

Milking Jersey's vs. Holstein's on a Commercial Dairy in California: Milk Production, Feed  
Efficiency, Intake, Costs, and Advantages.

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## **Abstract**

In this study, data from six Holstein dairies in California and four Jersey dairies were examined. Dairies were compared on 3.5% energy corrected milk, feed intakes, feed efficiency, feed costs per milking cow, and feed costs per hundred weight. Both Holstein and Jersey dairies had information taken from the months of September and May to observe the effects of weather on production and feed intakes, and so credible data could be determined for the year of 2012. For milk production the six Holstein herds produced an average of 70.925 lbs of energy corrected milk, while the four Jersey herds produced an average of 73.688 lbs of energy corrected milk. For feed intakes the six Holstein herds consumed an average of 52.417 lbs per milking cow, while the four Jersey herds consumed an average of 45.094 lbs of feed per milking cow for the year 2012. For feed efficiency, the Holstein dairies had 1.353 lbs of milk produced per pound of dry matter (DM) consumed. For the Jersey breed, the dairies reported an average feed efficiency of 1.635. Feed costs for the dairies were also observed. Feed costs per day per milking cow on the six Holstein dairies resulted in \$7.66 compared to \$7.45 for the four Jersey dairies. Another feed cost that was determined was the cost per hundred weight of milk. The Holstein dairies had a \$10.85 average on feed cost per hundred weight, while the Jersey dairies had a \$10.12 average on feed cost per hundred weight. As well as the information from the dairies, I constructed spread sheets to compare different prices of milk income for different cooperatives. Premiums were observed and milk quality bonuses were plugged into spread sheets for different cooperatives in California to see which ones were more beneficial to ship milk to. Information from this study was very hard to draw conclusions with, because of different factors that go into how cooperatives pay dairymen. With this information, I will determine if there is a sound

advantage between milking a Jersey herd or a Holstein herd on a commercial size dairy in California.

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## **Introduction**

There are many things to look at when starting in the dairy business, but one thing that is crucial in today's economy is having the best breed of cattle to be competitive with others in the same business. Two breeds of cows stand out at the top, which are Holstein and Jersey cows. Some people are looking to switch from the most famous breed, Holstein, to Jersey cows and others are looking at a possible mix of Jersey-Holstein cross breeds. Among these breeds, Jerseys were initially thought to best complement the Holstein breed due to their advantage in milk composition and fertility. Other characteristics of the Jersey breed, such as strong within-breed selection, competitive milk yield per unit of BW, and demonstrated heterosis with Holsteins, have led to their inclusion in crossbreeding programs (McAllister, 2002). Previous studies involving F<sub>1</sub> Holstein × Jersey crossbreds have examined many economically important traits. Heins et al. (2008) indicated a decrease in milk production and protein yield of crossbreds compared with Holsteins, but no difference was observed in fat yield. This study also noted that days open for first lactation crossbreds was lower than that of Holsteins (Bjelland et al., 2011). Holstein cows have been the dominate breed in the past because of their authority in higher milk production. Now with creameries and cooperatives making cheese and other dairy products besides milk, components are becoming a bigger deal for dairymen. Some cooperatives pay dairymen premiums for better components in their milk, and Jersey cows have proven to succeed over Holstein's in this category.

## **Calving Ease**

The fitness traits of different breeds of cows is very important when looking at which breed will be more beneficial. One trait to look at when comparing Jersey and Holstein cows is calving



ease. The easier cows calve out by themselves, the less harm they have on themselves and the newborn. Calving difficulty can lead to increased rates of neonatal calf mortality, lower milk production, and overall reduced health of cows (Heins et al., 2006). Calving difficulty has been associated with reduced survival of both cow and calf, as well as lower production, fertility, and longevity for the cow (Dhakal et al., 2012). Also when cows require help with calving, costs of assistance can range from \$100 all the way up to \$400 dollars, depending on what kind of help is provided. In a study done by (Olson et al., 2009) in research herds in Virginia, Kentucky, and North Carolina studying calving traits, they found that direct and maternal genetic effects to be significant. They reported that 100% purebred Holstein (HH) calves were 134.9 times more likely to require assistance at calving than 100% purebred Jersey (JJ) calves, and that calves born to Holstein dams were 22% as likely to require assistance at calving as those born to Jersey dams. In the same research study done above by Olsen, problems and deaths were recorded at calving for both Jersey and Holstein's at first and second lactation. For first lactation with Holstein heifers, there were 18 deaths at calving while there were only 5 deaths with Jersey calves. At second lactation there were 8 deaths with Holstein calves and 6 deaths with Jersey calves (Olsen et al., 2009).

### **Structural Soundness**

The structural soundness of a cow's body is another important factor to observe when comparing Jersey and Holstein cows. There are many things to look at when determining which breed is more structurally sound. One main advantage that Jersey cows have over Holstein's is their size. Looking at a commercial dairy, a dairyman can fit more Jersey cows on their facility than Holstein's. One way that this is possible is putting one or two extra stanchions in where normally Holstein cows would be overcrowded. So where five Holstein cows can fit in a given

eating area, that area will have enough room for six or seven Jersey cows to eat because of the smaller size of Jersey's. An example of this situation would be having a Holstein herd of 4,000 milking cows and wanting to switch over to a Jersey herd. When replacing the stanchions, it would be possible to fit one extra stanchion in for every five cows. Where normally five Holstein cows would fit at the bunks, six Jersey cows would now be eating. This would make the dairy into a 4,800 Jersey milk cow facility.

### **Longevity**

One important fitness trait that is sometimes overlooked is the longevity of a cow. Longevity can be defined as the length or duration of life (dictionary.com). This is an important category when looking at the breeds, because when dairymen have to feed their animals from birth until they become a milking cow, it costs a lot of money with feed and maintenance with no income coming from the cow until the cow starts producing milk. The lower the cow's longevity is, the sooner the cow dies meaning that the dairyman could have, for example, a first lactation heifer die which would be very bad. This puts a big loss on dairyman when they have young cows, having cost a lot of money to raise, die very soon when they finally become profitable and start producing milk. If culling (for whatever reason) occurs before the second lactation, the producer loses the natural milk increase due to parity, and when cows do not live past their second lactation, they do not have the opportunity to pay for their raising costs with milk production (Garcia-Peniche et al., 2004). In a study done by (Garcia-Peniche et al., 2005) research on the probability of surviving to 5 years of age (stayability) of Brown Swiss, Holsteins, or Jerseys in herds with one breed of cows by region was determined. The country was divided into 7 regions: Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Delaware, Maryland, New Jersey, Rhode Island, and Vermont), North Central

