

Limit Fed or Ad Libitum Feeding at the Stocker Phase

Claudia Hissong (hissongce@ksu.edu)

Glynn Tonsor (gtonsor@ksu.edu)

Dale Blasi (dblasi@k-state.edu)

Kansas State University Department of Agricultural Economics – September 2020

Background

A research study was conducted at the Kansas State University Stocker Unit to evaluate the impacts of limit feeding during the backgrounding phase and develop an economic framework to measure and quantify the sustainable attributes of limit feeding. Four hundred eighteen calves were allotted to two treatments, one a 60NEg diet that was limit fed and a 45NEg diet that was fed ad libitum for 90 days. Limit fed calves had feed restricted to 85% of ad libitum calves feed intake. Throughout the trial, performance data, tractor and mixer usage, and health data was collected to build a producer budget sheet. All variables from the study were utilized to construct a budget sheet that compares the cost of each feeding type and the diets fed. The budget sheet is built based off the research conducted at the stocker unit, but also allows producers to input their known operation costs as well.

Budget Sheet Explanation

This spreadsheet is designed for a stocker operation to input values relevant to their operation in combination with values found during the trial to evaluate the per head income over total costs for ad libitum and limit feeding. Values in blue are designed to be changed by the producer to represent their operation. If these values are unknown for your operation, use the values in place as a default.

Production Efficiency Measures

To begin, fill out death loss, average daily gain, and days in backgrounding lot. The anticipated increase in average daily gain for the limit fed diet is the value that was found through the research conducted at the KSU Beef Stocker Unit. If you choose to not account for the anticipated increase, this value can be set to zero. These values go into calculating the weight of calves when they are ready to be sold. The prices for feeder animal sale price is a default price based upon a March steer price and purchase price is default price based upon an October steer price. If purchasing heifers or steers at a different time of year these values should be adjusted accordingly. The average weight of calves purchased should be inserted into the purchase price quantity. Total gross return, is then calculated by taking the feeder animal sale price and subtracting purchase price and death loss from that value. Differences between the two feeding types are captured here through the anticipated increase in average daily gain of limit fed cattle resulting in a greater hundred weight produced.

The next section looks at the variable costs between the two feeding types. Pasture, crop residue, and harvested forage have been zeroed out, because they are not used in this example. Grain/ protein/ mineral supplement price per head per day values are representative of the diets fed during the research experiment. The two diets include different volumes of each ingredient, so the price for each diet is represented. The price is then multiplied by the days in the backgrounding lot. If the operation has additional feed costs those can be accounted for in the space provided. Labor represents the labor requirement for each animal during the backgrounding phase. The wage for employees should be

adjusted to fit the operation. Rain events require more labor, so a labor value per head was found. The average precipitation event value can be adjusted to fit the necessary climate to account for the additional labor cost. Mix and delivery times for each diet were recorded throughout the trial. The anticipated increase in time to mix and deliver the diet fed ad libitum is presented in the sheet, this value can be set to zero if preferred. Variable costs for vet medicine/ drugs, marketing costs, utilities, gas, fuel, oil, and machinery, facility/ equip repairs are all Kansas Farm Management Association (KFMA) values for the stocker/ backgrounding phase. These values may be used, or values for a specific operation may be inserted if available. Tractor and mixer time and usage accounts for the per hour lease cost of the equipment multiplied by the per head use. Research shows, the diet fed ad libitum takes additional time to mix and deliver, so the anticipated increase in time is accounted for. Again, this value can be set to zero if one prefers. Cash interest paid and other variable costs are also KFMA data for stocker and backgrounding operations. Other variable costs is a rough sum of all other KFMA variables costs, including fees/ publications/ travel, conservation, building rent, and auto expenses. If additional bunks are required to limit feed cattle at an operation, that per head cost should be included here. The sum of these values gives the total variable costs. The difference in variable costs are driven by the differences in feed cost, mix and delivery time, and tractor and mixer time and usage.

The next section focuses on fixed costs. Depreciation, taxes, and farm/ livestock insurance are all KFMA values. The Opportunity cost of investment is a KFMA value that represents interest charge, it does not represent cash interest paid, rather a measure to reflect the interest that could have been earned had the investment been made elsewhere. It is important to note that the fixed costs are the same for both feeding methods.

Finally, the income over variable costs and income over total costs is found at the bottom of the spreadsheet. The profitability of each feeding type can be compared and a producer may make adjustments and decisions as they see fit for their operation.

Producer Example:

Producer A backgrounds cattle for a total of 150 days and historically has experienced a 2% death loss. On average his cattle have had an average daily gain of 2.2 pounds. Producer A is anticipating an increase in average daily gain of .13 if he limits feeds his cattle. After inserting these values, he observes that the CWT produced under ad libitum feeding is 3.30, and the CWT produced under limit feeding is 3.495.

