beef, chicken eggs, and mixed vegetable production. First, while USU Extension has produced several cattle budgets, none have been primarily focused on purchasing steers at a low weight and feeding them to finish. Many people do not want to deal with breeding and calving but still want to enjoy feeding cattle and harvesting. As such, this paper provides a budget for purchasing and raising steers. Second, USU has never produced a chicken egg budget. As such, this paper provides a budget for purchasing and maintaining laying hens. Finally, although USU Extension has produced several mixed vegetable budgets, which have been updated throughout the years, the budget provided herein will differ by offering an interactive component. Notably, it will allow the user to input how many square feet of each given crop will be planted and it will output the cost and returns associated with that.

Chapter II – Importance of Enterprise Budgets

Enterprise Budgets may be used by many people for various reasons. These budgets will have the expected receipts and costs associated with each product. The prices associated with each can vary depending on the region and time of year. Oklahoma State University states that "[E]nterprise budgets are designed to provide a decision framework for short- and long-range economic analysis of production agriculture. Enterprise budgets assist in understanding the costs and returns of a production activity, identifying potential sources or risk and evaluating alternatives" (Sahs, 2022). When the user can understand the costs associated with the product

they are better able to make sound business decisions and understand what goes into producing the product.

Michigan State University states that "enterprise budgets can help you make simple and strategic management decisions. On the simple decision front, you could project fertilizer costs will be higher this year, so you can either look for ways to reduce this cost or explore other cost reductions. As another example, suppose after creating the enterprise budget you determine you have a high equipment depreciation and decide to sell an underutilized tractor" (LaPorte, 2021). The budgets can be adapted to suit a variety of different needs. The budgets are only an example of possible receipts and expenses.

The budgets are important because they provide a basepoint for the users to then manipulate to represent their operation. The ability to manipulate the budgets based on the way the market is heading gives the users an opportunity to do a sensitivity analysis and determine if the product is worth producing to them. This variability allows the budgets to be used by a wide variety of people and still be applicable to them.

Chapter III – Beef Budget

Beef is a staple in most American diets, according to the 2019 USDA Food Availability data the average American eats approximately 55 pounds of beef annually (Kovachevska, 2022). There are many ways for families to obtain their beef: the grocery store, local meat shop, or by raising their own beef and having it processed at a local butcher shop. While raising beef requires input and daily care, many prefer the taste of premium homegrown beef versus purchasing their meat in the grocery store. To aid these homegrown producers this chapter will analyze the costs associated with raising beef in small-scale production. When determining the number of calves to be purchased the buyer will determine how much land they have available

and if they are wanting to grain finish in confinement or grain finish on pasture. To grain finish in confinement one cow needs as little as 150 square feet with a sufficient water source depending on the condition of the pen and ground within (Beck, 2021). To grain finish on pasture, the general rule of thumb is 1 acre to 1 cow, but that can vary based on soil quality, irrigation, grass type, and weather. Grass-fed beef can also be done, the last three months of the animal's life it would not receive the additional grain that the said grain finished beef would. Discussed below will be a budget with cattle grain finished on pasture. Budgets for cattle grain finished in confinement can be found in Appendix B.1.

The budgets will assume five head of cattle will be raised and that one will be kept for personal consumption while the remaining four will be sold based on live weight. The steers will be purchased in October and slaughtered in September. They will be raised on pasture and grain finished. It is assumed that in Northern Utah they will graze from May to October and be supplemented with hay and bed with straw in the off months. The steers will be grain finished 90 days (about 3 months) prior to slaughter. See Appendix B.2 for the annual grazing schedule. For this budget Palisade's @RISK software (2022) will be utilized to introduce the uncertainty that comes with steers gaining weight at different rates and prices continually fluctuating. The deterministic budget fact sheet information can be found in Appendix B.

Data

At the Salina, Utah auction there are feeder cattle selling anywhere from 200lbs to 1,000lbs. According to the University of Florida, it is recommended producers sell their feeder calves between 300lbs and 400lbs (At, 2017). While Farmdoc daily recommends selling any time before 750lbs (Zwilling, 2021). For this budget, it will be assumed that the calf weight is

between 400lbs and 500lbs. The price per pound is from the Salina, Utah auction data which includes prices from October 2021 to November 2022.

It is estimated that the steers will gain between 1.5lbs and 2.5lbs per day (Step, 2022). The feed inputs include hay prices, calculated from January 2019 to December 20222. It also includes prices for a grain mix consisting of 50/50 oat and corn, calculated from December 2006 to December 2022. The hay prices range from January 2019 to December 2022. The oat price came from NASS Quick Stats and the corn price came from Livestock Marketing Information Center. For the months the steers are being fed hay they will require 2% of their body weight (How Much Hay, 2020). For grain finished steers they need roughly 90 days (about 3 months) on grain before slaughter (Taylor, 2022). The steers will be fed 20 pounds of grain per day in order to achieve additional marbling (Step). Purina states that a 250lb mineral tub would last 50 cows 10 days, so a 125lb tub would last 5 cows 25 days. For this budget we will figure the steers will get a new tub once a month. The mineral tub costs $99 at the local Tractor Supply (Wind, 2022). Bedding the steers in straw during the cold months helps to lower their nutritional requirements as they are able to stay warmer. The steers will need 80lbs of straw per head per month (Bedding). The price of straw was determined by the 2022 USU Cow-Calf Enterprise Budget at $115/ton based on local markets.

The budget also includes the cost of supplies, estimated to be $339.96. The hose was figured to cost $29.98 at Lowe's (Neverkink, 2022). The Rubbermaid 100-gallon water tank is $109.99 at Ace Hardware (Rubbermaid, 2022). The grain trough is $199.99 at Tractor Supply (10, 2022). Any other supplies are assumed to be previously owned. The fuel and transportation costs were calculated assuming each steer would travel 55 miles, which includes travel from auction and travel for one steer to the slaughter plant. The cost per mile is $1.35 (Find, 2022).

The cost of vet/medical per steer is $25 (Cow-Calf, 2021). The pasture fertilizer is $34.99 at Tractor Supply. One 50lb bag of fertilizer covers 15,000 square feet (16-6-16, 2022). Because 5 acres is equivalent to 217,800 square feet, the pasture will need 14.5 bags of fertilizer, which will round up to 15 bags.

The price that the fat steers will be sold at will come from the Salina, Utah auction data and the prices are from October 2021 to November 2022. The weight of the fat steers is estimated to be between 1,200 and 1,400 pounds. The budget is assuming that, of the 5 steers raised, 4 are sold on live weight and 1 is kept for personal consumption. To account for the meat that is kept, the price of retail beef is used to symbolize the amount of money it would cost to have purchased all the meat at the grocery store. The opportunity cost for utilizing the five-acre pasture for five steers instead of leasing it out as irrigated pasture is $695.31. The income for leasing out the pasture is $4.10/acre (Land, 2022) plus $105 of fertilizer was figured into the payment, for a total of $125.50. The landowner will have to decide if irrigating and feeding the animals is worth the additional money or if the steady rent income and having no maintenance is their preference. The slaughter and cut/wrap fees are determined by Theurer's, which is a local butcher shop (Service). The amount of beef received from the fat steers is calculated at 41.7% of the live weight (How Much Meat, 2022).

Method

This risk analysis will determine the expected profitability associated with raising steers. The data and assumptions discussed above will be presented in a budget and evaluated with the utilization of @RISK. Appendix B.3 includes the stochastic variable distributions and a graph of all the historical prices. The daily steer gain, feeder purchase weight, and fat steer weight all utilized the Palisade @RISK function '=riskuniform'. The risk uniform function informs @RISK

there is a uniform likelihood of the number being between the two numbers given. This function is the most appropriate for these stochastic variables because the animals will be purchased at varying weights, will gain at varying weights, and therefore finish at varying weights. The deterministic variables are as follows: straw/bedding $/ton, mineral cost, supplies, fuel/transportation, vet/medical, and pasture fertilizer. All the prices and amounts for these were discussed in the data section and can be seen in Appendix B.4.

The 'Budget Inputs' tab consists of the variables discussed above. The annual grazing schedule found in Appendix B.2, coincides with the 'Calendar' tab which houses the amount of feed necessary each month and is found in Appendix B.5.

The pounds of hay per head is determined by the grazing schedule, if there is a 1 indicating you are feeding the steers that month the pounds of hay per head will be calculated by multiplying the steer weight in that month by 2% multiplied by the number of days in the month. The 2% of the steer's weight is the amount of hay the steer should consume in a day. The cost of hay per head utilizes pounds of hay per head multiplied by alfalfa hay price/ton which is located on the 'budget inputs' tab divided by 2,000 since the amount is in pounds but the cost is per ton. The pounds of grain per head is 20lbs per day with the grain only being fed the last 3 months. The cost of grain per head is then figured by the pounds of grain per head multiplied by the 'Grain Mix price/lb' which is found on the 'Budget Inputs' tab. The pounds of straw per head is determined by the grazing schedule, if there is a 1 indicating you are bedding the steers then the amount needed will be 80lbs per head per month. The cost of the straw is then calculated taking the pounds of straw multiplied by the 'Straw/Bedding price/ton' which is located on the 'Budget Inputs' tab divided by 2,000 since the amount needed is in pounds and the cost is in tons. The totals are then at the end, which will tie into the overall budget.

Results

Appendix B.6 shows the results of the budget. The 'Total Income' indicates a positive value. Appendix B.7 is the simulated 'Total Income' distribution with 10,000 iterations incorporating all the stochastic variables discussed in the previous section. The minimum total income is -$3,502.42 and the maximum is $4,411.96. The downside risk of losing money raising beef is 19.6%. Appendix B.8 shows the tornado graph of the simulation and what has the most effect on the total income. The fat steer sale price has the highest effect on the total income. The order in which the inputs have the most effect is as follows; fat steer price, fat steer weight, price of oats, feeder purchase weight, price of corn, price of feeder calf, price of retail beef, and the price of hay (see Appendix B.8 for specific dollar amounts).

Chapter IV – Chicken Eggs

Eggs are a healthy source of protein and minerals and something many people eat daily. There has been an increase in all food prices at the grocery store and an increase in food grown at people's homes since COVID-19. Retail food prices spiked as a result of significant frictions in the food supply chain that prevented the free flow of some commodity food products from foodservice and toward supermarkets and grocery stores (Malone, 2021). We have since seen another increase in retail food prices with an avian influenza outbreak. "Highly pathogenic avian influenza (HPAI)—a disease infecting birds and poultry—struck egg-laying hens throughout 2022. As a result of recurrent outbreaks, U.S. egg inventories were 29 percent lower in the final week of December 2022 than at the beginning of the year. By the end of December, more than 43 million egg-laying hens were lost to the disease itself or to depopulation since the outbreak began in February 2022. The average shell-egg price was 267 percent higher during the week leading up to Christmas than at the beginning of the year and 210 percent higher than the same

time a year earlier." (Avian, 2023). The increase in egg prices led many people to look into raising chickens to produce their own eggs. This chapter will analyze the costs and returns associated with owning 10 laying hens. It will utilize @RISK to account for the variation in eggs laid per year and price of eggs. A fully deterministic budget fact sheet can be found in Appendix C.

Data

Ten chicks will be purchased at Tractor Supply for $39.99 or $3.99 each. The chickens are the brown and white egg production assortment and may include the following breeds: ISA Brown, Amberlink, California White, White Leghorn, Production Red, Black Sex Link, and Rhode Island Red. These breeds are hardy enough to withstand cold Utah winters and are tolerant to confinement (Poultry). The birds are 12 hours old when shipped and must be placed in a brood box to keep the chicks warm until they are able to regulate their own temperature (Raising, 2022). The chickens will lay eggs for approximately 4 years and then they will need to be replaced with new chicks. The chicks will be in a brood box for 6 weeks (about 1 and a half months) (4, 2022). The brood box will consist of a 110-gallon stock water tank ($92.99), heat lamp ($24.98), thermometer ($5.16) to check the temperature of the box and decrease it each week for 6 weeks (5154 Wall, 2023), and their feed and water (Poultry, 2023). The chicken coop is from Tractor Supply and can house up to 14 chickens, there are 3 nesting boxes and 3 roosting bars for $999.99 (Poultry, 2023).

The chicks will be on IFA chick starter feed ($26.99/50lb bag) from the time they arrive to 8 weeks. Each chick will eat approximately 1lb of feed each week (How Much Does, 2023). From 8 weeks until approximately 18 weeks (about 4 months), which is approximately when most chicks begin laying eggs, they will eat IFA pullet developer ($25.29/50lb bag) which is a

transitional feed to the IFA poultry layer crumble (24.99/50lb bag) which is what the chickens will eat for the rest of their lives. A grown chicken will eat approximately 1.5lbs of feed each week (How Much Does, 2023). The chickens will have free access to water and will be fed out of a feed box from Tractor Supply for $9.99 and waterer for $44.99 (Poultry, 2023).