(Michigan, Wisconsin, Iowa, Minnesota, North Dakota, and South Dakota), Northwest (Idaho, Washington, Wyoming, Montana, and Oregon), Central (Ohio, Indiana, Illinois, Kansas, Nebraska, Missouri, Kentucky, Tennessee, Virginia, and West Virginia), Southeast (Florida, Georgia, South Carolina, North Carolina, Alabama, and Mississippi), South Central (Texas, Oklahoma, Arkansas, and Louisiana), and Southwest (Colorado, New Mexico, Arizona, Utah, Nevada, and California). Herds with one breed had significant differences for the effects of breed, region, and their interaction for stayability. Brown Swiss obtained the largest stayabilities in most regions, except the Central and Southwest, where as Jerseys were better. Holstein usually had the lowest stayabilities compared with Brown Swiss or Jersey. The differences of Holstein with the other breeds were larger than 15% in South Central and Southeast regions, likely because of heat stress. On Holstein Jersey (HJ) farms, Jerseys had larger stayability values than their Holstein herd mates in all regions, with larger differences in South Central, Southeast, and Southwest regions. Another point that is important to look at along with stayability is the number of lactations completed in a given amount of time. Dairywomen do not want cows that do not become pregnant again after their first lactation, and end up staying in the milk string for a really long time, and eventually ending up going to beef. Research on the expected number of lactations completed by 5 years of age (LAC5) for Brown Swiss, Jerseys, and Holsteins in herds with one breed by region were constructed, and in herds with one breed, significant differences were detected (Garcia-Peniche et al., 2005). The breed trend for LAC5 was clear, with Jerseys likely to have more LAC5 than Holsteins, and Holsteins slightly more than Brown Swiss in all regions. The Jerseys in the Central region had the highest LAC5 value: 2.6 lactations completed by 5 year of age. The lowest value was less than 2 lactations completed for both Holsteins and Brown Swiss in the Southeast. On HJ farms, the Jersey cows were likely to have more LAC5

than the Holsteins, with greater differences between breeds in Central (2.3 vs. 2.1 likely lactations), Southwest (2.5 vs. 2.2), South Central (2.3 vs. 2), and Southeast (2.3 vs. 1.9). One other category in longevity to determine is herd life. Herd life can be defined as the total number of days from the first calving date to the last (culling) date (Tsuruta et al., 2005). The Jersey breed had the longest interval from first calving to death, culling, or 5 year of age (HL5) in all regions for herds with one breed of cows (Garcia-Peniche et al., 2005). In this study, the research showed that Jersey cows had the longest herd life in all regions, but for the number of days lived in the Southwest region, which would be California, there was no significant difference. Brown Swiss lived an average of 1523 days, Jersey cows lived 1525 days, and Holstein cows lived 1528 days. One possible reason for Jersey cows having the near same herd life in California and not a longer herd life, could be because of weather. The hot temperatures in California may decrease herd life in Jersey cows enough to make them close to equal with Holstein and Brown Swiss cows.

### **Milk Production**

Milk production is arguably the most important factor when deciding to milk Jersey or Holstein cows. Each breed has its own advantages in the category. Jersey cows on average produce less milk, but in return give a higher butterfat and protein. Holstein cows produce more milk, but yield a lower butterfat and protein percent. In a study done by (Xue et al., 2010), eight Holstein and 8 Jersey-Holstein crossbred dairy cows (all primiparous) were used in a repeated 2 (genotype)  $\times$  2 (concentrate level) factorial design study involving a total of 4 periods (each of 6-wk duration), designed to examine the effect of cross-breeding on the efficiency of milk production and energy use. Animals were offered a completely mixed diet containing grass silage and concentrates, with the level of concentrate in the diet either 30 or 70% of dry matter

(DM). In both the 30 and 70% concentrate level studies, the milk yield for Holsteins was higher than that of the Holstein-Jersey crosses. In the 30% study, Holsteins produced 18.2 kg/d of milk while the crossbred cows produced 17.9 kg/d of milk. In the 70% concentrate level study, Holstein cows had a milk yield of 21.7 kg/d while the back crosses produced 20.2 kg/d of milk. In another study done by (Bailey et al., 2005), milk production was recorded for 100 Holstein and 100 Jersey cows. The baseline milk production for the Holstein cows was 65.96 lbs of milk per cow per day. For Jersey cows, the baseline milk production was 46.22 lbs of milk per cow per day. According to this study, Holstein cows produced 19.74 more lbs of milk than Jersey cows per day per cow. A study done by (Capper et al., 2011) shows once again that Holstein cows out produce Jersey cows in milk yield. In this research, performance data was based off of 1.88 million Holstein cows located in 12,374 herds, and 68,916 Jersey cows from 634 herds located throughout the United States. The Holstein population averaged 29.1 kg of milk daily (9,554 kg rolling herd average, RHA). Jersey cows averaged 20.9 kg of milk daily (6,467 kg RHA). On average Holstein milk yield was 8.2 kg greater than that of the Jersey cow.

### **Energy Corrected Milk**

When comparing the two milk productions, it is important to use energy corrected milk (ECM) instead of fat corrected milk (FCM) or simple milk production. Most Jersey herds make their money selling to cheese plants where protein is the most important component; FCM does not account for this. To find the energy corrected milk, the equation  $ECM (kg) = [0.327 \times (milk\ kg)] + [12.96 \times (fat\ kg)] + [7.2 \times (protein\ kg)]$  can be used (Heins et al., 2008). In the research done by (Xue et al., 2010) discussed in the previous section, energy corrected milk data was also determined. In the 30% concentrate studies, it was recorded that Holsteins had an ECM of 18.1 kg/d while the Jersey-Holstein cows produced 19.9 kg/d of ECM. At the 70% concentrate

level, Holsteins gave 21.8 kg/d ECM while the Jersey-Holstein cows produced 23.4 kg/d of ECM.

## **Components**

The high components in milk that Jersey cows produce are one of the main reasons that dairymen are switching over to the breed. Of these components, Protein is the main one that cooperatives look at and pay premiums to dairymen. As benchmark numbers Jersey cows produce anywhere from 3.5 to 4 percent protein with a 4.5 to 5.5 percent butterfat, while Holsteins on the other hand only give about 3 to 3.5 percent protein with a 3.5 to 4 percent butterfat. Even with components in Jersey milk, Holstein cows are still the most liked breed of cows because they produce 10 to 20 more pounds of milk than Jersey's. In a study done by (Lopez-Villalobos et al., 2000) a model was developed to evaluate the concurrent effects of selection and crossbreeding on the rate of genetic gain and productivity of New Zealand dairy cattle over 25 years. Under comparison of all the mating strategies, upgrading to Holsteins (UPGH) resulted in the heaviest, most productive cows with the highest individual feed requirements. Upgrading to Jersey's (UPGJ) resulted in the lightest cows with the lowest feed requirements and, consequently, the highest stocking rate and highest production per hectare of fat and protein. Upgrading to Holsteins would create a national herd producing, on average, 583 L more milk, 6 kg more fat, and 11 kg more protein per cow than UPGJ, with the cows being 69kg heavier and requiring 578 kg more pasture DM per cow. When the comparison was made on the basis of production per hectare, the UPGH strategy resulted in 0.267 less cows (and proportional replacements) being carried, 387 L more milk, 34 kg less fat, and 15 kg less protein than UPGJ. In another study, done by (Capper et al., 2011) performance data were based on breed averages from 1.88 million Holstein cows located in 12,374 herds, and 68,916 Jersey cows

