

Intro Slide: Hello Everyone, in this section of the course we will go over Calf & Heifer Inventory Management.

My name is Margaret Quaassdorff, and I am the Dairy Management Specialist for the Cornell Cooperative Extension NWNY Dairy, Livestock, & Field Crops Team.

I have experience raising calves and heifers while I was a dairy manager, and also have worked extensively with other farms on their calf and heifer programs.

So without further delay, let's learn about inventory management.

Slide 3: Why is thinking about heifer inventory important? It has to do with farm efficiency, farm profitability, and helps you plan and reach goals regarding farm size.

Slide 4: Many farms tend to have too many heifers in their inventory. Some of the reasons being the implementation of new technology or better management. Some examples are the:

- Use of Sexed Semen: Which results in a higher proportion of pregnancies carrying heifer calves.

- Improvements in Reproductive Efficiency: We have done a better job getting cows bred at the right time, and pregnant...resulting in more calves being born.

- Better colostrum management and practices: Over the recent years, there has been greater understanding and improvements in this area. Farmers have done a good job testing colostrum for quality, properly managing it to maintain the quality of that colostrum, and learning proper delivery of the colostrum to the calf. This really sets the calves up for success in the system.

- Overall better calf management and raised standards of health: Resulting in more heifers making it through our raising systems due to better care, and treatment and management protocols.

So all of a sudden we have more heifers than we've had in past generations of farming, and we have to start to think about if we really need to keep ALL of them.

Benefits of reducing your heifer inventory to appropriate numbers include:

- Decreased stocking density (instead of building a new barn to hold all the heifers, farmers should consider if their current facility can hold all the right heifers)

- Maximized growth and health: Think about group pens with too many animals in them. They are often competing for feed and water, and clean dry bedding resources, and can be stressed...leading to increased incidence of disease and poor growth rates...slowing down the

time it takes to enter the milking herd. Focusing on raising the right heifers, instead of all of the heifers will benefit the farm in the long run.

- Valuable co-products (dairy and beef): Excess animals can be sold into the market

- Reduced labor and increased profitability: Fewer, healthier animals take less time to care for (and it is more fun to work with them if you are not constantly spending money and time treating sick animals)

Slide 5: So what we want to do is “Shift away from Quantity and Focus on Quality”. Each farm is going to be different in the number of replacement heifers it will need on an annual basis. When thinking about the right number of heifers for your operation, you should consider:

- Future herd size goals & a 3-5% cushion in order to avoid purchasing heifers in the future if a circumstance throws your inventory off and you need more than predicted.

- Size of herd

- Cull rate of mature cows in the herd

- Age at 1st calving

- heifer culling rate (and mortality loss)

Slide 6: Moving on to Calculating your Inventory Needs to determine the appropriate number of heifers for your operation.

How many do I need to maintain my herd size? To do this calculation you need to know the total number of Mature Cows, 1st Calf Heifers, and Dry Cows.

Slide 7: You need to know your farm’s “Age at first calving” in months

Slide 8: Herd Cull Rate

Slide 9: and you non-completion rate. Non-Completion rate is the percent of heifers that start in the system, but do not make it into the milking string for one reason or another.

Slide 10: So let’s walk through an example to calculate the number of heifers a farm will need to maintain herd size. The scenario is you have a 100-cow dairy planning to maintain herd size; 22 month age at first calving; a cull rate of 33%; and a non-completion rate of 10%.

The equation is $\text{Herd Size} \times (\text{Age at First Calving in Months}/24) \times \text{Cull Rate} \times (1 + \text{Non-Completion Rate}) = \text{Annual number of heifers needed}$

The calculation is thus: $100 \times (22/24)$...which is $0.9167 \times 0.33 \times (1 + 0.10)$...which is 1.1. Equals approximately 34 heifers needed to maintain herd size on an annual basis.

Slide 11: This slide shows it on the map here. 100 total cows...

Slide 12: Now that we know how many heifers we need to maintain herd size, let's go over how to calculate the number of heifers born on the farm every year.

Slide 13: For this calculation, you need the information we had before, plus Calving interval (in months)

Slide 14: The Percent of heifer calves born...which might change depending on your farm's use of sexed semen

Slide 15: and you Calf mortality rate (percent of calves that die within 24 hours of birth). You will not need the non-completion rate for this calculation.

Slide 16: Going back to our Scenario, we've added a calving interval of 13 months; 55% of calves are born as heifers, and a total heifer calf mortality of 10%...which is a little high, with a good goal of being under 5%

The equation would then be $1 \times \text{Herd Size} \times (12/\text{Calving Interval in months}) \times \text{Percentage of heifers} \times (1 - \text{Heifer mortality}) \times (24/\text{Age at first calving in months}) = \text{Annual number of heifer calves born.}$

The calculation would then be $1 \times 100 \times (12/13)$...which is 0.9231) $\times 0.55 \times (1 - 0.1)$...which is 0.9... $\times (24/22)$...which is 1.091 = 49 heifers born annually on this farm.