Chickens need to have bedding in their brood box and coop for many reasons. The main reason is to insulate the floor from the outside weather. It also acts as a cushion for the birds and their eggs if they were to fall from the nesting box. The bedding helps when it comes time to clean the coop, which should be cleaned once a week with a half a bag of a 5.5 cubic ft pine shavings bag ($6.79) being replaced each time (Poultry, 2023). The egg production rate according to Tractor Supply is 260-300 eggs. To account for Utah's cold climate and longer winter it is assumed that the chickens will lay approximately 225 to 260 eggs per year once they are in full production. Chickens typically begin laying at 18 weeks but during their first year they may not produce many eggs at all depending on the time of year (Fox, 2021). The egg count is assuming what the chicken will produce in a year once it is in full production.

Method

This risk analysis will determine the expected profitability associated with raising chickens. The data listed above will be presented in a budget and evaluated with the utilization of @RISK. Listed below is each stochastic value and how the stochastic numbers were determined. The price of eggs is a stochastic variable fit with a distribution from historical prices from NASS Quick Stats. To account for the premium farm fresh eggs, all the real historical prices were increased by one dollar to be conservative based on the $1.63 difference between Egglands grade A white eggs and Egglands organic grade A brown eggs at Walmart in April 2023. Appendix C.1 shows the stochastic variable distribution and a graph of all the historical prices.

The number of eggs produced was not fit from a historical yield but was instead given an @RISK formula based on the typical production of the breeds of chickens.

The 'Chicken Eggs' production ranges between 225 and 260 eggs per year and the function is as follows:

=RiskTriang(225,245,260)

The risk triangle function informs @RISK the minimum, most likely, and maximum numbers that are given, in that order. This function is the most appropriate for this variable because each chicken has the potential to lay more or less eggs, but typical production will be near 245 eggs. The deterministic variables are as follows: feed, bedding, brood box, heat lamp, thermometer, chicken coop, waterer, and feeder. All the costs were discussed in the data section and can be seen in the budget in the '*Results*' section.

Results

Appendix C.2 is the budget results for chicken eggs. Having chickens is costly at $596.20 each year but if the chickens produce 233 dozen at $3 there is a slight profit to be made. Appendix C.3 is the simulated 'Total Income' distribution with 10,000 iterations incorporating all the stochastic variables discussed in the previous section. The minimum total income is -$180.58 and the maximum is $2,207.09. The downside risk of losing money raising chickens for eggs is 44.3%.

Based on the price of eggs over the past year, chicken eggs are a viable option. In the past the price of eggs has been around $1.00, and, in that instance, this would not be a viable option. The price of eggs has the biggest influence on profitability, if the price of eggs dropped again the profitability would decrease, as reflected in Appendix C.4. In this figure, the egg price fit is using original egg prices from September 2021 to December 2022 and not accounting for the premium of farm fresh eggs. The downside risk increases to 77.9% chance of losing money.

Appendix C.5 shows the tornado graph of the results and indicates that the price per dozen has the highest impact on the total income.

Chapter V – Mixed vegetable budget

Vegetable gardens are something many people choose to participate in whether for their own consumption or to sell at a local farmers market. Planting a garden allows the grower to determine what pesticides are on their crops and it is a good way to get a large supply of vegetables to preserve through canning. Most vegetable budgets are set up as a set space and the receipts and costs are associated with the given allotted space. This budget is set up as an interactive budget where the user can update the square feet planted for each given vegetable and it will update throughout the budget.

Data

While this budget is an interactive per square foot budget the yield and prices are based on production experience at the Urban Farming Demonstration Gardens in Kaysville, UT. The yields are actual yields based on the years they were harvested at the garden from 2020 to 2022. The prices are from USDA published national wholesale prices and were used to show a ‘worst case scenario' since farmers market prices consistently bring in a premium for each crop. The variable expenses are associated with the square foot interactive function. The plants that require a cage are multiplied by the price of the cage and the square footage to get the total price of the cages and then divided by 10 to account for the useful life of said cage. The other miscellaneous expenses are all in accordance with the information given from the garden in Kaysville and then accounted for the price per square foot to get the total cost based on how many square feet. The fixed garden expenses are expenses that come whether you plant 100 square feet or 5,000 square feet. The water share is left blank for the user to include their own number of shares and cost of

said share. The irrigation system was based on the Kaysville garden and then sectioned out into per square foot costs. The number of controllers and solenoids are left to be changed depending on the size of the garden. The rest of the supplies use the total cost but are then calculated out to incorporate the number of useful years the supply has. The optional garden expenses are for those that wish to build a fence (Hansen, 2022) around their garden or have a metal storage shed (Outdoor, 2023). The mixed vegetable budget can be seen below in Appendix D.1.

Methods

By changing the number of square feet planted for each vegetable the overall costs and receipts associated will change. If the user desires to take their vegetables to the farmers market it is in their best interest to determine which vegetable is most desirable and whether it is a high value crop. If they are strategic about which mix of vegetables are planted there potential to increase the total revenue.

The budget shown in Figure 20 does not show the costs associated with marketing, and boxes that are associated with taking produce to the farmers market. It is not included in the initial budget because some may choose to sell their produce in a different avenue or not at all and are curious about the money they are 'saving' by planting a garden themselves. Labor is a variable that can change drastically depending on the size of the garden. If the garden is large there may be a need to hire additional people, but it is also a reason to purchase tools to assist. An estimated cost per square foot has been figured utilizing the labor hours from the Kaysville Garden vegetable portion of 117 hours and divided by the total vegetable square feet of 1,860 and then multiplied by $15 to estimate the per square foot cost of labor. Cody Zesiger with Utah State University Extension has done studies regarding tools for small acreage and the opportunity costs associated with that.

For soil prep there are options such as a shovel, tiller, two-wheel tractor, and a tractor. Appendix D.2 shows the times and costs associated with these tools. The size of the garden plays a large role in the decision of which tool to use. Soil prep is an important factor to the health and productivity of vegetables. Another tool that has a large impact on cost and time are planting tools. Appendix D.3 shows the times and costs associated with sowing 8 rows with a seeder, sowing 8 rows by hand, transplanting by hand with a dibbler, and transplanting with paper pot. There are several ways to prepare a garden depending on which way works best for the gardener. The labor costs ride on the fact of which tools are available and the size of the garden. The price for boxes and marketing can vary, as some may only show up to the farmers market and that is the only advertising they do while some may choose to set up a website and have ads on the local radio station.

Chapter VI – Conclusion

According to the budgets analyzed throughout this paper, small-scale agriculture production in Utah can be profitable. It is not a guarantee as the margins are thin for all the budgets. However, all these budgets are just one hypothetical example of what could happen. There are numerous ways to revise the outcomes. For the beef, there are ways to reduce costs and increase receipts. Beef has many inputs and there may be ways to find a feeder steer cheaper than what was quoted due to a neighbor looking to get rid of some of their herd quickly. It is also possible to decrease mineral costs, shop for cheaper hay, or evaluate other options of maintaining animal quality of life while decreasing costs elsewhere.

For chickens, operations may reduce food waste and feed cost by feeding table scraps and other food waste. Further, many of the items such as the brood box, chicken coop, and heat lamp can be found second hand on local classifieds. With proper nutrition and care the chickens

should lay more eggs and therefore may also increase profit. While there are fewer inputs that go into chickens, any way a farmer might reduce costs will increase the farmer's overall profit.

Finally, for mixed vegetables cost may be saved by harvesting seeds from vegetables the prior year rather than purchasing new seeds each year. Further, as stated in the vegetable chapter, increasing the square footage planted in high value crops will help ensure that there is a profit at the end of the season. The size of the garden has a big influence on all of the costs, the smaller-scaled gardens are more likely to make less money because they will use hand tools and little marketing while larger gardens will require more expensive equipment. The equipment will cost more but it will also reduce the labor time. The options for vegetables are endless.

Overall, small-scale agriculture production in Utah is still possible even with decreasing farmland. The micro farms are proven to have potential for modest profitability and help Utah become more self-sustainable by providing more foods that are grown locally for personal benefit and also for possible sales at a local farmers market. It is also shown that agriculture is cyclical and there may be years that the micro farm loses money, and the grower needs to be prepared for that possibility. However, by continuing to farm it is keeping the heritage of Utah and providing ways for many to learn the value of where their food is grown.