from 634 herds located throughout the United States. The Holstein population averaged 29.1 kg of milk daily (9,554 kg rolling herd average, RHA) with milk components for milk fat and protein averaging 3.8 and 3.1%, respectively. Jersey cows averaged 20.9 kg of milk daily (6,467 kg RHA) with a milk fat concentration of 4.8% and protein content of 3.7%. In another study that was mentioned in “milk production” before, the components of 100 Holstein cows and 100 Jersey cows was also recorded (Bailey et al., 2005). In this research, it was recorded that Holstein cows produced a 3.72% butterfat and a 3.03% protein. Jersey cows produced 4.67% fat and 3.57% protein, giving them much higher components than Holstein cows. According to this study, Jersey cows outperformed Holstein cows in components, producing 0.95% more fat and 0.54% more protein.

## **Feed Costs**

Another aspect that immediately correlates to milk production is feed costs. With milk production being the biggest income on the dairy, feed costs are the highest on the other side of the spectrum, being the largest costs. Total feed costs account for approximately 80% of the total variable costs associated with milk production (Shalloo et al., 2004). For many years, milk price has driven variation in the milk-to-feed-cost ratio (MF) while feed prices, especially corn prices, have been low and stable. However, in recent years, volatility in corn and soybean prices became major factors in driving MF variation. The 10-yr average (1997–2006) US price for corn was \$2.49/bushel (bu; 1 bu = 56 lb = 25.40 kg), whereas prices in 2008 exceeded \$7/bu for a brief period and averaged \$4.78/bu for the year (USDA-NASS, 2009). These high corn prices have the effect of pulling acres out of soybeans and hay, which increase those feed prices. Even when a farm is not purchasing cash feed, if grain and alfalfa hay prices increase, the opportunity cost of feeding homegrown crops to cows has also increased (Wolf et al., 2012). With corn

prices being as high as they were in 2012, hitting a record high of \$8.49/bushel in August (Pitt et al., 2012), it is necessary to get the most efficient milking cows. So when feed prices are really high as they were in 2012 Jersey's are more efficient in feed and production, because it costs less to buy feed.

### **Feed Intakes**

It is also very important to observe feed intakes on the dairy. When you know how much each pen is eating, you are able to determine a lot more information. It is vital for dairymen to be able to find how much it costs for them to feed their cows in order to know how much money they are making or losing. Along with feed efficiency, it is also important to look at what the cost per cow is per day, and the cost of feed per hundredweight (cwt.). When finding the cost per cow per day, first the dry matter intakes (DMI) of each pen must be calculated, and how many cows are in each pen. Then all feed prices and commodities must be accounted for in costs, and you can figure out what the average DMI for that pen is. Daily feed costs would then be calculated by  $(\text{pounds/cow/day} / 100) * (\$/\text{cwt of feed})$ . In a study done by (Blake et al., 1985) dry matter and N were calculated for 34 daughters of 21 Holstein and 29 daughters of 18 Jersey sires in first and second trimesters of lactation. Holstein cows consumed one-third and one-fifth more DM than Jersey cows in the first and second trimesters; however, Jersey cows consumed more DM as a percentage of body weight than Holsteins, especially in second trimester. Because relative capacity of the gastrointestinal tract increases proportionally with body weight, higher percent DM intake of Jersey's was expected to result in relatively greater nutrient intake and lower digestibility than for Holstein's. This study observed that while Jersey cows eat less than Holstein cows, Jersey cows eat more when given the percent the cow eats compared to the body weight. Overall in the study, it was suggested that there was no comparative advantage for



Jersey cows in spite of higher ratios of milk to body weight and feed intake less than Holstein. Research done by (Heins et al., 2008) showed different results than that of most studies. Jersey × Holstein crossbred (J×H) cows (n = 24) were compared with pure Holstein cows (n = 17) for body weight, body condition score, dry matter intake (DMI), and feed efficiency during the first 150 days of first lactation. The DMI of cows was measured daily and averaged across 7 day periods. The J×H cows did not differ ( $P > 0.10$ ) from the pure Holstein cows for DMI during any period postpartum. The DMI rapidly increased for both breed groups from the 1st to 15th period postpartum. For the 15th period, DMI appeared to plateau at 25 to 26 kg/d. The J×H cows (22.0 kg) did not differ ( $P > 0.30$ ) from the pure Holstein cows (22.7 kg) for mean weekly DMI, and the J×H and pure Holstein cows consumed similar DMI as a percentage of BW (4.7 vs. 4.5%, respectively). According to my own research Holstein cows ate 13.631% more feed than Jersey cows in the month of September, and 14.286% more than Jersey's in the month of May. With all dairymen that I have talked with, Jersey cows eat around 15% less feed than Holstein's, which agrees with my research.

### **Feed Efficiency**

One important economical data point to observe is the feed efficiency. Feed efficiency can be defined as pounds of milk produced per pound of dry matter (DM) consumed (Hutjens et al., 2004). Efficient conversion of either grown or purchased feed nutrients directly affects the profitability of your operation. Good feed efficiency is not just economically important, but is also a good indicator of nutritional management on your farm (Alltech Fresno, California). In the study done by (Heins et al., 2008) discussed above in Feed Intakes, feed efficiency was also recorded for the set of data. The J×H cows (3,233 kg) were not significantly ( $P > 0.42$ ) different from the pure Holstein cows (3,326 kg) for total DMI from the 4th to 150th day postpartum of

first lactation. Furthermore, J×H and pure Holstein cows did not differ ( $P > 0.88$ ) for  $FE_{FP}$  (0.094 vs. 0.093) or  $FE_{EN}$  (1.43 vs. 1.43). The  $FE_{FP}$  was the ratio of 147 day fat plus protein production (kg) divided by 147 day DMI (kg), and the  $FE_{en}$  was the ratio of 147 day ECM (kg) divided by 147 day DMI (kg). Therefore, J×H cows produced similar amounts of fat plus protein (kg) and ECM per kilogram of DMI consumed compared with pure Holstein cows. The measures of FE used in this study do not partition energy into the alternative components for production, body maintenance, growth, or restoration of body reserves. Overall, Jerseys are more efficient feed converters than Holsteins; that is lbs ECM divided by pounds dry matter consumed.