Producer A prefers to buy 550 pound steers, so he utilizes the prices provided in the spread sheet. After backgrounding for 150 days, the steer fed ad libitum are expected to be 880 pounds and the steers limit fed are expected to be 900 pounds. After accounting for death loss, the total gross return for producer A under limit feeding is \$335.94 and \$307.74 under ad libitum feeding.

Pasture, crop residue, and harvested forage do not impact producer A, so he leaves those values at zero. Producer A plans to formulate his diets like those in the study, so feed costs per head per day is \$.90 for limit feeding and \$1.03 for ad libitum feeding. After feeding for 150 days limit feeding will cost \$135.32 per head and ad libitum feeding will cost \$154.59. Producer A will not be using any other feed, so that line remains untouched. Producer A accounts for a labor wage of \$16 per hour. After 150 days and a .3 hour a month labor requirement per head, labor costs are \$24 for both limit feeding and ad libitum feeding. Producer A is budgeting for 3 precipitation events, so he adjusts that value leading to a cost of \$.23 for each feeding type. To account for the labor cost of mix and delivery times of the diets, producer A

inputs the \$16 per hour labor wage. He anticipates the ad libitum fed diet will take longer, so he finds feeding once a day the ad libitum diet costs \$20.67 per head and the limit fed diet costs \$13.01. Producer A opts to use the KFMA values for vet medicine/ drugs, marketing costs, utilities, gas, fuel, oil, and machinery, facility/ equip repairs. Producer A accounts for his tractor and mixer time and usage at a lease rate of \$46 per hour. The diet that is fed ad libitum will require more tractor and mixer use, so he accounts for that in the anticipated increase in time per head. This leads to a cost of \$59.43 for the ad libitum diet and \$37.42 for the limit fed diet. Producer A also decides to use the provided KFMA values for cash interest paid and other variable costs. After completing the variable cost section, producer A observes variable costs under limit feeding equal \$251.48 per head and variable costs under ad libitum feeding equal \$300.42 per head.

Producer A decides to use the KFMA values for the fixed cost section, and does not have any other fixed costs. This brings his total fixed costs to \$26.25 for both limit fed and ad libitum. Due to the higher variable costs associated with ad libitum feeding, income over variable costs is \$7.32, compared to limit feeding's income over variable costs which is \$84.46. Since fixed costs are the same between the two, income over total costs is greater for limit feeding at \$58.21. Income over total costs for ad libitum feeding comes out to be -\$18.93. After completion of the budget sheet, producer A observes an economic benefit to limit feeding.

Producer B Example:

Producer B backgrounds her cattle till they reach about 800 pounds and then markets them. When purchasing calves at 550 pound, under ad libitum feeding, steers reach 800 pounds after backgrounding for 100 days. With limit feeding, steers reach 800 pounds after being backgrounded for 95 days. With a 1% death loss and an average daily gain of 2.5 pounds, the CWT produced when ad libitum feeding is 2.5 and 2.49 when limit feeding.

Producer B's gross return when feeding steers is slightly different between the two feeding types. The difference occurs at the animal sale price, with limit feeding the feeder animal sale price is \$1,156.74 and with ad libitum feeding the sale price is \$1,156.96. The purchase price and death loss is the same under both management methods. Therefore, the total gross return is slightly higher for ad libitum feeding at \$201.50, compared to limit feeding at \$201.28.

When looking at variable costs, producer B observes a noticeable difference in grain/ protein/ mineral supplement cost. The diet that is limit fed, is less expensive and fed for less days in comparison to the diet fed ad libitum. The feed cost for limit feeding for 95 days is \$85.70 and the feed cost for ad libitum feeding for 100 days is \$103.06. After accounting for a labor wage of \$15 per hour the labor cost under both feeding types is \$14.25. She plans for 4 precipitation events bringing the cost to \$.29. Producer B expects the ad libitum fed diet to take longer to mix and deliver, so she accounts for the extra time per head and at a labor wage of \$15 per hour the cost for ad libitum is \$12.92. The mix and delivery time cost is slightly lower for limit feeding at \$7.73. The additional time to mix and deliver the diet that is fed ad libitum also corresponds to a higher cost for the tractor and mixer time and usage. At a rate of \$46 per hour the ad libitum diet leads to a cost of \$39.62 and the limit fed diet has a cost of \$23.70. Producer B opts to use KFMA values for the remaining variable costs. This brings her total variable costs for \$172.16 when cattle are limit fed and \$211.38 when cattle are fed ad libitum.

Producer B also uses KFMA values in the fixed costs section, bringing her total fixed costs to \$26.25 for both limit feeding and ad libitum feeding. Under limit feeding, producer B has an income over variable costs of \$29.12. Her income over total costs comes out to be \$2.87. With ad libitum feeding, her income over variable costs is -\$9.88 and her income over total costs is -\$36.13.