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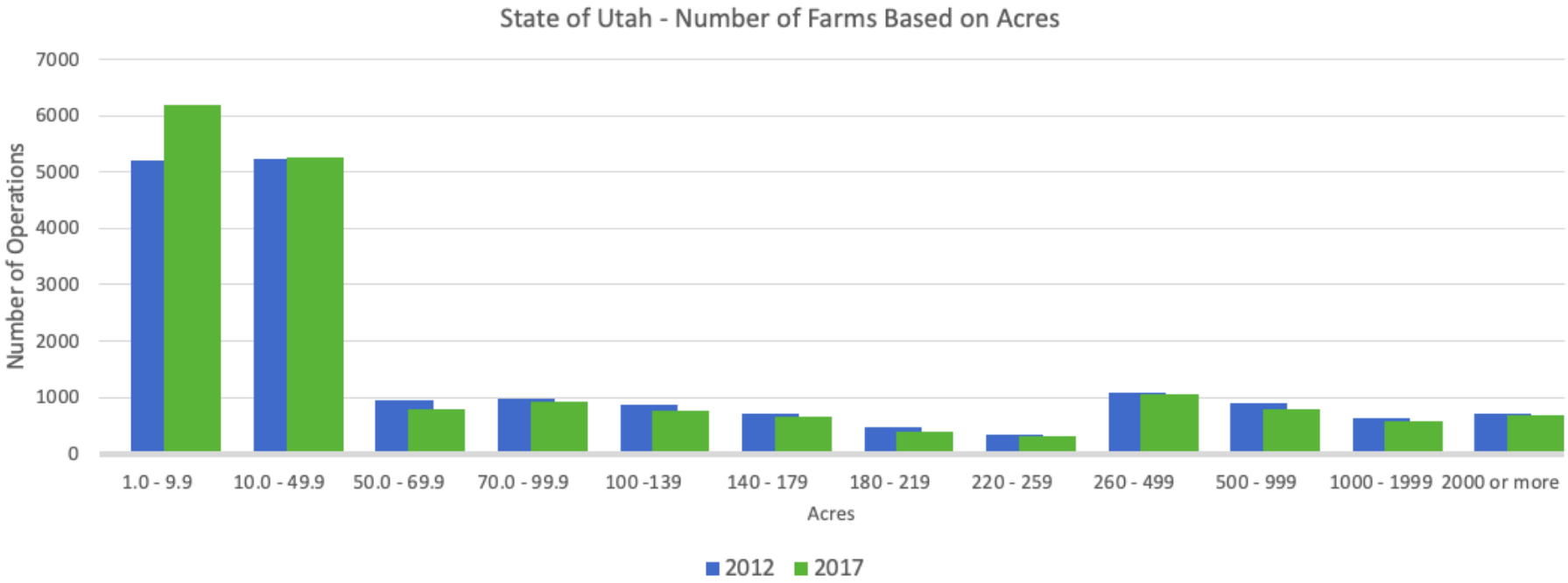
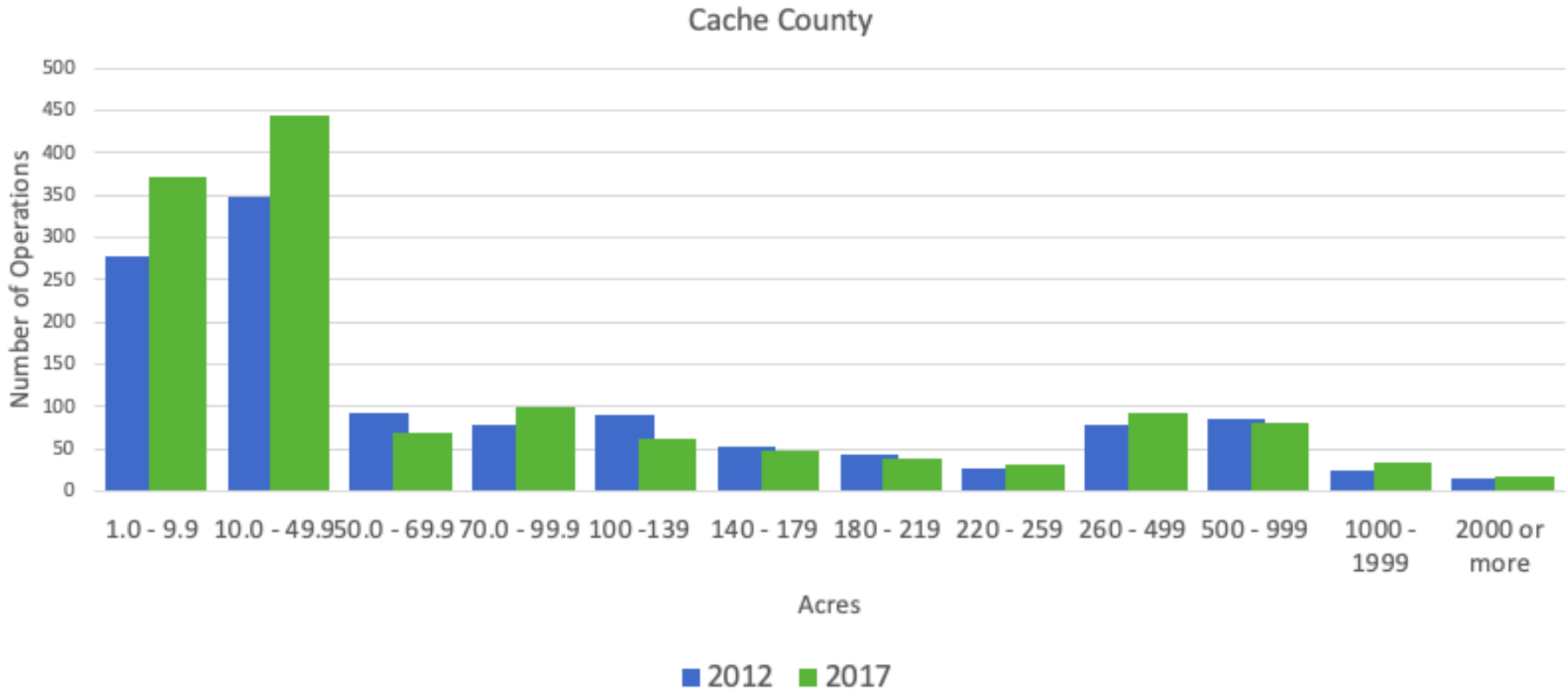
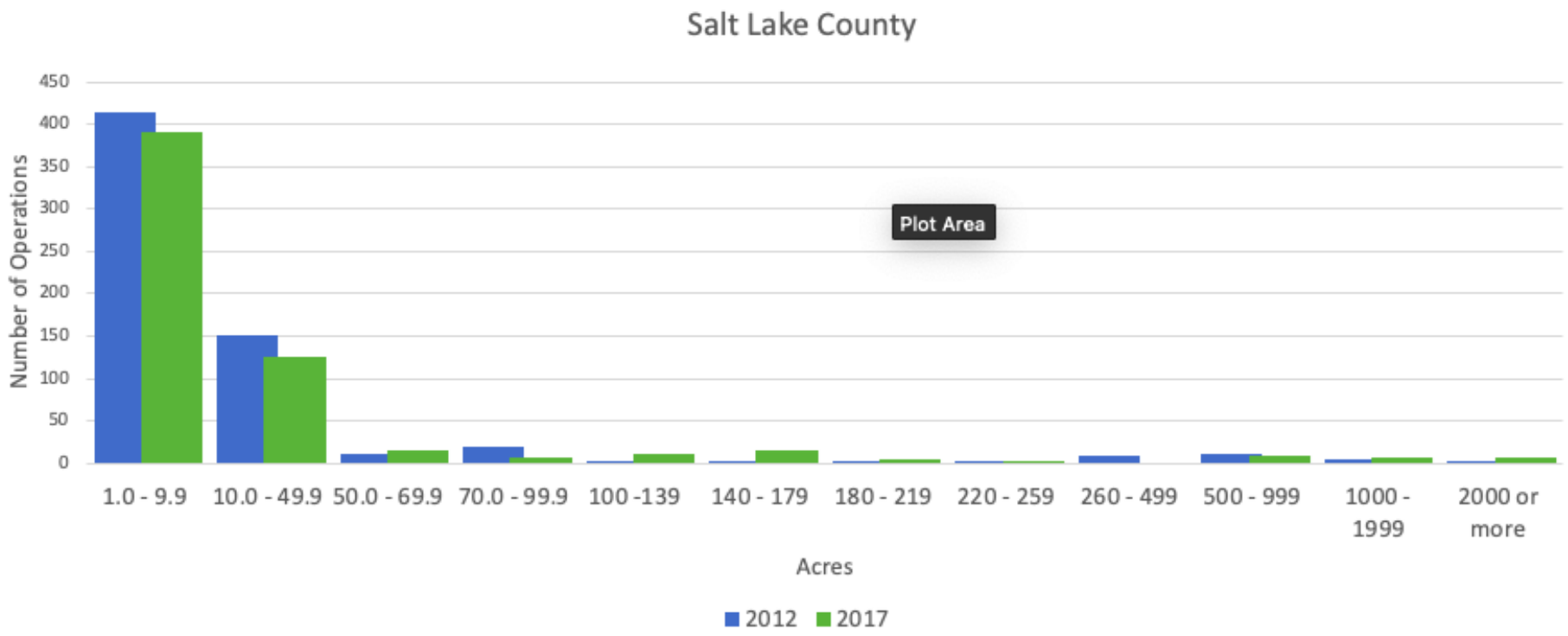
Appendix A: Number of Farms in Utah Graph



Appendix A.1 Number of Farms in Cache County Graph



Appendix A:2 Number of Farms in Salt Lake County Graph



Appendix B: Beef on Pasture Fact Sheet

Economics of Northern Utah Backyard Beef on Pasture, 2023

Introduction

Economics of beef raised on pasture and grain finished for consumption in Northern Utah. This publication is intended to be a guide used to make production decisions and understand the costs associated with raising beef. All that is included in the budget may not be applicable to all producers and the grazing period may vary based on precipitation/irrigation, soil type, and grass variety.

Production Description

Land: The represented land is five acres of fenced irrigated pasture. The land can graze one head per acre, so the land will house five steers. The steers will graze from May to October and will receive a supplemental diet of hay during the winter months.

Beef/Steers: The steers will be purchased as feeder cattle at 500lbs and will cost $1.65/lb based on Salina, UT auction prices. The steers are assumed to be purchased in October and fed hay through the winter. The steers will graze pasture beginning in May and will transition into grain supplementation three months prior to slaughtering. The calves are said to gain approximately 2lbs per day, the calves were purchased at 500lbs their final weight will be approximately 1,230lbs (Step). The selling price of the steers at $1.30/lb is based on Salina, UT auction prices. The price of retail beef is $7.60/lb which is essentially what the steer purchaser would be paying for beef in the grocery store had they not raised and slaughtered beef to keep for themselves.

Production Practices

Feed: The pasture is assumed to graze the steers from October when the steers are first purchased and then fed hay and bed with straw during the winter months of November to April. The amount of hay fed calculated by 2% of the steers body weight, and the steers gain 2lbs per day which can be calculated based on their purchased weight on a monthly basis (How Much Hay, 2020). Beginning in May the steers will graze pasture until their slaughter date in the end of September. Three months prior to slaughtering, in this case would be July, the steers are fed 2lbs of grain per 100lb of body weight. When the steers are eating grain the hay will decrease to 7lbs of hay per day per steer (Step).

Veterinary: Total veterinary costs for the steers are assumed to be $25, which includes vaccinations, etc (Cow-Calf, 2021).

Pricing: The price of hay at $225/ton is based on data from NASS Quick Stats. The price of grain is based on Valley Wide Coops Top Hat Farms mix at $0.26 per pound when bought in a 1,500 pound tote.

The steers will need 80lbs of straw per head per month (Bedding). The price of straw was determined by the 2022 USU Cow-Calf Enterprise Budget at $115/ton.

Purina states that a 250lb mineral tub would last 50 cows 10 days, so a 125lb tub would last 5 cows 25 days. For this budget we will figure the steers will get a new tub once a month. The mineral tub costs $99 at the local Tractor Supply (Wind, 2022).

The supplies were estimated to be $339.96. The hose was figured to cost $29.98 at Lowe's (Neverkink). The Rubbermaid 100 gallon water tank is $109.99 at Ace Hardware (Rubbermaid, 2022). The grain trough is $199.99 at Tractor Supply (10). Any other supplies are assumed they are already owned. The pasture fertilizer is $34.99 at tractor supply, one 50lb bag covers 15,000

square feet (16-6-16). 5 acres is equivalent to 217,800 square feet so the pasture will need 14.5 bags which will round up to purchasing 15 bags.

Butchering: The slaughter fee per head is $100. Cut/wrap for retail cuts/hamburger is $0.65/lb and hamburger patties are $0.85/lb. The amount of consumable beef from each steer is assumed to be 40% of the steers live weight (How Much Meat, 2022). 25% of consumable beef is hamburger quality and for this budget, 25% of that is assumed to be wrapped as hamburger patties (Services, 2022).

Transportation: The transportation cost is accounting for transportation of the steers from the place of purchase to the purchaser's facility. It is assumed that each steer will travel approximately 55 miles and the cost per mile is $1.35 (Find, 2022).

Production Overhead: For the purpose of this budget all other costs are not accounted for. The property tax, water, insurance, etc. would be paid regardless of animals being present on the property.

Table 1. Budget Inputs

Herd Characteristics	
Number of Feeder Calves Purchased	5
Feeder Purchase weight	500
Feeder Purchase $/lb	$ 1.65
Fat Steer weight	1,230.00
Fat Steer $/lb	$ 1.30

Steer Gains	
Daily Steer Gain lbs	2.00

Output Prices	
Fat Steer Price	$ 1.30
Retail Beef $/lb	$ 7.60

Input Prices	
Feeder Calf Price	$ 825.00
Alfalfa Hay $/ton	$ 225.00
Grain Mix $/lb	$ 0.26
Straw/Bedding $/ton	$ 115.00
Cut/Wrap - Hamburger patties $/lb	$ 0.85
Cut/Wrap - Retail Cuts/Hamburger $/lb	$ 0.65
Slaughter Fee	$ 100.00
Salt/Mineral Cost - 125lb Purina mineral tub	$ 99.00
Supplies	$ 339.96
Fuel/Transportation Cost per head/mile	$ 1.35
Vet/Medical per head	$ 25.00
Pasture Fertilizer per acre	$ 34.99

Table 2. Calendar

Northern Utah	October	November	December	January	February	March	April	May	June	July	August	September	Total	Units
Days of Month	31	30	31	31	28	31	30	31	30	31	31	30	365	Days
Steer Weight	562.00	622.00	684.00	746.00	802.00	864.00	924.00	986.00	1,046.00	1,108.00	1,170.00	1,230.00	668.00	Total gain (lbs)
Lbs of Hay/Head	-	373.20	424.08	462.52	449.12	535.68	554.40	-	-	-	-	-	2,799.00	Total Hay (lbs)
Lbs of Grain/Head	-	-	-	-	-	-	-	-	-	686.96	725.40	738.00	2150.36	Total Gain (lbs)
Cost of Hay/Head	$ -	$ 41.99	$ 47.71	$ 52.03	$ 50.53	$ 60.26	$ 62.37	$ -	$ -	$ -	$ -	$ -	$ 314.89	Total Hay $
Cost of Grain/Head	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 178.61	$ 188.60	$ 191.88	$ 559.09	Total Grain $
Lbs of Straw/head	0	80	80	80	80	80	80	0	0	0	0	0	480	Total Straw (lbs)
Cost of Straw/head	$ -	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ -	$ -	$ -	$ -	$ -	$ 27.60	Total Straw $

Table 3. Economics/Budget - Five Head on Pasture – Grain Finished

Backyard Beef Enterprise Budget							
Number of Steers	5						
Gross Receipts							
	Weight	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Fat Steer	1,230.00	Lbs	4	Head	$ 1.30	$ 6,396.00	$ 1,279.20
Retail Beef	1,230.00	Lbs	1	Head	$ 7.60	$ 9,348.00	$ 1,869.60
Total Receipts						**$ 15,744.00**	**$ 3,148.80**
Direct Costs							
	Amount needed	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Variable Costs							
Alfalfa Hay	2,799	Lbs	5	Head	$ 0.11	$ 1,574.44	$ 314.89
Grain Mix	2150.36	Lb	5	Head	$ 0.26	$ 2,795.47	$ 559.09
Feeder Calf	500	Lb	5	Head	$ 1.65	4125	825
Straw/Bedding	480	Lbs	5	Head	$ 0.06	$ 138.00	$ 27.60
Cut/Wrap - hamburger patties	30.75	lbs	1	Head	$ 0.85	$ 26.14	$ 5.23
Cut/Wrap - retail cuts/hamburger	461.25	Lb	1	Head	$ 0.65	$ 299.81	$ 59.96
Slaughter Fee	1	Head	1	Head	$ 100.00	$100	$20
Salt/Mineral Cost	1	Tub	12	Month	$ 99.00	$ 1,188.00	$ 237.60
Supplies	1	-	1	-	$ 339.96	$ 339.96	$ 67.99
Fuel/Transportation Cost	55	Miles	5	Head	$ 1.35	$ 371.25	$ 74.25
Vet/Medical	1	-	5	Head	$ 25.00	$ 125.00	$ 25.00
Pasture Fertilizer	3	Bags	5	Acre	$ 34.99	$ 524.85	$ 104.97
Total Costs						**$ 11,607.92**	**$ 2,321.58**
Total Income						**$ 4,136.08**	**$ 827.22**

Appendix B.1: Beef in Confinement Fact Sheet

Economics of Northern Utah Backyard Beef in Confinement, 2023

Introduction

Economics of beef raised in confinement and grain finished for consumption in Northern Utah. This publication is intended to be a guide used to make production decisions and understand the costs associated with raising beef. All that is included in the budget may not be applicable to all producers.