## **Reproduction**

Reproduction is another category that we can look at and differentiate between the two breeds of cows. It is reported that 21% of direct health costs on dairies are for reproductive disorders, and insemination expenses accounted for an additional 19% (Shanks et al., 1979). Breeding is another area that Jersey cows outperform Holsteins. Jersey heifers are consistently bred around 12 months of age due to few calving problems. Holstein heifers are normally bred around 13-15 months of age, and have more calving problems. In a study done comparing Jersey and Holstein heifers for age at first calving, Jersey's were younger than Holsteins in every region of the United States and every state, but differences were only significant for herds in Wisconsin, California, and Florida (Garcia-Peniche et al. 2005). In a study done by (Brown et al., 2011) Holsteins (HH), Jerseys (JJ), and their crosses were used to determine differences between the breeds. In the research done, it was concluded that the HH had the highest service number per pregnancy (2.4) followed by the HJ (2.1), JJ (2.1), and finally the JH (1.9). The days open analysis followed the same pattern, with the HH (169) having the highest days open, then the HJ (143), JJ (132), and finally the JH (127).

## **Pregnancy Rate**

Pregnancy rates are another important number to look at when comparing the breeds. In a study done by the USDA in a November 2004 evaluation, daughter pregnancy rates were taken for both Jersey and Holstein cows, and it showed that Jersey cows had a far better pregnancy rate. Jersey cows showed nearly a 28% pregnancy rate while the Holstein breed reached a mere 21% pregnancy rate. This is important, because semen used to inseminate the animals costs a lot, and the more cows that get pregnant on first breeding the less semen the dairyman has to buy. Genetics is another topic that Jerseys jargon over Holsteins. Jerseys have better genetics, and are a smaller animal than Holsteins, making them easier to handle and space wise you can fit more cows in a given area. The genetics for Jersey's is a smaller animal that has lower energy and protein needs for maintenance giving it a slight edge over Holsteins.

## **Beef Income**

Comparing beef income for the two breeds is another aspect that a lot of dairymen look at when deciding between the two breeds. When beef prices are high, it is very beneficial to have a Holstein herd because Holstein cows weigh more and they get more money for beef. Jersey cows weigh a lot less than Holsteins, and do not get any money for bull calves because they are somewhat "worthless". Jersey bull calves are worth no money when born while Holstein bull calves are relatively worth about \$100, a number that is always fluctuating though. One possibility Jersey dairies are doing is breeding a small percent of their herd to Angus cows or some other type of breed that has good beef characteristics. With this breeding, the dairyman will be able to receive some money back for the bull calves that were crossed over. Along with calves being a downfall in the beef category, cows are also a setback for Jersey dairies. A Holstein cow

that might weigh 1300 pounds could get around 65 cents/cwt, while a Jersey cow might weigh 950 pounds getting the dairyman maybe half of what a Holstein cow can get for beef.

## **Raising Calves**

According to the USDA, heifer rearing represents about 20 percent of the total operating expenses on dairy operations, making it the second largest expense behind feeding costs. To raise heifers, dairies invest money and resources in feed, labor, and housing without receiving a return on their investments until the heifers calve, usually around 24 months of age. In a research study done by Bascom et al., 2002, Jersey calves showed little or no increase in BW from birth to 22 d. However, BW began to increase in Holstein calves after d 15. The diets were designed to support 227 g of ADG and calves should have gained more than 8 kg BW over the duration of the experiment but the Jersey calves gained less than 5 kg BW. This indicates maintenance energy requirement of Jersey calves may have been higher per unit of metabolic BW than Holstein calves and that NRC (2001) equations for maintenance energy may not be appropriate for Jersey calves. Increasing the feeding rate and/or increasing the caloric content of the liquid diet may improve the growth of young calves and this may be particularly important in Jersey calves (Bascom et al., 2002). In the same study, Bascom also reported that Jersey calf mortality is lower than what has been previously reported for the United States calf population. This may be due in part to the superior colostrum management and nutritional practices on Jersey herds. In the past, Jersey calves have been known to be harder to raise, and have higher mortality rates. Recently, Jersey and Holstein calves have shown close to equal numbers when observing calf mortality. In another study done through the North Central Regional Research Project 119 included 226 Holstein and 67 Jersey herds from MN, MO, PA, VA, and WA. Calf mortality rates from birth to first calving were 15.3 % for Holsteins and 15.8% for Jerseys

(Winston et al., 1998). After looking at these studies, and talking with managers about raising Jersey and Holstein calves, I believe that it is harder to raise a Jersey calf. Jersey calves are known to be harder to raise, because they get sick easier and die quicker compared to the bigger Holstein calves.

## **Co-ops**

Cooperatives (Co-ops), or the person that dairymen ship their milk to, is a vital part of the dairy business. In California, there are a few big co-ops that dominate the state, which are Land O Lakes (LOL), California Dairies, Inc (CDI), and Dairy Farmers of America (DFA). Hilmar Cheese is another large company that takes in a lot of California milk, but they are privately owned by dairy families. Depending on where the dairy correlates to the milk receiver, it can be a tough decision for which co-op to ship to because of the cost of milk hauling. Efficient shipping is important to have for both the dairyman and the co-op. Some co-ops let the dairyman ship the milk themselves if they have their own trucks, and other co-ops have company trucks that pick up the milk mandatorily for the dairyman. Co-ops like CDI and LOL pick up the milk themselves, while DFA and Hilmar Cheese give the option of having the dairyman ship the milk with their own trucks. When a dairyman is given the option of shipping their own milk, this can be a big cost saver in the long run. The start-up cost for a dairyman shipping their own milk might be high, but after a few years the trucks will pay themselves off in money saved from compared to the co-op shipping the milk. Some co-ops pay dairymen differently, for example give protein premiums for the milk that they get. With this aspect, comes the decision of what breed of cattle does the dairyman want to milk, because, depending on the co-op, that receiver might pay a lot more for Jersey milk compared with Holstein milk because of the protein and/or butterfat components. Along with premiums that co-ops pay to dairymen, they also pay milk

quality bonuses. Milk quality bonuses are different for each receiver, and are paid to dairymen when they have good clean milk. Most co-op quality bonuses are tested on the somatic cell count (SCC), the standard plate count (SPC), coliform count, and lab pasteurized count (LPC). Co-ops and milk receivers usually have a system in which they pay dairymen for quality, where the better the quality of milk, the more money is paid to the dairyman. Base is another large decision process when talking about different co-ops. Base can be thought of as the amount of milk, in gallons, that a dairyman can ship to a co-op. For example, if a dairyman bought 20,000 gallons of base and had 2,000 cows, the maximum amount of milk that that dairyman can ship to their co-op would be an average of 86 lbs per cow. To understand how to do this, 20,000 gallons of base is equal to 172,000 pounds, because a gallon of milk is 8.6 pounds. Then, take the total pounds of base and divide that by the number of milking cows to find how many pounds of milk per cow per day you can ship. In the year 2012, milk production was extremely high in California due to weather and other factors. A mild summer and a winter that was very dry and considerably warm made milk production sky rocket instead of its usual steady production. Open lot dairies that were usually under water and in deep mud were getting a lot of milk out of their cows because of the good weather. When this happened, co-ops in California were getting more milk than they have ever had, and didn't know what to do with it. In March 2012, the co-op Land O' Lakes sent out a letter to all their members, telling them that they would be supplementing base reduction measures. This meant that they would assess \$10/cwt to all members who produced over their newly revised base volume. Additional to this they made it mandatory for all Tulare and Southern California dairies to reduce production by an additional 6%. In return for the reduction, all members would get an additional \$.30/cwt on the premium

price if and only if the dairymen made the reductions. This is just one example of how important base is in the dairy business, and understanding it is essential to running a good business.

