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Dairymen who hire custom calf raisers pay a premium price for their services. Hard times have caused dairyman to reevaluate their calf raising expenses and determine if it would be economically beneficial to invest in a calf raising facility. The basic assumption is that these calf raising facilities are in the business of making money. Therefore, once their costs are accounted for, they charge a premium for their services. This project aims to determine the costs associated with building a first class calf raising facility and determine whether the costs involved make it a viable and economical option to counter the high custom calf raising expenses.

Another option to combat the expenses of custom calf raising is to sell calves at birth and buy replacements as necessary. The literature review will analyze the pros and cons of this option and make an educated decision whether or not this approach is another viable option. The ultimate goal of this senior project is to provide a decisive conclusion on the most economical and efficient way to supply replacements to an established milking herd.
Importance of Calf Raising

*Raising animals compared to buying replacements.* Every dairy producer is faced with the option to either raise his calves or sell them and buy replacement heifers as necessary. Most dairy producers choose to raise their replacements for many reasons. Raising (on the farm or custom) calves allows for more control over the genetics and quality of the animals that will eventually be a part of the milking herd (5). Cows are bred with specific genetics which the producers choose through artificial insemination programs or by a bull that was placed in the corrals. Whether a heifer being bought was artificially or naturally conceived is usually known, however her specific genetics are rarely exposed. This means a dairy producer buying replacement heifers doesn’t know whether the animals being purchased have good genetics or not. Raising calves allows for complete control over the herds genetic viability.

Dairy biosecurity is greatly increased by raising calves (5). Animals purchased outside the herd can be carriers of foreign diseases such as tuberculosis and BSE (mad cow). Heifers bought at auctions are tested for diseases but many diseases are untraceable until days after they are contracted. Therefore, it is impossible to be certain that animals being purchased are not carriers of harmful and potentially contagious pathogens. This raises a major concern for dairymen wishing to buy replacements because the effects of a contagious virus such as
tuberculosis or BSE can be catastrophic and lead to the quarantine or extermination of an entire herd.

A properly managed dairy will yield more replacements than animals leaving the herd. This means the dairy has the ability to slowly increase the milking herd size without having to purchase any additional replacement heifers. Slowly increasing the herd size is easier to manage than an abrupt increase in herd size when a dairy producer wishes to increase the milking herd (5). In other words, management is not forced to deal with an instant influx of animals; growth can be slow and steady. This allows management to adapt to a larger milking herd overtime as well as evaluate what the most efficient milking herd size for the given facility is.

Methods of Raising Replacement Heifers

*Raising animals on the farm.* Dairymen have the option to raise their youngstock on the farm. Given that they have the proper permitting and extra land necessary to accommodate a calf raising program, many dairymen choose to raise their animals themselves. Raising animals on the farm allows for direct supervision of the calf raising program. Dairymen are able to observe and control the management of the calves on a daily basis. They have complete control over vaccination, dehorning, feeding, and all other management techniques associated with a calf raising facility. This allows the dairy producer to manage the animals in the best possible way suited for their needs. There have been major concerns that calves on heifer raising facilities get mixed up. In other words, the dairyman receives an animal from another dairy. Raising animals on your farm guarantees that you will be milking the same animal that was calved at
your facility (8). The swapping of calves from one farm to another also brings up the same biosecurity concerns as discussed in buying replacements.

*Custom Calf Raising.* Hiring a custom calf raising facility is the other option for a dairyman. A dairyman may choose to have someone else raise the calves after birth. Custom calf raising facilities are set up to solely cater to the requirements of raising calves. Basically, they have no other concerns besides raising healthy calves. All of their managerial efforts and resources go towards the raising of animals. This means that historically calf raising facilities have been able to maintain a lower calf mortality rate then calves raised on a personal farm. As an average, calves raised on farms have an approximate mortality rate of 7% (1), and those raised on a successful custom calf raising facility are around 3% (8). Custom calf raising also frees up labor and resources for the dairyman. The advantages to the dairyman can include less required labor, ability to concentrate on milking herd management, freeing up of housing space to expand milking herd, and less feed inventory (2). The dairyman is able to allocate all his resources and time towards the milking herd. Therefore custom heifer raising can increase the efficiency of a dairy. Also with respect to budgeting, dairymen know their exact input costs and can budget according to the specific cost per animal.