Production Description

Land: Raising a steer in confinement requires as little as150 square feet with a sufficient water source depending on the condition of the pen and ground within (Beck, 2021). We are assuming the producer has adequate room to house 5 steers so a minimum of 750 square feet.

Beef/Steers: The steers will be purchased as feeder cattle at 500lbs and will cost $1.70/lb based on Salina, UT auction prices. The steers are assumed to be purchased in October and fed hay through September. The steers will transition into grain supplementation three months prior to slaughtering. The calves are said to gain approximately 2lbs per day, the calves were purchased at 500lbs their final weight will be approximately 1,230lbs (Step). The selling price of the steers at $1.25/lb is based on Salina, UT auction prices. The price of retail beef is $7.60/lb which is essentially what the steer purchaser would be paying for beef in the grocery store had they not raised and slaughtered beef to keep for themselves.

Production Practices

Feed: The amount of hay fed calculated by 2% of the steers body weight, and the steers gain 2lbs per day which can be calculated based on their purchased weight on a monthly basis (How Much Hay, 2020). Three months prior to slaughtering, in this case would be July, the steers are fed 2lbs of grain per 100lb of body weight. When the steers are eating grain the hay will decrease to 7lbs of hay per day per steer (Step).

Veterinary: Total veterinary costs for the steers are assumed to be $25, which includes vaccinations, etc. (Cow-Calf, 2021).

Pricing: The price of hay at $225/ton is based on data from NASS Quick Stats. The price of grain is based on Valley Wide Coops Top Hat Farms mix at $0.26 per pound when bought in a 1,500 pound tote.

The steers will need 80lbs of straw per head per month (Bedding). The price of straw was determined by the 2022 USU Cow-Calf Enterprise Budget at $115/ton.

Purina states that a 250lb mineral tub would last 50 cows 10 days, so a 125lb tub would last 5 cows 25 days. For this budget we will figure the steers will get a new tub once a month. The mineral tub costs $99 at the local Tractor Supply (Wind, 2022).

The supplies were estimated to be $339.96. The hose was figured to cost $29.98 at Lowe's (Neverkink). The Rubbermaid 100 gallon water tank is $109.99 at Ace Hardware (Rubbermaid, 2022). The grain trough is $199.99 at Tractor Supply (10). Any other supplies are assumed they are already owned.

Butchering: The slaughter fee per head is $100. Cut/wrap for retail cuts/hamburger is $0.65/lb and hamburger patties are $0.85/lb. The amount of consumable beef from each steer is assumed to be 40% of the steers live weight (How Much Meat, 2022). 25% of consumable beef is hamburger quality and for this budget, 25% of that is assumed to be wrapped as hamburger patties (Services).

Transportation: The transportation cost is accounting for transportation of the steers from the place of purchase to the purchaser's facility. It is assumed that each steer will travel approximately 55 miles and the cost per mile is $1.35 (Find, 2022).
*Production Overhead :*For the purpose of this budget all other costs are not accounted for. The property tax, water, insurance, etc. would be paid regardless of animals being present on the property.

Table 1. Budget Inputs

Herd Characteristics	
Number of Feeder Calves Purchased	5
Feeder Purchase weight	500
Feeder Purchase $/lb	$ 1.65
Fat Steer weight	1,230.00
Fat Steer $/lb	$ 1.30

Steer Gains	
Daily Steer Gain lbs	2.00

Output Prices	
Fat Steer Price	$ 1.30
Retail Beef $/lb	$ 7.60

Input Prices	
Feeder Calf Price	$ 825.00
Alfalfa Hay $/ton	$ 225.00
Grain Mix $/lb	$ 0.26
Straw/Bedding $/ton	$ 115.00
Cut/Wrap - Hamburger patties $/lb	$ 0.85
Cut/Wrap - Retail Cuts/Hamburger $/lb	$ 0.65
Slaughter Fee	$ 100.00
Salt/Mineral Cost - 125lb Purina mineral tub	$ 99.00
Supplies	$ 339.96
Fuel/Transportation Cost per head/mile	$ 1.35
Vet/Medical per head	$ 25.00

Table 2. Calendar

Northern Utah	October	November	December	January	February	March	April	May	June	July	August	September	Total	Units
Days of Month	31	30	31	31	28	31	30	31	30	31	31	30	365	Days
Steer Weight	562.00	622.00	684.00	746.00	802.00	864.00	924.00	986.00	1,046.00	1,108.00	1,170.00	1,230.00	668.00	Total gain (lbs)
Lbs of Hay/Head	348.44	373.20	424.08	462.52	449.12	535.68	554.40	611.32	627.60	217.00	217.00	210.00	5,030.36	Total Hay (lbs)
Lbs of Grain/Head	-	-	-	-	-	-	-	-	-	686.96	725.40	738.00	2150.36	Total Gain (lbs)
Cost of Hay/Head	$ 39.20	$ 41.99	$ 47.71	$ 52.03	$ 50.53	$ 60.26	$ 62.37	$ 68.77	$ 70.61	$ 24.41	$ 24.41	$ 23.63	$ 565.92	Total Hay $
Cost of Grain/Head	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	Total Grain $
Lbs of Straw/head	80	80	80	80	80	80	80	80	80	80	80	80	960	Total Straw (lbs)
Cost of Straw/head	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 55.20	Total Straw $

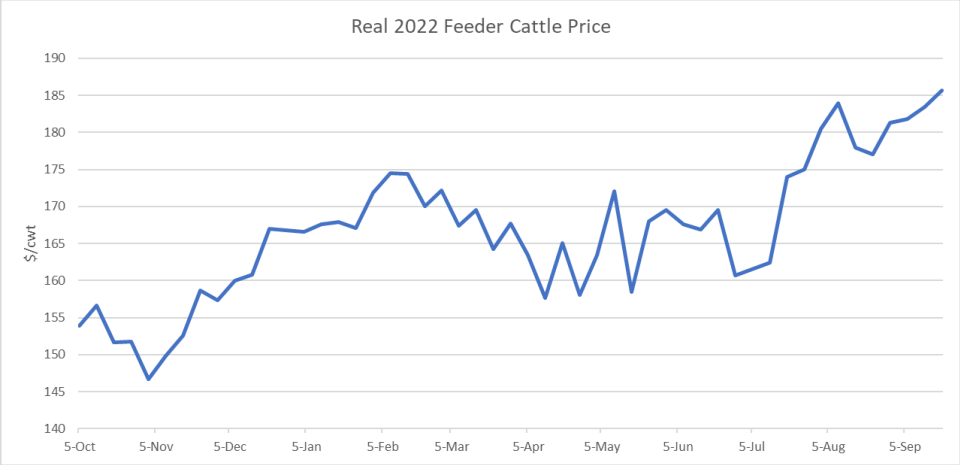
Table 3. Economics/Budget - 5 Head in Confinement – Grain Finished

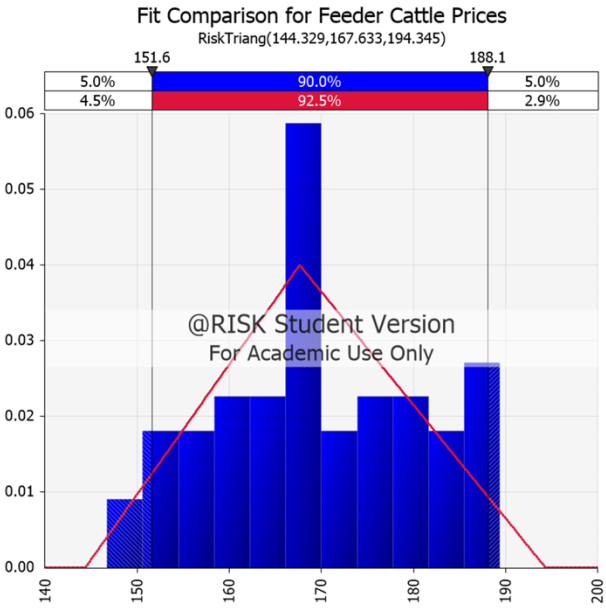
Backyard Beef Enterprise Budget							
Number of Steers	5						
Gross Receipts							
	Weight	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Fat Steer	1,230.00	Lbs	4	Head	$ 1.30	$ 6,396.00	$ 1,279.20
Retail Beef	1,230.00	Lbs	1	Head	$ 7.60	$ 9,348.00	$ 1,869.60
Total Receipts						**$ 15,744.00**	**$ 3,148.80**
Direct Costs							
	Amount needed	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Variable Costs							
Alfalfa Hay	5,030	Lbs	5	Head	$ 0.11	$ 2,829.58	$ 565.92
Grain Mix	2150.36	Lb	5	Head	$ 0.26	$ 2,795.47	$ 559.09
Feeder Calf	500	Lb	5	Head	$ 1.65	4125	825
Straw/Bedding	960	Lbs	5	Head	$ 0.06	$ 276.00	$ 55.20
Cut/Wrap - hamburger patties	30.75	lbs	1	Head	$ 0.85	$ 26.14	$ 5.23
Cut/Wrap - retail cuts/hamburger	461.25	Lb	1	Head	$ 0.65	$ 299.81	$ 59.96
Slaughter Fee	1	Head	1	Head	$ 100.00	$100	$20
Salt/Mineral Cost	1	Tub	12	Month	$ 99.00	$ 1,188.00	$ 237.60
Supplies	1	-	1	-	$ 339.96	$ 339.96	$ 67.99
Fuel/Transportation Cost	55	Miles	5	Head	$ 1.35	$ 371.25	$ 74.25
Vet/Medical	1	-	5	Head	$ 25.00	$ 125.00	$ 25.00
Total Costs						**$ 12,476.21**	**$ 2,495.24**
Total Income						**$ 3,267.79**	**$ 653.56**

Appendix B.2: Annual Grazing Schedule

Annual Grazing Schedule												
	October	November	December	January	February	March	April	May	June	July	August	September
Private Pasture	1	0	0	0	0	0	0	1	1	1	1	1
Feed Hay & Bed Straw	0	1	1	1	1	1	1	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1	1	1
Days of Month	31	30	31	31	28	31	30	31	30	31	31	30
Feed Grain	0	0	0	0	0	0	0	0	0	1	1	1

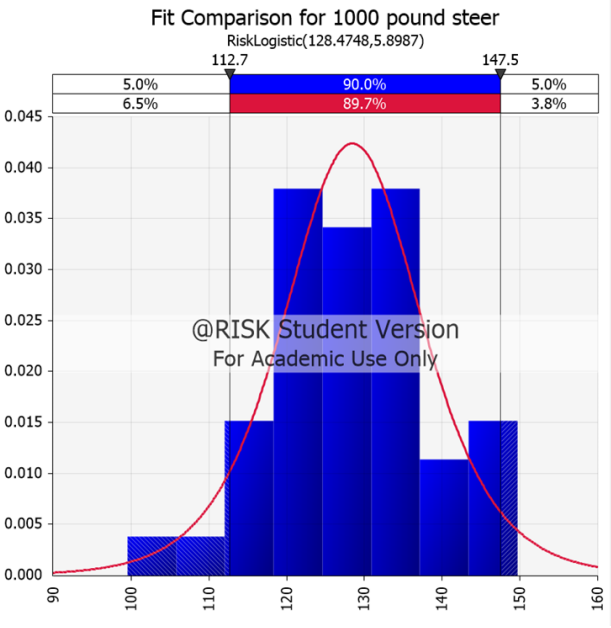
Appendix B.3 Budget Input Graphs and PDFs