## **Materials and Methods**

I will use information from previous studies, and also information extracted by Theo Lykos from Dairy Technical Solutions. Theo has more than 15 years experience in the field, and has a PhD as a dairy nutritionist. Data from six Holstein dairies in California and four Jersey dairies will be examined. There are five Holstein dairies that are free stall type layouts, and one Holstein dairy that is on open corrals. Out of the five dairies that are from free stalls, three of the dairies are milking more than 2000 cows on a 2X per day milking schedule and the other two free stall dairies are milking less than 2000 on a 2X per day milking schedule. The one Holstein dairy that is open corrals is milking more than 2000 cows, and is on a 4X per day milking schedule for the fresh cows and a 2X per day milking schedule for all other milking cows. For the Jersey dairies, all facilities are free stalls. Out of the four dairies, three are milking more than 2000 cows and are on a 3X per day milking schedule and using Bovine Somatotropin (BST). The other Jersey dairy is milking less than 2000 cows, is on a 4X per day milking schedule for the fresh cows and a 2X per day milking schedule for all other milking cows, and is also using BST. I will compile the data, and determine averages for energy corrected milk (ECM), feed intakes, feed efficiency, feed costs per milking cow, and feed costs per cwt for the Holsteins and Jersey herds. Once I have the averages of the six Holstein herds and the four Jersey herds, I will have actual data that I can use to better understand the differences in the two breeds, and be able to use this data in a spreadsheet model to find which breed is more efficient. Along with this information, I will contact different co-ops to find out premiums that are paid to dairymen in order to find out which co-op would be best to ship to. Spread sheets will be made to compare milk income and feed

expenses for the year 2012 for shipping to different co-ops. Benchmark numbers will be used for most of the spreadsheet. I used a dairy of 2,140 cows for both Holstein and Jersey's, where Holstein cows produced 75 pounds and Jersey cows produced 55 pounds of milk. For the price per cwt, I used the average from 2012 for the milk price. For the feed costs, I used an average benchmark number for the Holstein herd, and used 15% less feed for the Jersey herds.

## Results

### Milk Production

In September 2012 (Table 1), six dairies of Holstein herds and four dairies with Jersey herds were taken and data was determined. The six Holstein herds produced an average of 68.033 lbs (SD=7.107) of energy corrected milk, while the four Jersey herds produced an average of 71.875 lbs (SD=1.299) of energy corrected milk. According to this information, Jersey's produced 3.842 lbs more ECM than Holstein's during the month of September.

**Table 1.** Comparison of 3.5% energy corrected milk in pounds between six Holstein dairies and four Jersey cow dairies in September, 2012

Breed	Holstein	Jersey
	77.50	77.00
	79.00	78.00
	67.50	76.00
	82.00	71.00
	69.00	
	67.90	
Average ECM:	73.817	75.500
SD:	6.411	3.109



**Table 2.** Comparison of 3.5% energy corrected milk in pounds between six Holstein dairies and four Jersey cow dairies in May, 2012

Breed	Holstein	Jersey
	70.50	71.50
	74.00	72.50
	64.00	73.25
	77.50	70.25
	59.00	
	63.20	
Average ECM:	68.033	71.875
SD:	7.107	1.299

In the month of May 2012 (Table 2), the same herds were evaluated again on their performance for ECM production. On average from the six Holstein herds, 73.817 lbs (SD=6.411) of energy corrected milk was produced. From the four Jersey herds, an average of 75.500 lbs (SD=3.109) of energy corrected milk was produced. According to this study, Jersey cows produced 1.683 more pounds of energy corrected milk than Holstein cows.

### Intakes

The feed intakes were recorded and data analyzed as well. For the month of September (Table 3), the intakes for milking cows were recorded for each dairy. For the six Holstein dairies, an average of 50.583 lbs (SD=2.268) was consumed for milking cows. For the four Jersey dairies, an average of 43.688 lbs (SD=.554) was consumed for milking cows. On average, Holstein cows ate 6.895 lbs more than Jersey cows during the month of September.

**Table 3.** Comparison of feed intakes in pounds between six Holstein dairies and four Jersey cow dairies from data taken in September, 2012

Breed	Holstein	Jersey
	50.50	43.25
	52.50	43.50
	51.00	44.50
	53.50	43.50
	48.00	
	48.00	
Average Intake:	50.583	43.688
SD:	2.268	0.554

**Table 4.** Comparison of feed intakes in pounds between six Holstein dairies and four Jersey cow dairies from data taken in May, 2012

Breed	Holstein	Jersey
	55.00	46.50
	57.00	47.25
	55.00	47.75
	57.00	44.50
	52.50	
	49.00	
Average Intake:	54.250	46.500
SD:	3.062	1.429

For the month of May (Table 4) intakes were also recorded for the dairies, to see which breed fairs better under certain weather conditions. Intakes for both breeds increased compared to the month of September, but Holstein cows increased more. Holstein cows increased their intake from 50.583 lbs to 54.250 lbs, a 3.667 lb increase. The Jersey cows went from 43.688 lbs to 46.500 lbs, a 2.812 lb increase. On average, Holstein cows ate 13.631% more feed than Jersey cows in the month of September, and 14.286% more than Jersey's in the month of May.

## Feed Efficiency

The feed efficiency was determined for each Holstein and Jersey dairy in the months of September and May for 2012. For the month of September (Table 5), the six Holstein herds had an average feed efficiency of 1.343 (SD=0.091), and the four Jersey herds resulted with a feed efficiency of 1.645 (SD=0.025). On average according to this study, Jersey cows had a feed efficiency that was 0.302 higher than that of the Holstein cows.

**Table 5.** Comparison of feed efficiency between six Holstein dairies and four Jersey cow dairies from data taken in September, 2012

Breed	Holstein	Jersey
	1.40	1.65
	1.41	1.67
	1.25	1.65
	1.45	1.61
	1.23	
	1.32	
Average Feed Efficiency:	1.343	1.645
SD:	0.091	0.025

**Table 6.** Comparison of feed efficiency between six Holstein dairies and four Jersey cow dairies from data taken in May, 2012

Breed	Holstein	Jersey
	1.41	1.66
	1.39	1.65
	1.23	1.59
	1.44	1.60
	1.31	
	1.39	
Average Feed Efficiency:	1.362	1.625
SD:	0.078	0.035

For the month of May, the results were very similar. The six Holstein herds had an average feed efficiency of 1.362 (SD=0.078), and the four Jersey herds resulted with a feed efficiency of 1.625 (SD=0.035). The results for May (Table 6) showed a 0.263 difference in feed efficiency

between the two breeds, and also that the Holstein herds feed efficiency went up from September to May while the Jersey herds nearly stayed the same during the transition.