Slide 17: Here it is on the map...100 cows

Slide 18: To determine the number EXTRA heifers you have, you can take the number of heifers needed, which was 34 and multiply that by 1.05 to include a cushion of 5% extra heifers to keep and you get a total of 36 heifers needed annually. Then subtract that number from the 49 that you have coming in, and you end up with a total of 13 extra heifers annually.

Slide 19: Now some people get nervous about cutting back on heifers, but based on projected heifer price, cutting back is still more financially sound than the cost of raising too many heifers.

Excess heifers can still be sold later, but the return is not as great as the loss due to raising too many. For further detail, refer to Jason Karszes' presentation on heifer raising economics.

Slide 20 to 23: You've calculated what you need and what you have for heifers, so now there's no excuse to be a heifer hoarder.

Slide 24: How do you choose who stays and who goes?

There are tools to make informed decisions on which heifers to keep and which one to let go in order to best move forward with the goals of your herd.

-Genomics is a tool where you can test a portion of (or all) heifers born on the dairy to determine genetic value. From there, you have a better idea of your genetically highest valued animals, and can make a quick decision to cull the bottom percent. If your herd has above average genetics throughout your bell curve, it's possible that some of your excess animals could be sold for dairy at a higher market value. With this tool, it is important to price out the service to determine if the cost of testing is feasible for your end goal.

-Another tool to help you choose is looking at the pedigrees and PTA's of your animals to get a better idea of their possible potential. Without genomic information, it's hard to be sure of the true genetics, but it's a good way to go. And with both of these tools, you have to not forget that the ENVIRONMENT that the heifer is raised in matters. A high genetic valued animal could still miss her potential if she becomes sick.

Slide: 25: Which brings us to Health Records as a tool to choose animals to keep or cull.

Having accurate health records can help you make decisions later on. For example, knowing that a calf went through a difficult calving may help predict future lower performance, as well as noting any injury and disease event. Animal with poor conformation may also be candidates for culling...as you can see in the picture, this heifer walks downhill pretty significantly, and may have physical and calving issues in the future.

Keeping track of sickness, disease and treatment is also useful. In a study by researchers at Cornell in 2012, they found that calves that had diarrhea and were treated with antibiotics produced 1,086 lb less milk in their 1st lactation than calves with no record of being treated.

Personally, I have implemented a 3-strike policy where if a calf was treated for moderate to severe illness 3 times, they were culled after the withhold period. And severe pneumonia was an automatic out in my book, as the lungs were so damaged that they had a very small chance of making it to the milking string as efficient healthy animals.

Slide 26: Moving on to Strategies for Heifer Inventory management from the cow side

We know how many we need, how do we reduce the number that we produce?

-Strategies can include the incorporation of Beef Semen in your breeding program. Why? Because a crossbred dairy/beef calf has a higher beef market value than a purebred dairy calf

-Cows that may be candidates for beef semen may include lower genomic valued animals, cows with poor production records (low producing), and the cow's repro status (number of times bred to a dairy bull...if that number is too high, and you want her pregnant...beef semen sometimes settles better)

-Which beef bulls do you use? Not all beef bulls are created equal, just like not all dairy bulls will throw the best quality dairy calves.

-Work with AI companies to determine their best offerings and make a plan for your herd. I just want to mention that it is important for the dairy industry to produce a high quality beef animal as a co-product of our farms in order to build a good reputation in the market. AI companies have programs to help determine what % of the herd to breed to what...usually a mixture of sexed dairy semen and conventional beef to specified categories of cows. There are a variety of programs out there, just ask an AI rep.

Slide 27: Let's go through some Farm Examples of Inventory management:

Problem: This dairy says half their herd is 1st calf heifers, and they have no space left for calves

-too many calves per autfeeder is leading to increased sickness risk, and limiting growth potential

-the employees are forced to wean calves early to make room for more, which creates small weaned calves under stress

-the herd is also not capitalizing on the higher milk production of the mature cows

Solution: The farm decides to determine their actual heifer needs, and sell excess heifer calves and 1st lact animals while incorporating beef bulls into their breeding program.

-they've looked at dam and sire production criteria to reduce the number of 1st lactation animals in the herd

-and decided to breed the top 40% of the milking herd back to HO, and the rest to Angus

-Crossbred calves are also sold off the farm within a week to maintain adequate space for dairy heifers

Slide 28: Farm Example #2

Problem: this dairy has excessive expenses and wants better calf performance, and are trying to raise all animals at the highest quality without success

Solution: Determined inventory goals, and worked with an AI rep to breed the top 25% of herd back to HO, then the rest to limousin. In addition, 90% of their heifers were bred to sexed semen, and bottom 10% bred to high quality angus bulls with highly heritable traits.

Slide 29: Moving on to the big picture: Our overall goal is to Raise Profitable High Quality Heifers

Slide 30: But how do we know we are on the right track?

Slide 31: We track growth goals by measuring throughout the growing process.