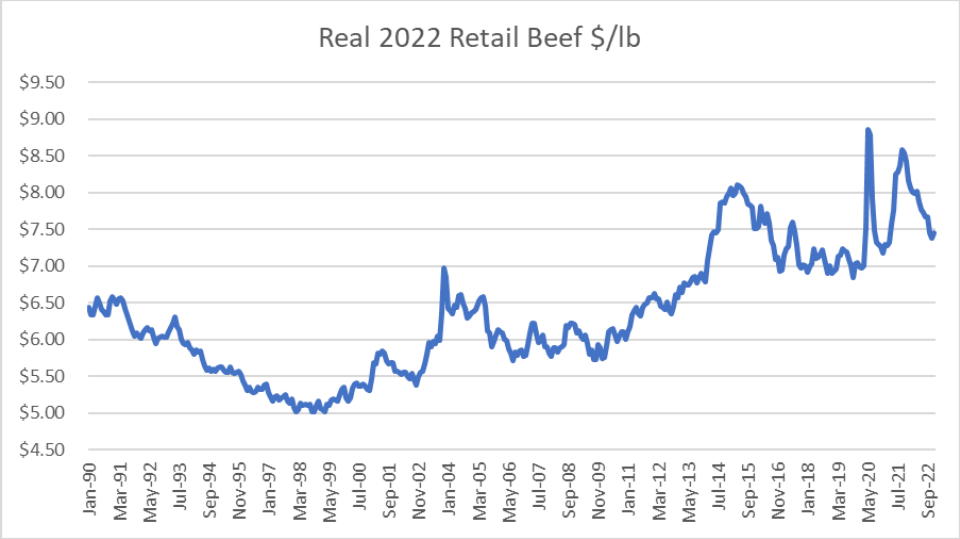
Statistics

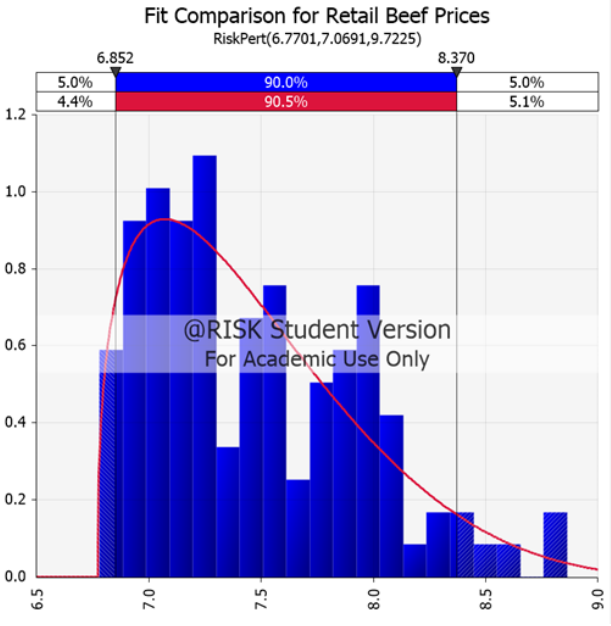
	Input	Triang
Minimum	146.703	144.329
Maximum	189.400	194.345
Mean	169.317	168.769
Mode	≈169.531	167.633
Median	167.947	168.499
Std Dev	10.955	10.217
Skewness	0.0367	0.0666
Kurtosis	2.2350	2.4000
Left X	151.6	151.6
Left P	5.0%	4.5%
Right X	188.1	188.1
Right P	95.0%	97.1%
Dif. X	36.500	36.500
Dif. P	90.0%	92.5%
1%	146.703	147.743
2.5%	149.820	149.727
5%	151.610	151.963
10%	153.933	155.125
20%	158.617	159.597
25%	160.823	161.399
30%	163.407	163.029



Statistics

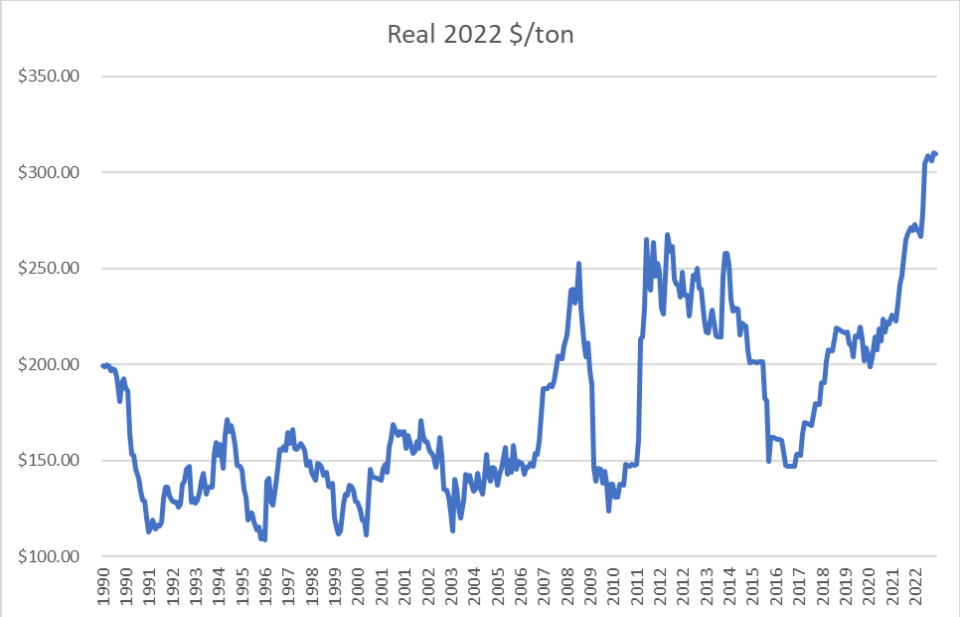
	Input	Logistic
Minimum	99.510	−∞
Maximum	149.700	+∞
Mean	128.534	128.475
Mode	≈124.183	128.475
Median	126.980	128.475
Std Dev	10.670	10.699
Skewness	-0.1061	0.0000
Kurtosis	3.4426	4.2000
Left X	112.7	112.7
Left P	5.0%	6.5%
Right X	147.5	147.5
Right P	95.0%	96.2%
Dif. X	34.800	34.800
Dif. P	90.0%	89.7%
1%	99.510	101.370
2.5%	110.980	106.865
5%	112.720	111.107
10%	115.640	115.514
20%	121.370	120.298
25%	122.500	121.994
30%	124.090	123.477

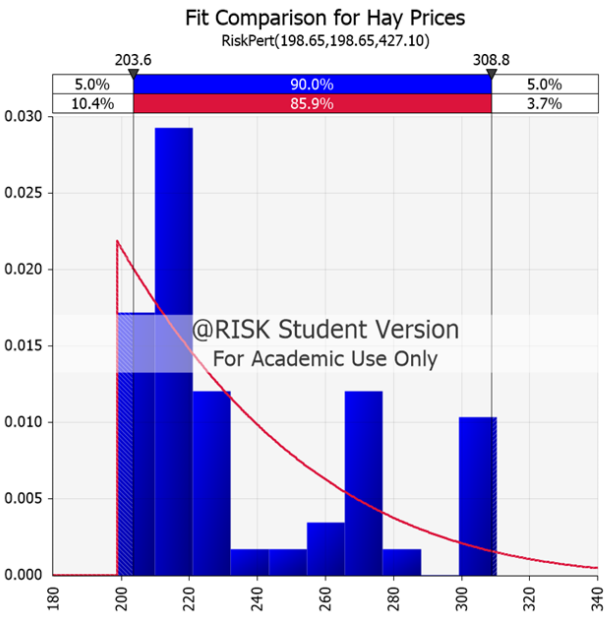




Statistics

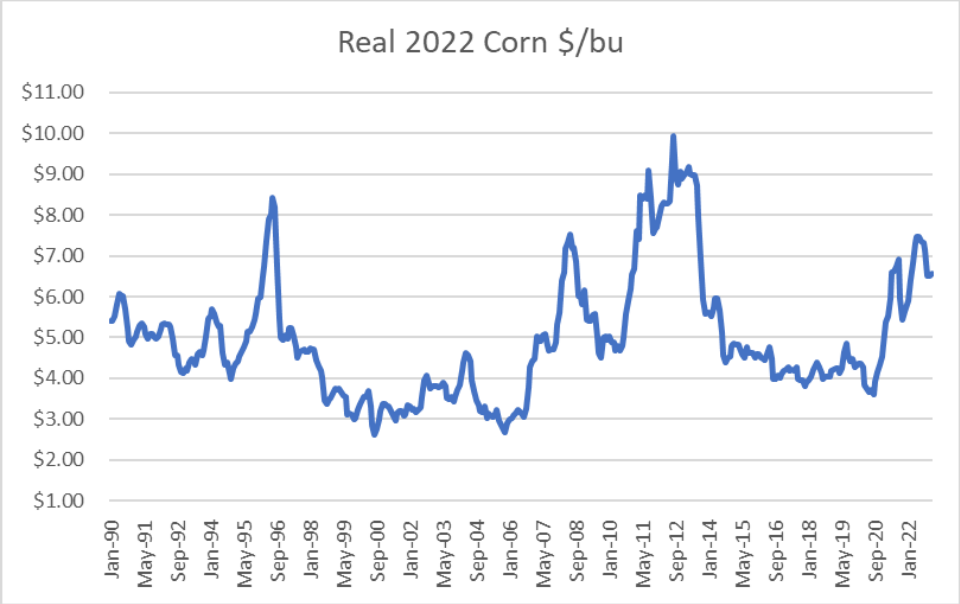
	Input	Pert
Minimum	6.7778	6.7701
Maximum	8.8633	9.7225
Mean	7.4683	7.4615
Mode	≈7.2727	7.0691
Median	7.3522	7.3712
Std Dev	0.4788	0.4726
Skewness	0.7002	0.8304
Kurtosis	2.8674	3.2527
Left X	6.852	6.852
Left P	5.0%	4.4%
Right X	8.370	8.370
Right P	95.0%	94.9%
Dif. X	1.5187	1.5187
Dif. P	90.0%	90.5%
1%	6.7930	6.7977
2.5%	6.8282	6.8238
5%	6.8515	6.8596
10%	6.9277	6.9214
20%	7.0032	7.0325
25%	7.0407	7.0863
30%	7.1206	7.1404

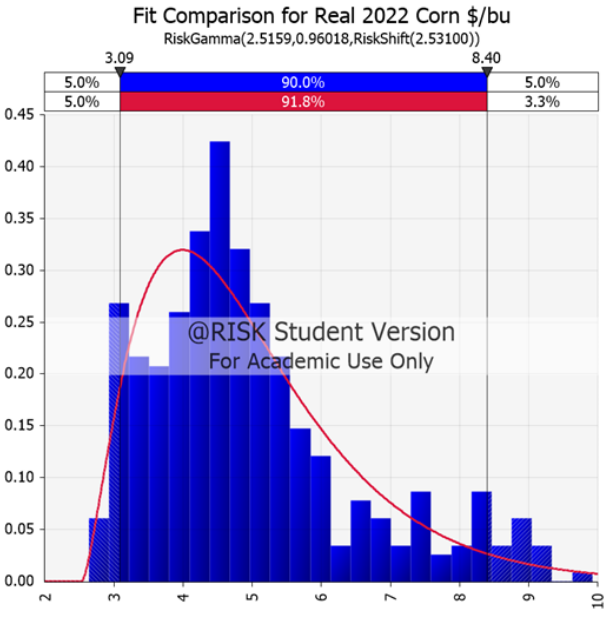




Statistics

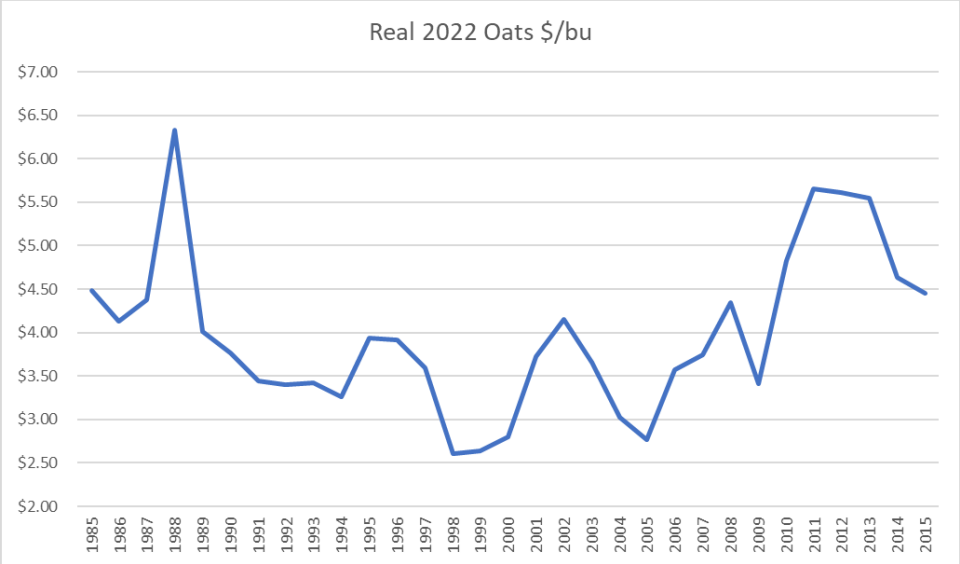
	Input	Pert
Minimum	198.65	198.65
Maximum	310.41	427.10
Mean	236.73	236.73
Mode	≈216.73	198.65
Median	218.87	228.22
Std Dev	34.38	32.18
Skewness	1.0108	1.1832
Kurtosis	2.6845	4.2000
Left X	203.6	203.6
Left P	5.0%	10.4%
Right X	308.8	308.8
Right P	95.0%	96.3%
Dif. X	105.19	105.19
Dif. P	90.0%	85.9%
1%	198.65	199.11
2.5%	201.83	199.80
5%	203.60	200.98
10%	207.00	203.41
20%	210.18	208.62
25%	212.51	211.42
30%	214.16	214.38