## Feed Costs

For the feed costs analysis for six Holstein dairies and four Jersey dairies, I chose to take averages for the whole year of 2012 on the feed cost per milking cow and the feed cost per cwt. In table 7, the data was analyzed and results were concluded. The Holstein breed ate \$7.66 (SD=0.424) per cow per day, and each Jersey milking cow ate on average \$7.45 (SD=0.176) per day. According to this information, Jersey cows cost less money to feed per day per head.

**Table 7.** Comparison of feed costs per day per milking cow between six Holstein dairies and four Jersey cow dairies from data in the year 2012

Breed	Holstein	Jersey
	7.75	7.45
	8.04	7.52
	7.55	7.63
	8.13	7.22
	7.51	
	6.96	
Average Feed \$/head (Milking):	7.655	7.454
SD:	0.424	0.176

**Table 8.** Comparison of feed costs per hundred weight between six Holstein dairies and four Jersey cow dairies from data in the year 2012

Breed	Holstein	Jersey
	10.49	10.04
	10.53	10.00
	11.50	10.22
	10.21	10.22
	11.76	
	10.65	
Average Feed \$/cwt	10.853	10.118
SD:	0.620	0.116

For the analysis for feed costs per hundred weight, numbers were abstracted from the months of May and September and averaged for the year of 2012. In table 8, the data was analyzed and results were concluded. For the year 2012, the average feed costs per hundred weight for Holstein cows was \$10.85 (SD=0.62), and the average feed costs per hundred weight for Jersey cows came out to be \$10.12 (SD=0.116). According to this data, Holstein cows resulted in eating more feed and having a higher feed cost per hundred weight, being 73 cents higher than that of Jersey cows.

### **Milk Income and Feed Expenses for California Co-ops**

For all cooperative information, I used the same numbers. I used benchmark numbers for milk production, which were 55 pounds of milk for Jersey dairies and 75 pounds of milk for Holstein dairies. I used the thumb rule of adding or subtracting one pound of milk for every one tenth percentage point change above or below 3.5 percent fat test. For example, for the Holstein herd averaging 75 pounds of milk with 3.8 percent milk fat, the estimated pounds of 3.5% FCM would be 78 pounds instead of 75 pounds. For protein and milk fat numbers, I used 3.8% fat and 3.1% protein for Holstein cows, and 4.8% fat and 3.7% protein for Jersey cows. Milk quality bonuses were observed, and the best bonuses offered by each co-op were used. Protein premiums were configured and plugged in for the different co-ops in order to come to a conclusion. For feed costs, I used benchmark numbers from a Holstein California dairy, and then used numbers that were 15% less for the Jersey cows. Using numbers that were on average 15% less also correlated with my earlier study on feed intakes where Holstein cows ate 13.631% more feed than Jersey cows in the month of September, and 14.286% more than Jersey's in the month of May.

## California Dairies, inc. (CDI)

CDI is one of the largest milk receivers in California, which is why a lot of dairymen ship to them. They have, or had in the past, room for growth so dairymen could easily buy base and start off in the dairy business or expand. One thing that is interesting though, is that they do not offer any premiums except for milk quality. All the other milk receivers that I looked at offered at least some kind of premium, but CDI had no differences for receiving Holstein and Jersey milk. CDI had milk quality bonuses that were at a maximum of \$0.20/cwt, when getting less than 125,000 SCC, 100 COLI, 100 LPC, and 15,000 SPC on counts.

**Figure 1.** Milk income and feed expenses for a Holstein dairy shipping to California Dairies, inc.

Holstein CDI										Beef
Income	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Cost/Cow
Milk Sales Net	2140	78	166920	1	\$16.63	\$832,763.88	\$9,993,166.56	16.40	92.8%	
						\$0.00	\$0.00	0.00	0.0%	
Milk Quality					\$0.20	\$10,015.20	\$120,182.40	0.20	1.1%	
Beef Cows	2360			0.37	\$545.00	\$39,657.83	\$475,894.00	0.78	4.4%	
Calf Sales	80				\$150.00	\$12,000.00	\$144,000.00	0.24	1.3%	
calf milk						\$3,000.00	\$36,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$897,703.58</b>	<b>\$10,772,442.96</b>	<b>17.68</b>	<b>100.0%</b>	<b>\$ 12.97</b>
Expenses		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	7.63				\$494,424.00	\$5,933,088.00	9.74	55.1%	
Dry cows	281	3.58				\$30,179.40	\$362,152.80	0.59	3.4%	
Heifers	1830	2.04				\$111,996.00	\$1,343,952.00	2.21	12.5%	
<b>Total</b>						<b>\$636,599.40</b>	<b>\$7,639,192.80</b>	<b>12.54</b>	<b>70.9%</b>	<b>\$ 7.63</b>

**Figure 2.** Milk income and feed expenses for a Jersey dairy shipping to California Dairies, inc.

Jersey CDI										Beef
Income	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Cost/Cow
Milk Sales Net	2140	68	145520	1	\$16.63	\$725,999.28	\$8,711,991.36	16.40	96.1%	
Protein Premium		0	0		\$0.00	\$0.00	\$0.00	0.00	0.0%	
Milk Quality					\$0.20	\$8,731.20	\$104,774.40	0.20	1.2%	
Beef Cows	2360			0.37	\$250.00	\$18,191.67	\$218,300.00	0.41	2.4%	
Calf Sales	80				\$0.00	\$0.00	\$0.00	0.00	0.0%	
calf milk						\$2,500.00	\$30,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$755,688.81</b>	<b>\$9,068,265.76</b>	<b>17.07</b>	<b>100.0%</b>	<b>\$ 11.31</b>
Expenses		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	6.4855				\$420,260.40	\$5,043,124.80	9.49	55.6%	
Dry cows	281	3.043				\$25,652.49	\$307,829.88	0.58	3.4%	
Heifers	1830	1.734				\$95,196.60	\$1,142,359.20	2.15	12.6%	
<b>Total</b>						<b>\$541,109.49</b>	<b>\$6,493,313.88</b>	<b>12.23</b>	<b>71.6%</b>	<b>\$ 6.49</b>

## Land O' Lakes

LOL has a system where protein premiums start at 3.5% for milk. So once a dairyman can get an average above 3.5% protein from their herd of cows, they will start receiving premiums from the cooperative. This number is higher than DFA and Hilmar, which makes it harder for dairymen to achieve the premium price especially if they have a Holstein herd. Land O' Lakes has a different milk quality system than most other co-ops. They pay \$0.20/cwt for SCC <125,000, and have a different bonus for their other bacteria counts. When the dairyman has good LPC and SPC scores another nickel is added to the bonus, making a \$0.25 bonus possible.