**Housing Calves**

The way calves are housed is the most variable part of a calf raising facility. Dr. Quigley’s research states, there are many ways to house young dairy calves - hutch, pens, groups, greenhouses, or calves tied to a post (6). Almost as many ways to house calves as there are farms. Calf housing is unique to most farms - responding to the unique features of the farm,
including topography, land available, buildings on the farm, number of cows and calves, presence of water, fields, etc. Housing calves is also dynamic. It needs to change with changes in herd size, calving schedules, weaning schedules, etc (6). According to the USDA NAHMS National Dairy Heifer Evaluation Project (NDHEP), the types of housing used by producers in the U.S. for preweaned calves are in the table. W is winter. S is summer.

TABLE 1. U.S. Calf Housing Distributions

<table>
<thead>
<tr>
<th>Type of Housing</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual hutches</td>
<td>30.5</td>
<td>32.4</td>
</tr>
<tr>
<td>Group (super) hutches</td>
<td>2.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Individual pens in the cow barn</td>
<td>14.6</td>
<td>13.6</td>
</tr>
<tr>
<td>Group pens in the cow barn</td>
<td>21.8</td>
<td>18.0</td>
</tr>
<tr>
<td>Tied in the cow barn</td>
<td>15.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Individual pens in another barn (not cow barn)</td>
<td>20.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Group pens in another barn (not cow barn)</td>
<td>12.8</td>
<td>14.0</td>
</tr>
<tr>
<td>Tied in another barn (not cow barn)</td>
<td>4.7</td>
<td>4.4</td>
</tr>
<tr>
<td>No building (loose lot or pasture)</td>
<td>1.2</td>
<td>5.6</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Individual hutches are the most popular method for housing calves as shown in the table 1. Although they are a more expensive method, individual hutches provide added benefits which are very important to a young calf’s success. Ventilation is very important because it reduces the risk of airborne pathogens traveling from one calf to another and also reduces the toxic odor which can cause stress on the calf and weaken their immune system (6). Individual hutches also provide isolation for each animal. Calves have a weak immune system and can pass contagious diseases very easily. Well maintained individual hutches can also provide the best calf comfort. It is crucial that the hutches are always dry. This promotes the best environment to discourage infectious bacteria from growing in the hutches. It is not necessary to discuss the other options for calf housing because none of them meet the standards of excellence in the field of calf raising the author wishes to achieve from this report. They all fall short in one of the crucial areas of housing which include: isolation, ventilation, and comfort.

Designs for individual hutches can differ according to the climate they are designed to accommodate. Hutches are either made of wood or plastic. They are designed to be economical, easy to clean, and well ventilated. The author has chosen the wood hutches designed for central California climate for this project. Figure 1 illustrates the exact style hutch proposed in the bid. These hutches are built on location and are considered a very efficient option for warm weathered climate because they allow ventilation and are very economical. Figures 2 and 3 simply serve as a comparison model. These hutches represent a plastic design intended for colder climates, however many are used in California.
Figure 1. Wooden Hutches (4)

Figure 2. Plastic Hutch Facility (4)  

Figure 3. Individual Plastic Hutches (4)
Figure 4. Layout of Large Scale Calf Raising (4)

Figure 5. Different view of Large Scale Calf Raising Facility (4)
Materials and Methods

The literature review discussed the implications and importance of calf raising. It provided an overview of the different options a dairy producer has with regards to raising the animals and also provided information on the best kind of housing for a calf raising facility. Data was analyzed to express the importance of calf raising and to show the benefits of on farm calf raising as well as custom calf raising. It was determined from the data that individual hutches are the best way to achieve the most success calf raising operation. All research came from professional publications and interviews from leading professionals in the dairy and calf raising industries. The data offered in this paper will aid in showing what it takes to build a proper calf raising facility and determine whether it can be more economically beneficial to raise calves on a personal farm as opposed to paying for the services.