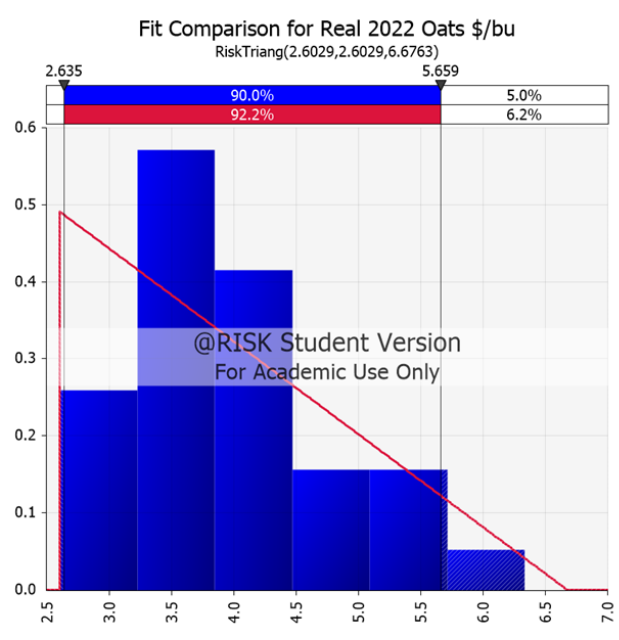




Statistics

	Input	Gamma
Minimum	2.6315	2.5310
Maximum	9.9222	+∞
Mean	4.9468	4.9468
Mode	≈3.5525	3.9866
Median	4.6224	4.6353
Std Dev	1.5142	1.5230
Skewness	1.0783	1.2609
Kurtosis	3.7439	5.3848
Left X	3.09	3.09
Left P	5.0%	5.0%
Right X	8.40	8.40
Right P	95.0%	96.7%
Dif. X	5.3097	5.3097
Dif. P	90.0%	91.8%
1%	2.7729	2.8016
2.5%	2.9916	2.9359
5%	3.0871	3.0881
10%	3.2231	3.3129
20%	3.7215	3.6666
25%	3.9209	3.8268
30%	4.1226	3.9838





Statistics

	Input	Triang
Minimum	2.6029	2.6029
Maximum	6.3334	6.6763
Mean	3.9756	3.9607
Mode	≈3.4105	2.6029
Median	3.7624	3.7960
Std Dev	0.9188	0.9601
Skewness	0.7786	0.5657
Kurtosis	3.4140	2.4000
Left X	2.635	2.635
Left P	5.0%	1.6%
Right X	5.659	5.659
Right P	95.0%	93.8%
Dif. X	3.0243	3.0243
Dif. P	90.0%	92.2%
1%	2.6029	2.6233
2.5%	2.6029	2.6541
5%	2.6348	2.7060
10%	2.8039	2.8119
20%	3.3994	3.0329
25%	3.4094	3.1486
30%	3.4383	3.2683

Appendix B.4 Stochastic Beef Budget Inputs

Herd Characteristics	
Number of Feeder Calves Purchased	5
Feeder Purchase weight	450
Feeder Purchase $/lb	$ 1.69
Fat Steer weight	1,300.00
Fat Steer $/lb	$ 1.28

Steer Gains	
Daily Steer Gain lbs	2.00

Output Prices	
Fat Steer Price	$ 1.28
Retail Beef $/lb	$ 7.46

Input Prices	
Feeder Calf Price	$ 759.46
Alfalfa Hay $/ton	$ 236.73
Grain Mix $/lb	$ 0.21
Straw/Bedding $/ton	$ 115.00
Cut/Wrap - Hamburger patties $/lb	$ 0.85
Cut/Wrap - Retail Cuts/Hamburger $/lb	$ 0.65
Slaughter Fee	$ 100.00
Salt/Mineral Cost - 125lb Purina mineral tub	$ 99.00
Supplies	$ 339.96
Fuel/Transportation Cost per head/mile	$ 1.35
Vet/Medical per head	$ 25.00
Pasture Fertilizer per acre	$ 34.99

Appendix B.5 Stochastic Steer Feed Calendar

Northern Utah	October	November	December	January	February	March	April	May	June	July	August	September	Total	Units
Days of Month	31	30	31	31	28	31	30	31	30	31	31	30	365	Days
Steer Weight	512.00	572.00	634.00	696.00	752.00	814.00	874.00	936.00	996.00	1,058.00	1,120.00	1,180.00	668.00	Total gain (lbs)
Lbs of Hay/Head	-	343.20	393.08	431.52	421.12	504.68	524.40	-	-	-	-	-	2,618.00	Total Hay (lbs)
Lbs of Grain/Head	-	-	-	-	-	-	-	-	-	620.00	620.00	600.00	1840	Total Gain (lbs)
Cost of Hay/Head	$ -	$ 40.62	$ 46.53	$ 51.08	$ 49.84	$ 59.74	$ 62.07	$ -	$ -	$ -	$ -	$ -	$ 309.87	Total Hay $
Cost of Grain/Head	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 131.51	$ 131.51	$ 127.26	$ 390.28	Total Grain $
Lbs of Straw/head	0	80	80	80	80	80	80	0	0	0	0	0	480	Total Straw (lbs)
Cost of Straw/head	$ -	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ -	$ -	$ -	$ -	$ -	$ 27.60	Total Straw $

Appendix B.6 Beef Budget Results – Simulation

Backyard Beef Enterprise Budget

Number of Steers	5

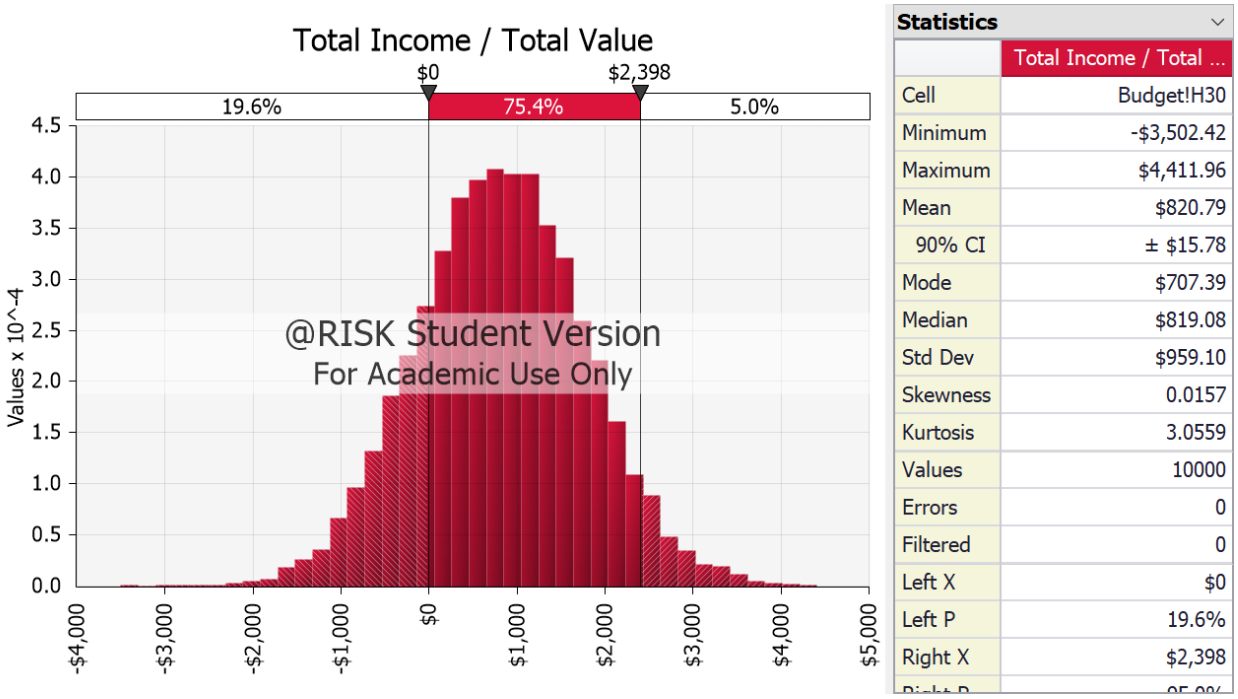
Gross Receipts

	Weight	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Fat Steer	1,300.00	Lbs	4	Head	$ 1.28	$ 6,680.69	$ 1,336.14
Retail Beef	542.10	Lbs	1	Head	$ 7.46	$ 4,044.88	$ 808.98
Total Receipts						**$ 10,725.57**	**$ 2,145.11**

Direct Costs

	Amount needed	Unit	Total Number	Unit	Price	Total Value	Value or Cost/Head
Variable Costs							
Alfalfa Hay	2,618	Lbs	5	Head	$ 0.12	$ 1,549.37	$ 309.87
Grain Mix	1840	Lb	5	Head	$ 0.21	$ 1,951.38	$ 390.28
Feeder Calf	450	Lb	5	Head	$ 1.69	$ 3,797.30	$ 759.46
Straw/Bedding	480	Lbs	5	Head	$ 0.06	$ 138.00	$ 27.60
Cut/Wrap - hamburger patties	32.50	lbs	1	Head	$ 0.85	$ 27.63	$ 5.53
Cut/Wrap - retail cuts/hamburger	487.50	Lb	1	Head	$ 0.65	$ 316.88	$ 63.38
Slaughter Fee	1	Head	1	Head	$ 100.00	$ 100.00	$ 20.00
Salt/Mineral Cost	1	Tub	12	Month	$ 99.00	$ 1,188.00	$ 237.60
Supplies	1	-	1	-	$ 339.96	$ 339.96	$ 67.99
Fuel/Transportation Cost	55	Miles	5	Head	$ 1.35	$ 371.25	$ 74.25
Vet/Medical	1	-	5	Head	$ 25.00	$ 125.00	$ 25.00
Pasture Fertilizer	3	Bags	5	Acre	$ 34.99	$ 524.85	$ 104.97
Total Costs						**$ 9,904.75**	**$ 1,980.95**
Total Income						**$ 820.79**	**$ 164.16**

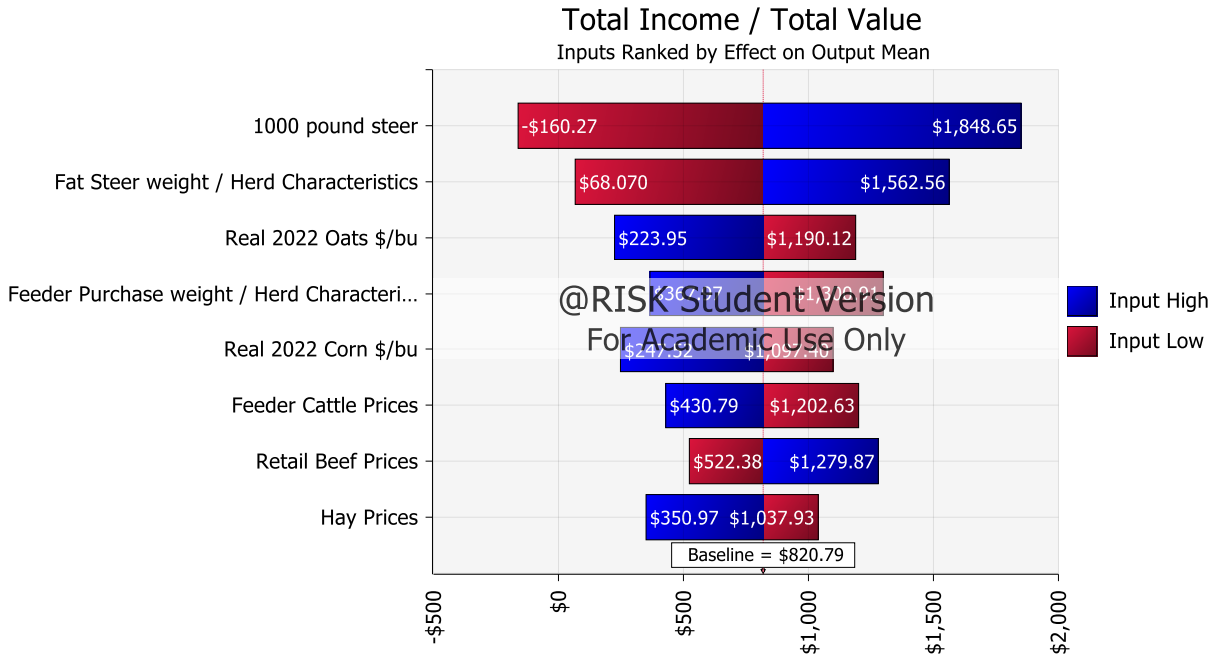
Appendix B.7 Beef Total Income PDF



Statistics

	Total Income / Total ...
Cell	Budget!H30
Minimum	-$3,502.42
Maximum	$4,411.96
Mean	$820.79
90% CI	± $15.78
Mode	$707.39
Median	$819.08
Std Dev	$959.10
Skewness	0.0157
Kurtosis	3.0559
Values	10000
Errors	0
Filtered	0
Left X	$0
Left P	19.6%
Right X	$2,398

Appendix B.8 Beef Budget Total Income Tornado Graph



Appendix C: Chicken Egg Budget Fact Sheet

Economics of Chicken Eggs in Utah, 2023

Introduction

Economics of raising chickens for the purpose of selling their eggs. This publication is intended to be a guide used to make production decisions and understand the costs associated with raising chickens. All that is included in the budget may not be applicable to each operation depending on location and chicken breed.