**Figure 3.** Milk income and feed expenses for a Holstein dairy shipping to Land O' Lakes

<b>Holstein LOL</b>										
	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef
<b>Income</b>										
Milk Sales Net	2140	78	166920	1	\$16.63	\$832,763.88	\$9,993,166.56	16.40	92.6%	
Protein Premium		0	0		\$0.00	\$0.00	\$0.00	0.00	0.0%	
Milk Quality					\$0.25	\$12,519.00	\$150,228.00	0.25	1.4%	
Beef Cows	2360			0.37	\$545.00	\$39,657.83	\$475,894.00	0.78	4.4%	
Calf Sales	80				\$150.00	\$12,000.00	\$144,000.00	0.24	1.3%	
calf milk						\$2,500.00	\$30,000.00	0.05	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$899,707.38</b>	<b>\$10,796,488.56</b>	<b>17.72</b>	<b>100.0%</b>	<b>\$ 12.97</b>
<b>Expenses</b>		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	7.63				\$494,424.00	\$5,933,088.00	9.74	55.0%	
Dry cows	281	3.58				\$30,179.40	\$362,152.80	0.59	3.4%	
Heifers	1830	2.04				\$111,996.00	\$1,343,952.00	2.21	12.4%	
<b>Total</b>						<b>\$636,599.40</b>	<b>\$7,639,192.80</b>	<b>12.54</b>	<b>70.8%</b>	<b>\$ 7.63</b>

**Figure 4.** Milk income and feed expenses for a Jersey dairy shipping to Land O' Lakes

<b>Jersey LOL</b>										
	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef
<b>Income</b>										
Milk Sales Net	2140	68	145520	1	\$16.63	\$725,999.28	\$8,711,991.36	16.40	92.7%	
Protein Premium		55	117700		\$0.78	\$27,541.80	\$330,501.60	0.78	3.5%	
Milk Quality					\$0.25	\$8,827.50	\$105,930.00	0.25	1.1%	
Beef Cows	2360			0.37	\$250.00	\$18,191.67	\$218,300.00	0.41	2.3%	
Calf Sales	80				\$0.00	\$0.00	\$0.00	0.00	0.0%	
calf milk						\$2,500.00	\$30,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$783,326.91</b>	<b>\$9,399,922.96</b>	<b>17.70</b>	<b>100.0%</b>	<b>\$ 11.74</b>
<b>Expenses</b>		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	6.4855				\$420,260.40	\$5,043,124.80	9.49	53.7%	
Dry cows	281	3.043				\$25,652.49	\$307,829.88	0.58	3.3%	
Heifers	1830	1.734				\$95,196.60	\$1,142,359.20	2.15	12.2%	
<b>Total</b>						<b>\$541,109.49</b>	<b>\$6,493,313.88</b>	<b>12.23</b>	<b>69.1%</b>	<b>\$ 6.49</b>

## Dairy Farmers of America (DFA)

DFA has a complex way of figuring out premiums for their milk. Dairymen are put into pools, where each pool gets paid a certain premium based on the components from all the dairies in that pool. For protein, premiums start at 3.35% for milk. So once a dairyman can get an average above 3.35% protein from their herd of cows, they will start receiving premiums from the cooperative. Based on this information, it is hard for me to configure a protein premium price for DFA. The numbers that I used for the DFA protein premium are from a dairyman who said that \$0.65/cwt was the price that he got for the protein premium from DFA. DFA has other premiums that I have not put into the spread sheets in Figure 5 and 6, like DFA advantage and BST free premiums. Also Holstein herds have a chance to obtain the protein premium with the minimum of 3.35% for protein, but for me using 3.1% protein, Holstein's would not get the premium. DFA also has a complex milk quality bonus system. The system is set on a three tier system, with the highest bonus being \$0.15/cwt. At this bonus, dairymen must have counts of 100,000 SCC, 150 SPC, and 150 LPC.

**Figure 5.** Milk income and feed expenses for a Holstein dairy shipping to Dairy Farmers of America

<b>Holstein DFA</b>										
	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef
<b>Income</b>										
Milk Sales Net	2140	78	166920	1	\$16.63	\$832,763.88	\$9,993,166.56	16.40	93.0%	
						\$0.00	\$0.00	0.00	0.0%	
Milk Quality					\$0.15	\$7,511.40	\$90,136.80	0.15	0.8%	
Beef Cows	2360			0.37	\$545.00	\$39,657.83	\$475,894.00	0.78	4.4%	
Calf Sales	80				\$150.00	\$12,000.00	\$144,000.00	0.24	1.3%	
calf milk						\$3,000.00	\$36,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$895,199.78</b>	<b>\$10,742,397.36</b>	<b>17.63</b>	<b>100.0%</b>	<b>\$ 12.97</b>
<b>Expenses</b>		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	7.63				\$494,424.00	\$5,933,088.00	9.74	55.2%	
Dry cows	281	3.58				\$30,179.40	\$362,152.80	0.59	3.4%	
Heifers	1830	2.04				\$111,996.00	\$1,343,952.00	2.21	12.5%	
<b>Total</b>						<b>\$636,599.40</b>	<b>\$7,639,192.80</b>	<b>12.54</b>	<b>71.1%</b>	<b>\$ 7.63</b>



**Figure 6.** Milk income and feed expenses for a Jersey dairy shipping to Dairy Farmers of America

<b>Jersey DFA</b>										
<b>Income</b>	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef Cost/Cow
Milk Sales Net	2140	68	145520	1	\$16.63	\$725,999.28	\$8,711,991.36	16.40	93.7%	
Protein Premium		55	117700		\$0.65	\$22,951.50	\$275,418.00	0.52	3.0%	
Milk Quality					\$0.15	\$5,296.50	\$63,558.00	0.12	0.7%	
Beef Cows	2360			0.37	\$250.00	\$18,191.67	\$218,300.00	0.41	2.3%	
Calf Sales	80				\$0.00	\$0.00	\$0.00	0.00	0.0%	
calf milk						\$2,500.00	\$30,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$775,205.61</b>	<b>\$9,302,467.36</b>	<b>17.51</b>	<b>100.0%</b>	<b>\$ 11.67</b>
<b>Expenses</b>		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	6.4855				\$420,260.40	\$5,043,124.80	9.49	54.2%	
Dry cows	281	3.043				\$25,652.49	\$307,829.88	0.58	3.3%	
Heifers	1830	1.734				\$95,196.60	\$1,142,359.20	2.15	12.3%	
<b>Total</b>						<b>\$541,109.49</b>	<b>\$6,493,313.88</b>	<b>12.23</b>	<b>69.8%</b>	<b>\$ 6.49</b>

## Hilmar Cheese

Hilmar Cheese has a fairly simple program. They have devised a matrix to figure out premiums for their privately owned company. In order to figure out what premium a dairyman will get, the company must know the protein and butterfat percents, and then look on the matrix to find how much to pay. Premium prices for Hilmar cheese start when component numbers are greater than or equal to 3.2% protein and greater than or equal to 3.8% fat. For milk quality bonuses, Hilmar had the best prices. The top quality bonus was for \$0.30/cwt, with quality counts of less than or equal to 150,000 SCC, 15,000 SPC, 225 LPC, and 225 COLI.