A good initial calf and heifer growth goal is to “double their birth weight by weaning date”

-Options for weighing newborn and weaned calves are shown. On the left is a typical small animal scale, that can be modified to roll a small cart on top. Newborn calves don't typically stand steady right away so this is a good option. In the center is a dairy calf weigh tape that can be used once the animal stands well on its own. On the right is WayPig scale that is useful in weighing weaned calves.

-Start by measuring birth weight, and weigh again at weaning or before moving to a weaned pen to calculate growth rate. Remember to keep weaning age (or the age that you measure around weaning) consistent for proper comparison.

-In addition, options for weighing larger animals may be putting them on a larger dairy scale as a group, and letting them off on by one, recording the weight difference. Or weighing as a group and dividing by the number of calves to get an average animal weight. Very large dairies may use a drive over scale to weigh truckloads and divide for an average.

Slide 32: This slide with diagrams courtesy of Penn State Extension show the proper use of the weigh tape...where the calf should be standing on a level floor with the head upright...and the tape should be snug around the heart girth (just behind the front legs and should blades)

-Wither and hip heights may also be taken to track growth

Slide 33: Another growth goal is to have heifers calve in at 22-24 months of age, and to do this they must reach a certain size before breeding.

-Start by weighing a sample of mature cows in your herd

-back calculate to see if you are hitting the weight goals of 55% of BW at 1st conception (12-15 months of age) and 85% of mature BW at 1st calving

-height targets are also seen here

-If you find that you are not within reach of your goals, consider your nutrition program, overall environment for raising heifers, and health factors affecting your gains.

Slide 34: This spreadsheet from Penn State Extension generates a growth chart from mature size and age at first calving, and compares heifer performance to growth required to meet herd goals, not to a breed standard.

Slide 35: Remember, the percentages are based on averages, and small herds with diverse genetics may produce calves outside the average, skewing your results. Think about a big flashy show calf mixed in a pen with commercial heifers, or twins that may be smaller than average.

Slide 36: this photo shows a normal calf in the background, and a premature calf in the foreground.

Slide 37: A herd of all jerseys wouldn't have an issue, but a few mixed in should be indicated in your measurement to not create confusing results.

Slide 38: Moving on to grouping strategies.

-These are typically based on ease of management, space and facility availability, feeding strategies/diet, health requirements (vaccination/treatments) and repro status

Animals are divided into different groups based on age and weight

-Group 1: Day 0 to 2 months: these calves are usually in a single pen/hutch or in an autofeeder situation. These are groups that can easily be monitored for health and feeding behaviors. In addition, you want to put these babies in areas that are well-ventilated, but draft free...and definitely clean, dry and comfortable

-Group 2: consists of heifers 2 to 4 months. Small groups of animals work best here as you should monitor them for increasing intake, and make sure they are transitioning well to new social situations and resources. Try to keep this group low-stress and avoid vaccinations. If calves are going to crash, this is typically the age group, due to the many life changes and social stressor.

-Group 3: Animals 4 to 6 months of age, in smaller groups and not mixed with older animals to prevent being pushed away from resources.

Slide 39: You may want introduce headlocks and freestall housing to heifers 6 to 9 months old, but definitely want to have headlocks available where you are housing animals 9-12 months of age. Typically this is the group that you should start to monitor for heats, but are not quite of breeding age yet. If the next group gets backed up, you will still be able to easily breed heifers on time if you have headlocks.

Group 6 is our breeding age animals and should be easily monitored for heats, and have headlocks in the pens for breeding, and group 7 are the oldest heifers. These heifers typically receive pre-calving vaccinations, and will need to be moved to quiet comfortable place to calve several weeks before calving.

Please refer to Curt Gooch's section of this course for recommendations on pen size, flow, and design for each of these stages.

Slide 40: Just want to mention, that the number of groups can depend on facilities available, and the number of animals, and that Groups 4 through 7 (with animals ranging in age from 6 or

24 months, and weights of 400 to 1200 lbs) can do well combined in different ways, if necessary.

Slide 41: Alright, we've reached the end of this section. Remember our Calves and Heifers are the future of our dairy herds. If you want to predict what your herd might look like 2+ years down the road, take a look at your current heifer inventory.

In Summary we want to:

- ✓ Achieve best management practices to have the ability to raise the best quality heifers possible.
- ✓ Calculate appropriate heifer inventory needs depending on your operation's management system.
- ✓ Employ strategies of choosing the most valuable animals to raise through your system.
- ✓ Save input costs by removing less desirable animals from your farm.
- ✓ Increase income by selling above-average dairy heifers for dairy purposes, and incorporate high quality beef genetics into your breeding program to create a value-added co-product.
- ✓ Measure and monitor growth rates to maximize efficiency, and learn where improvements can be made in your system.
- ✓ Consider grouping strategies that maximize the health, growth, and labor efficiency on your operation.

Slide 42: Ok, that's it for the Inventory Management section of this Calf and Heifer Management course. Looking forward to answering your questions in the upcoming session. Thank you.