Production Description

Chickens: Ten chicks will be purchased at Tractor Supply for $39.99. The chickens are the brown and white egg production assortment it may include the following breeds: ISA Brown, Amberlink, California White, White Leghorn, Production Red, Black Sex Link, and Rhode Island Red. These breeds are hardy enough to withstand cold Utah winters and are tolerant to confinement (ts). The birds are 12 hours old when shipped and must be placed in a brood box to keep the chicks warm until they are able to regulate their own temperature. The chickens will lay eggs for approximately 4 years and then they will need to be replaced with new chicks.
Coop/Brood Box: The chicks will be in a brood box for 6 weeks (about 1 and a half months). The brood box will consist of a 110-gallon stock water tank, heat lamp, thermometer (to check the temperature of the box and decrease it each week for 6 weeks), and their feed and water. The chicken coop is from Tractor Supply and can house up to 14 chickens, there are 3 nesting boxes and 3 roosting bars for $999.99.

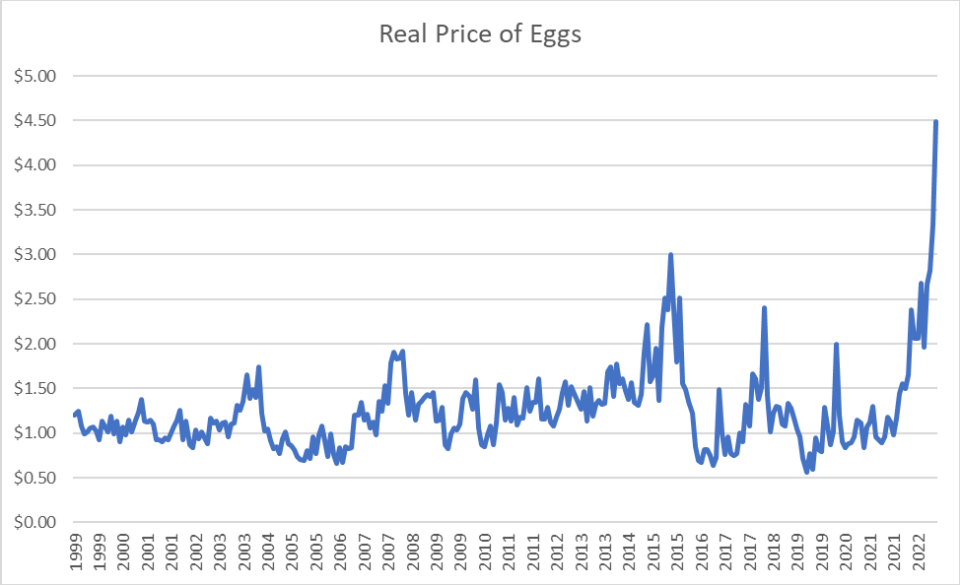
Production Practices:

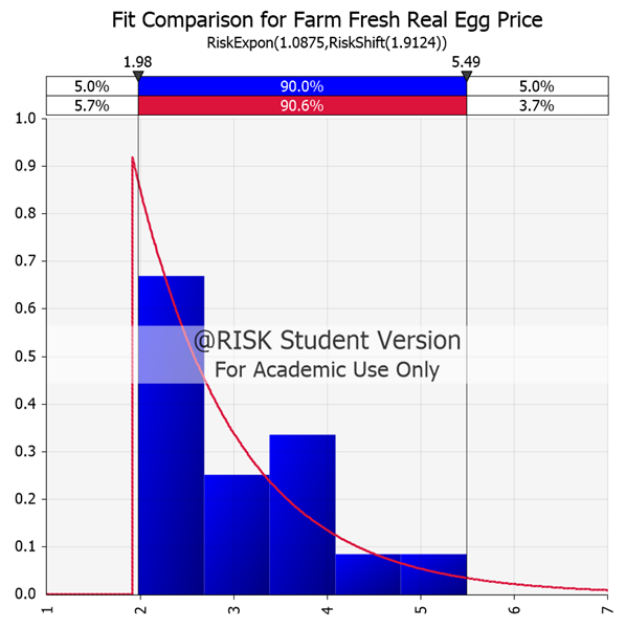
Feed: The chicks will be on IFA chick starter feed from the time they arrive to 8 weeks. Each chick will eat approximately 1lb of feed each week. From 8 weeks until approximately 18 weeks (about 4 months), which is approximately when most chicks begin laying eggs, they will eat IFA pullet developer which is a transitional feed to the IFA poultry layer crumble which is what they will eat the rest of their life. The chickens will have free access to water their whole lives. They will be fed out of a feed box from Tractor Supply for $9.99 and water for $44.99.
Bedding: Chickens need to have bedding in their brood box and coop for many reasons. The main reason is to insulate the floor from the outside weather. It also acts as a cushion for the birds and their eggs if they were to fall from the nesting box. The bedding helps when it comes time to clean the coop, the coop should be cleaned once a week and a half a bag of shavings will be replaced each time.
Eggs: The egg production rate according to Tractor Supply is 260-300 eggs. To account for Utah's cold climate and longer winter it is assumed that the chickens will lay approximately 225 eggs per year once they are in full production. Chickens typically begin laying at 18 weeks and their first year they may not produce many eggs at all depending on the time of year. The egg count is assuming what the chicken will produce in a year once it is in full production.

Table 1. Chicken Egg Budget

Chicken Egg Enterprise Budget					
Number of Chickens	10				
Reciepts					
Item	Quantity	Unit	Price		Total Value
Chicken Eggs*	225.00	Dozen	$4.00		$ 900.00
* dozen per year once the chickens are in full egg production					
Variable Costs					
Item	Quantity	Unit	Price		Total Cost
chick feed (0-8 weeks)	2	50lb bag	$26.99		$53.98
Chick feed (8-18 weeks	2	50lb bag	$25.49		$50.98
Bedding	26	bags	$6.79		$176.54
Chicken feed (18 weeks	10	50lb bag	$24.99		$249.90
Total variable cost					$531.40
Fixed Costs					
Item	Quantity	Unit	Price		Total Cost
Chicks	4	years	$39.99		$10.00
Brooder box	10	years	$92.99		$9.30
Heat lamp bulb	2	years	$11.99		$6.00
Heat lamp	5	years	$12.99		$2.60
Chicken Coop	30	years	$999.99		$33.33
Waterer	5	years	$44.99		$9.00
Feeder	5	years	$9.99		$2.00
Thermometer	2	years	$5.16		$2.58
Total fixed cost					$64.80
Total Costs					$596.20
Total Profit					**$ 303.80**

Appendix C.1 Price Input Graph and PDF





Statistics

	Input	Expon
Minimum	1.9764	1.9124
Maximum	5.4900	+∞
Mean	3.0639	2.9999
Mode	≈2.0898	1.9124
Median	2.9641	2.6662
Std Dev	0.9260	1.0875
Skewness	1.1750	2.0000
Kurtosis	4.5085	9.0000
Left X	1.98	1.98
Left P	5.0%	5.7%
Right X	5.49	5.49
Right P	95.0%	96.3%
Dif. X	3.5136	3.5136
Dif. P	90.0%	90.6%
1%	1.9764	1.9234
2.5%	1.9764	1.9400
5%	1.9764	1.9682
10%	2.1238	2.0270
20%	2.1834	2.1551
25%	2.4477	2.2253
30%	2.5023	2.3003

Appendix C.2 Chicken Egg Budget Results

Chicken Egg Enterprise Budget	
Number of Chickens	10

Reciepts					
Item	Quantity	Unit	Price		Total Value
Chicken Eggs*	233.33	Dozen	$3.00		$ 699.98

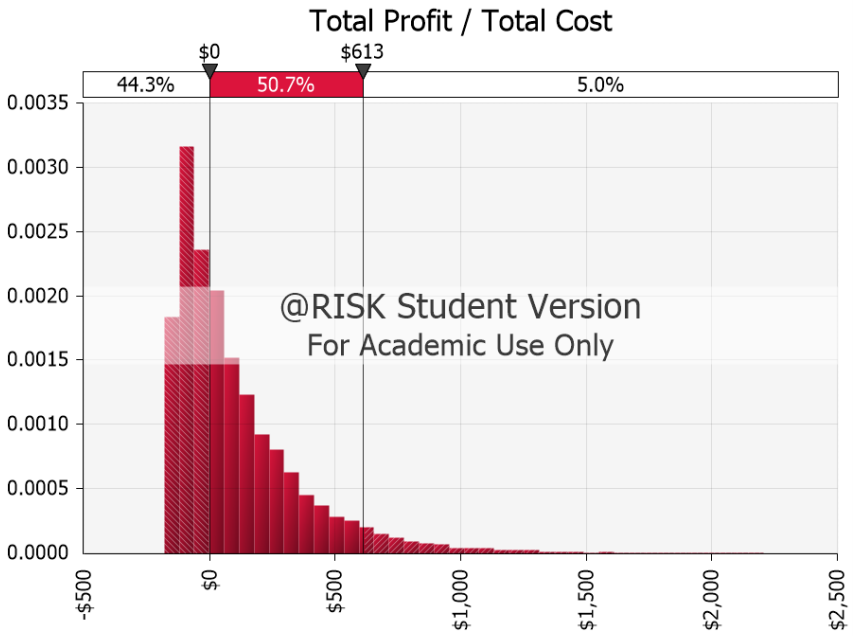
***dozen per year once the chickens are in full egg production**

Variable Costs					
Item	Quantity	Unit	Price		Total Cost
chick feed (0-8 weeks)	2	50lb bag	$26.99		$53.98
Chick feed (8-18 weeks	2	50lb bag	$25.49		$50.98
Bedding	26	bags	$6.79		$176.54
Chicken feed (18 week	10	50lb bag	$24.99		$249.90
Total variable cost					$531.40

Fixed Costs					
Item	Quantity	Unit	Price		Total Cost
Chicks	4	years	$39.99		$10.00
Brooder box	10	years	$92.99		$9.30
Heat lamp bulb	2	years	$11.99		$6.00
Heat lamp	5	years	$12.99		$2.60
Chicken Coop	30	years	$999.99		$33.33
Waterer	5	years	$44.99		$9.00
Feeder	5	years	$9.99		$2.00
Thermometer	2	years	$5.16		$2.58
Total fixed cost					$64.80
Total Costs					$596.20