Plans for Calf Raising Facility

*Land Accommodations.* All costs and estimates for the calf raising facility are based off a 5,000 cow milking herd. With a 35% cull rate, in 1 year 6,750 calves will be born, half of which will be female. This leaves 3,375 heifers over a 12 month period. Based on a 2 month calf raising program, the facility must be able to sustain the occupancy of 562 calves at any given time (7). Tim Sellers bid the project based on 20 acres of land sold at the going rate of $6,000 per acre.
The author is assuming the 1 acre per 20 calves necessary for nutrient management plan requirements has already been predisposed.

Construction Implications. The 10% profit margin a contractor incurs from a project has already been factored into the individual bid prices. The facility will require the construction of a milk house which will contain the pasteurizer, milk tanks, and also provide storage space for bottles, buckets, vaccines, and any other equipment. The water pressure system contains all costs associated with drilling a well, as well as equipment and installation costs. The hutches are made of wood and will house 3 calves on each platform. The platform is under one roof and has an individual section for each calf. The hutches were chosen because the calves are not able to come in contact with each other and provide the most cost effective method of housing. The Regional Water Quality Control Board and the Air Quality District Board require special permitting prior to the start of construction. Also all county regulations must be met in order to start construction. The Authority to Construct (ATC) permitting quotes are based off estimates from similar facilities in the King’s County district. The Air Quality Control Board is the lead agency in charge of permitting (8).

Operating Costs. A 562 animal calf raising facility can be efficiently ran by 3 employees. The manager assumes normal managerial duties as well as occasional cleaning and maintenance duties. The labor costs are based off a monthly salary whereas the feeders are paid hourly. The water, power, and contingency costs are all estimates based off a similar facility located in the Central Valley of California (8).
Results and Conclusion

All loans necessary for the construction and completion of the calf raising facility are based off a 6% annual interest rate on a 30 year fixed loan. For clarity and ease of explanation the loans were broke up into a land loan and a construction loan. The $120,000 purchase of 20 acres of property carries a loan payment of $719.46 per month. The total construction cost of $403,350 has a monthly payment of $2,418. The facilities monthly operating cost is $18,200. When converted to cost per head per month, the costs yield a $37.96 payment per calf per month with all costs associated with construction and operating included. The average rate for a calf raising facility is $1.80 per calf per day. This translates to $54 per calf per month. When $54 is subtracted from $37.96, the difference between a dairy producer raising his own animals and a custom calf raising facility is $16.04 cents per calf per month. Based on a calf raising facility containing 562 head, this translates to $9,014.48 savings per month for the dairy producer who raises his own animals. In 1 year the dairy producer can save $108,173.76.

As discussed in the literature review, there are many other factors involved with the decision of building a calf raising facility, but because time and stress related factors are impossible to measure, the author’s conclusions are purely based on financial gains. There are resource and time sacrifices which must be made in order to have a successful calf raising facility. The author has concluded that the collateral and resource sacrifices associated with a calf raising facility
are minimal compared to the financial gains and opportunity. The author encourages any
dairyman in a position for investment or expansion, to seriously consider building a calf raising
facility. The author has concluded from the collected data that a dairies efficiency is drastically
increased by lowering cattle input costs. The startup costs are fairly marginal compared to the
financial savings. The opportunity for expansion and future investment also provide an
excellent incentive. In order to formulate a persuasive argument it is also necessary to integrate
the capital gains associated with this business decision. Not only is money being saved in the
short term, but in the long run, a portion of those monthly payments are going toward the
acquisition of the property and equipment. This means the business owner’s overall net worth
is increasing over time with this business decision. The author hopes this report has painted a
very clear picture of the opportunities associated with the construction and operation of a calf
raising facility from an investment standpoint.
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