**Figure 7.** Milk income and feed expenses for a Holstein dairy shipping to Hilmar Cheese

Holstein Hilmar										
Income	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef Cost/Cow
Milk Sales Net	2140	78	166920	1	\$16.63	\$832,763.88	\$9,993,166.56	16.40	92.3%	
Protein Premium		75	160500		\$0.01	\$481.50	\$5,778.00	0.00	0.1%	
Milk Quality					\$0.30	\$15,022.80	\$180,273.60	0.30	1.7%	
Beef Cows	2360			0.37	\$545.00	\$39,657.83	\$475,894.00	0.78	4.4%	
Calf Sales	80				\$150.00	\$12,000.00	\$144,000.00	0.24	1.3%	
calf milk						\$2,500.00	\$30,000.00	0.05	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$902,692.68</b>	<b>\$10,832,312.16</b>	<b>17.78</b>	<b>100.0%</b>	<b>\$ 12.98</b>
Expenses		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	7.63				\$494,424.00	\$5,933,088.00	9.74	54.8%	
Dry cows	281	3.58				\$30,179.40	\$362,152.80	0.59	3.3%	
Heifers	1830	2.04				\$111,996.00	\$1,343,952.00	2.21	12.4%	
<b>Total</b>						<b>\$636,599.40</b>	<b>\$7,639,192.80</b>	<b>12.54</b>	<b>70.5%</b>	<b>\$ 7.63</b>

**Figure 8.** Milk income and feed expenses for a Jersey dairy shipping to Hilmar Cheese

Jersey Hilmar										
Income	hd	lbs	lbs	%	\$/cwt	Per month	Annual	Per CWT	Percent	Beef Cost/Cow
Milk Sales Net	2140	68	145520	1	\$16.63	\$725,999.28	\$8,711,991.36	16.40	90.2%	
Protein Premium		55	117700		\$1.34	\$47,315.40	\$567,784.80	1.34	5.9%	
Milk Quality					\$0.30	\$10,593.00	\$127,116.00	0.24	1.3%	
Beef Cows	2360			0.37	\$250.00	\$18,191.67	\$218,300.00	0.41	2.3%	
Calf Sales	80				\$0.00	\$0.00	\$0.00	0.00	0.0%	
calf milk						\$2,500.00	\$30,000.00	0.06	0.3%	
heifer sales beef	4				\$800.00	\$266.67	\$3,200.00	0.01	0.0%	
<b>Total Income</b>						<b>\$804,866.01</b>	<b>\$9,658,392.16</b>	<b>18.18</b>	<b>100.0%</b>	<b>\$ 12.05</b>
Expenses		Cost/day				Per Month	Annual			
Feed										
Milk cows	2160	6.4855				\$420,260.40	\$5,043,124.80	9.49	52.2%	
Dry cows	281	3.043				\$25,652.49	\$307,829.88	0.58	3.2%	
Heifers	1830	1.734				\$95,196.60	\$1,142,359.20	2.15	11.8%	
<b>Total</b>						<b>\$541,109.49</b>	<b>\$6,493,313.88</b>	<b>12.23</b>	<b>67.2%</b>	<b>\$ 6.49</b>

## Discussion

There are many different things to look at when deciding whether or not to milk Jersey or Holstein cows in California and some of the deciding factors are very complex. One of the hardest things to look at in today's economy is where the dairy industry is headed. The dairy industry was very tough in the year 2012, and it's hard to say where it will go from there. Dairymen went out of business, selling their herds or going bankrupt, and it's hard to say what will happen next with droughts in the U.S. driving feed prices to record setting highs. One question that may arise for a dairyman wanting to switch over from Holstein to Jersey cows would be when the dairy business will settle and get good again. There are certain co-ops that

are much better to ship to when milking Jersey cows, because they pay protein premiums for milk. Often times, the only way to get into one of these co-ops is to buy a herd that comes with base. So if a dairyman wanted to get into one of these co-ops, and wanted to milk Jersey cows, the question is how big of a dairy does he/she want, and is there room for expansion. With the dairy business going through hard times in 2012, some dairymen took risks of buying Jersey herds and switching over to co-ops that gave premiums. Most of the Jersey herds that come for sell are relatively smaller than Holstein herds, so let's say that a dairyman who used to milk 4,000 Holstein cows and wants to switch over to Jersey cow's, probably would get a Jersey herd of close to 1,500 cows. One risk of this situation is the dairy business getting really good after buying a small Jersey herd. If the dairy business all of a sudden gets really good, there is no room for expansion for that dairyman, and now he has a facility that is practically empty and must resort to filling it with expensive Jersey cows or cheaper Holstein cows and getting a lower premium price from their co-op. Taking all of this into account and comparing the different characteristics of each breed, one can try to decide which cow is more efficient.

## **Conclusion**

There are many factors that go into figuring out which breed of cattle will be more profitable in California; so many that it may be hard to conclude with a defined answer. Over the course of my research, I found that a conclusion would depend on the milk price, feed prices, and which cooperative the dairyman would ship to. Both breeds of cows are similar and have pros and cons to both of them. The main advantages of milking Holstein cows is that they produce more milk, are easier to raise, and get better money for their beef cows. The main advantages of milking Jersey cows is that they have higher protein and fat components in the milk giving premiums for certain milk cooperatives, they are a smaller breed of cows that are easier to handle, and they eat

less feed than Holstein cows. As for the co-ops, I would conclude that wherever the dairy can ship their milk to would be good. The first choice would be to get a Jersey herd and ship to either DFA, Land O' Lakes, or Hilmar, but it's very hard to do this considering available cows for sale and the current problems with base and over milk production in California. CDI, with Holsteins, would probably be the easiest to get into and would be the next best choice. Other premiums and disadvantages that these cooperatives infer are not taken into judgment in this study, but do play a very large role on where a dairy can get their milk shipped to. There are so many factors in this decision that it would be more of an opinion overall. Aspects like the amount of income for vesting required for each co-op could be another big decision when looking at where to ship to. In final, I would conclude that choosing between Jersey and Holstein cows is a risk factor. Jersey cows are less risky in the sense that they don't make as much money when times are good, but they don't lose as much money when times are bad. Holstein cows have a higher risk factor in the sense that when times are good they make more money, but when times are bad they lose more money compared to Jersey dairies.

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