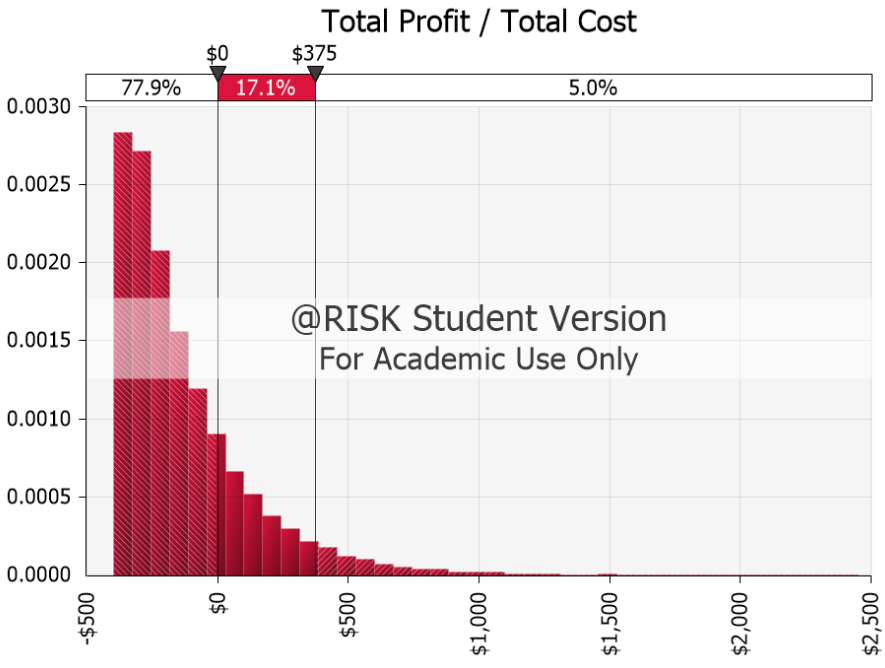
Total Profit					**$ 103.81**

Appendix C.3 Chicken Egg Total Income PDF



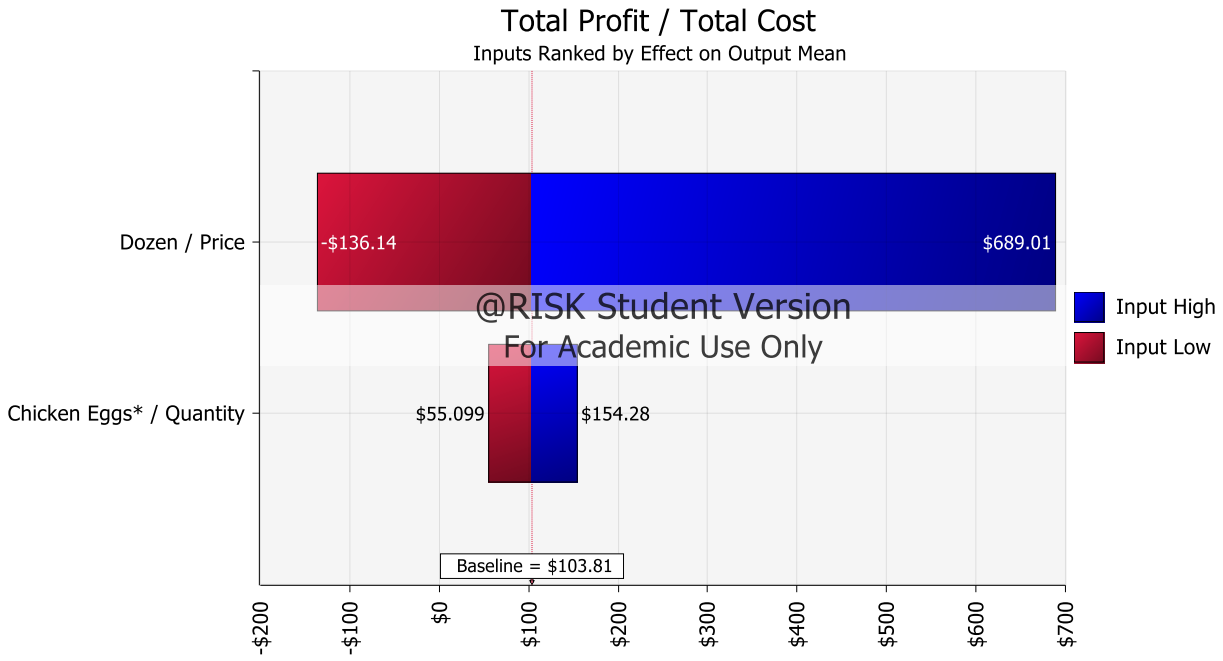
Statistics	Total Profit / Total Cost
Cell	Budget!G32
Minimum	-$180.58
Maximum	$2,207.09
Mean	$103.81
90% CI	± $4.21
Mode	-$110.17
Median	$26.19
Std Dev	$255.74
Skewness	1.9882
Kurtosis	8.8990
Values	10000
Errors	0
Filtered	0
Left X	$0
Left P	44.3%
Right X	$613

Appendix C.4 Chicken Egg Total Income PDF with Decreased Egg Prices



Statistics	Total Profit / Total Cost
Cell	Budget!G32
Minimum	-$397.83
Maximum	$2,452.83
Mean	-$129.50
90% CI	± $4.19
Mode	-$361.01
Median	-$208.11
Std Dev	$254.94
Skewness	2.0261
Kurtosis	9.3397
Values	10000
Errors	0
Filtered	0
Left X	$0
Left P	77.9%
Right X	$375

Appendix C.5 Chicken Egg Budget Total Income Tornado Graph



Appendix D: Mixed Vegetable Budget Fact Sheet

Economics of Mixed Vegetable Garden in Utah, 2023

Introduction

Economics of mixed vegetable garden. This publication is intended to be a guide used to make productions decisions and understand the costs associated with a variety of mixed vegetables. All that is include in the budget may not be application to each operation depending on the chosen vegetables and size of garden. The information for this budget is based off the Utah Farming Demonstration Gardens in Kaysville, UT.

Vegetable Receipts

A variety of vegetables can be chosen to plant, of the ones listed in the budget the costs and receipts of the given vegetable are associated with a per square foot basis. The prices were determined by USDA national prices, while these prices are on the lower end, they were used to add in a level of risk reduction due to vegetables getting a premium when sold at farmers markets or sold locally. Yields are the actual yields harvested from the Kaysville garden between 2020 and 2022 growing seasons.

Variable Expenses

The variable garden expenses were determined by vegetable seed and start prices at Johnny's seed and can be seen in Appendix D.1 below (Vegetables). The vegetables that require a cage are multiplied by the price of the cage and the square footage to get the total price of the cages and then divided by 10 to account for the useful life of said cage. The other variable expenses listed in the budget were products used at the Kaysville garden and apportioned to a per square foot cost. An estimated cost per square foot has been figured utilizing the labor hours from the Kaysville Garden vegetable portion of 117 hours and divided by the total vegetable square feet of 1,860 and then multiplied by $15 to estimate the per square foot cost of labor.

Fixed Expenses

The fixed garden expenses are expenses regardless of the size of the garden. The water share is left blank for the user to include their own number of shares and cost of said share. The irrigation system was based on the Kaysville garden and then sectioned out into per square foot costs. The number of controllers and solenoids are left to be changed depending on the size of the garden. The rest of the supplies use the total cost but are then calculated out to incorporate the number of useful years the supply has. The optional garden expenses are for those that wish to build a fence (Hansen, 2022) around their garden or have a metal storage shed (5', 2023).

Potential Additional Costs

Labor, marketing, and other materials are all costs that cut into the profitability of growing a garden. The size of the garden has a big impact on the amount of hours and costs of tools and labor required to maintain the area. Based on the size of the garden the user will need to assess what they are wanting to invest in their garden and if the costs of the tools and labor are worth it.

Appendix D.1 Mixed Vegetable Budget

Mixed Vegetable Enterprise Budget

Total Sqft Planted: 265

Interactive numbers to change according to personal garden

Vegetable Reciepts

Vegetable	Sqft Plante	Lbs of produce	Price	Total Value
Broccoli	10	19.4	0.99	$19.21
Beet	20	34.8	0.51	$17.75
Carrot	25	20	0.73	$14.60
Cucumber	30	207.3	1.63	$337.90
Eggplant	35	149.8	1.54	$230.69
Garlic	10	7.4	3.99	$29.53
Greenbean	25	47	1.51	$70.97
Onion	30	79.2	1.24	$98.21
Potato	30	64.2	1.12	$71.90
Sweet Pepper	25	57.25	1.37	$78.43
Tomatoes	25	76.5	$2.34	$179.01
Total Sqft Planted	265			
Total Vegetable Recipts				**$1,148.20**

Variable Vegetable Expenses

Item	Quantity	Unit	Price	Total Cost
Broccoli Seed	10	Sqft	$0.06	$0.60
Beet Seed	20	Sqft	$0.14	$2.80
Carrot Seed	25	Sqft	$0.70	$17.50
Cucumber Seed	30	Sqft	$0.36	$10.80
Eggplant Seed	35	Sqft	$0.27	$9.45
Garlic Start	10	Sqft	$0.10	$1.00
Greenbean Seed	25	Sqft	$0.28	$7.00
Greenbean Cage	25	Cage	$3.48	$8.70
Onion Start	30	Sqft	$0.84	$25.20
Potato Start	30	Sqft	$0.77	$23.10
Sweet Pepper Seed	25	Sqft	$0.22	$5.50
Sweet Pepper Cage	25	Cage	$3.48	$8.70
Tomato Seed	25	Sqft	$0.46	$11.58
Tomato Cage	25	Cage	$3.48	$8.70
Chemical Pump Spra	5	Years	$17.99	$9.00
Fertilizer	265	Sqft	$0.02	$0.53
Pesticide	265	Sqft	$0.03	$0.80
Weed Spray	265	Sqft	$0.05	$1.33
Plant Labels - paint s	1	Package	$9.10	$0.91
Garden Labor	265	Sqft	$0.94	$249.10
Total Variable Vegetable Expenses				**$402.29**

Fixed Garden Expenses

Item	Quantity	Unit	Price	Total C
Irrigation				
Irrigation		Water shares		$ -
Irrigation Supplies	265	Sqft	$0.39	$ 103.
Labor Setup	265	Sqft	$0.13	$ 34.
Solenoid	1	Unit	$17.13	$ 17.
Puck Controller	1	Unit	$81.75	$ 81.
Digital Scale	1	Scale	$42.99	$ 42.
Compost Bins				
Screws and Stakes	10	Years	$64.90	$6
Pallets	10	Years	$21.00	$2
Spading fork	10	Years	$22.80	$2
Gardening Supplies				
Pruning shears (3 pack)	2	Years	$31.98	$15
Knives	2	Years	$8.94	$4
Tool box totes (x2)	5	Years	$65.94	$13
Assorted hooks	2	Years	$12.87	$6
Interlocking organizer	2	Years	$9.77	$4
Soil Prep				
Soil Ammendment	10	Years	$206.00	$20
Tiler	10	Years	$299.00	$29
Hula Hoes (x6)	5	Years	$100.00	$20
Total Fixed Garden Expenses				**$406.**

Optional Garden Expenses

Item	Quantity	Unit	Price	Total C
Metal Storage Shed 5' x 4'	10	Years	$265.99	$26
Fencing	* based on 5400 sqft garden			
Skid steer (half day rental)	10	Years	$160.00	$16
Screws	10	Years	$23.98	$2
Lumber	10	Years	$552.01	$55
Fence Posts	10	Years	$315.42	$31
Auger	10	Years	$123.60	$12
Total Optional Expenses				**$144.**

Garden Revenue

Total Vegetable Recipts	$1,148.20
Total Variable Vegetable Expenses	$402.29
Total Fixed Garden Expenses	$406.01
Total Optional Expenses	$144.10
Total Revenue	**$195.80**

Appendix D.2 Soil Prep Cost Information

Time (seconds) 10'x4' plots	Soil Prep: tiller (19")	Soil Prep: tractor (two-wheel 32")	Soil Prep: tractor (four-wheel 4')	Soil Prep: by-hand
Rep 1	46	*25*	*4*	363
Rep 2	46	*25*	*4*	307
Rep 3	46	*25*	*4*	310
Average (seconds)	46	25.0	4.1	326.7
Hours/Acre	13.8	7.6	1.2	98.8
Hours/0.5Acre	6.9	3.8	0.6	49.4
Hours/0.25Acre	3.4	1.9	0.3	24.7
Hours/0.1Acre	1.4	0.8	0.1	9.9
Minutes/4'x100'	7.58	4.17	0.68	54.44
Hours/4 successions (1/10th acre)	5.5	3.0	0.5	39.5
Labor/Job($15/hr)	$82.58	$45.37	$7.44	$592.90
Machine Price	$850.00	$5,780.00	$15,000.00	-
Time to break even (years)/job on 1/10th acre	1.67	10.6	25.6	-

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Appendix D.3 Planting Seed Cost Information

Time (seconds) 10'x4' plots	Sowing: seeder (8 rows)	Sowing: by-hand (8 rows)	Transplanting: by-hand w/ dibbler	Transplanting: paper pot (8 rows)
Rep 1	*25*	832	*754*	*96*
Rep 2		824		
Rep 3		812		
Average (seconds)	25.0	822.6	754.0	96.0
Hours/Acre	7.6	248.8	228.1	29.0
Hours/0.5Acre	3.8	124.4	114.0	14.5
Hours/0.25Acre	1.9	62.2	57.0	7.3
Hours/0.1Acre	0.8	24.9	22.8	2.9
Minutes/4'x100'	4.17	137.09	125.67	16.00
Hours/4 successions	3.0	99.5	91.2	11.6
Labor/Job($15/hr)	$45.37	$1,492.96	$1,368.51	$174.24
Machine Price	$650.00	-		$950.00
Time to break even (years)/job on 1/10th acre	0.4	-		0.8