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# Comparison of Economic and Animal Performance of Dairy Heifers in Feedlot and Pasture-Based Systems[1]

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## Abstract

*Commercial custom heifer growing is an emerging industry in the U.S. With the industry growth comes an interest in pasture-based systems for raising dairy heifers as an alternative to traditional feedlots. Questions about animal performance and costs associated with converting cropland to pastures must be addressed. A 3-yr replicated trial on a commercial, custom dairy growing operation compared animal performance and economics of feedlot vs pasture-based systems for raising dairy heifers. The ADG on the pasture system ranged from 0.90 to 0.93 kg per head compared with 0.91 to 0.95 kg per head in the feedlot. The pasture-based system had fewer costs, averaging $0.99/d per head compared with $1.28/d per head over the 3 yr. Productive cropland converted from a corn-soybean-alfalfa hay rotation to pasture was used to graze dairy heifers. Returns from dairy heifers exceeded returns for corn and soybeans in each of the 3 yr and exceeded alfalfa hay returns in 2 of the 3 yr. Heifers returned an average of $268/ha over the 3 yr. The next greatest crop return was alfalfa hay at $225/ha. Heifer returns were greater than corn and soybeans in each year, even when government payments were included.*

(Key Words: Management Intensive Rotational Grazing, Dairy Heifers.)

## Introduction

Outsourcing of heifer raising has resulted in the emergence of a custom heifer grower industry. Wolf (2002) found that 27% of custom dairy heifer growers surveyed used a pasture system. Simulation models have shown that if pasture contributes up to 80% of total growth requirements during the grazing season, feed costs can be substantially reduced compared with confinement feed costs (Toro, 1987). Use of management intensive grazing (**MIG**) systems that intensively utilize pasture as the major forage source during the grazing season has garnered interest in the heifer growing industry.

Fox et al. (1991) observed that 150-kg Holstein heifers under MIG on pastures containing grass-legume mixtures at a stocking rate of (**SR**) of five heifers/ha gained 0.92 kg/d. Supplemental protein at 0.2 kg/d per heifer increased ADG by 10%. Pre- and post pubertal dairy heifers on six Minnesota commercial livestock pasture systems supplemented with grain and/or hay had ADG between 0.7 to 0.96 kg/d with a SR of two to five heifers/ha depending on age and forage availability over 144- to 181-d grazing seasons in 2 consecutive yr (Chester-Jones, 1996; Hoffman and Chester-Jones, 1996). Novaes (1992) compared performance of dairy heifers fed a total mixed ration (**TMR**) in a dry feedlot or pasture with or without daily supplements of 2 kg of a grain (9% CP) mix, or an ionophore (200 mg of lasalocid per heifer) mixture. Drylot heifers gained similarly (0.91 kg/d) to those fed pasture with grain mix but greater than those fed pasture alone (0.76 kg/d) or with lasalocid supplement (0.84 kg/d).

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Slow growth in dairy heifers translates to either a smaller heifer at calving or a heifer calving at an older age, both conditions being costly. Mourits et al. (1997) estimated feed cost savings when calving age is reduced from 26 to 22 mo ranged from $42 to $119 per heifer.

The objectives of the study were 1) to compare growth of pre-breeding age heifers raised in a dry feedlot with those raised on a MIG system and 2) to delineate complete economic analyses of the two heifer raising systems to determine whether net returns per hectare for growing dairy heifers on alfalfa pasture were sufficient to warrant pasture establishment on highly productive crop farmland.

# Materials and Methods

Pre-breeding age Holstein dairy heifers were divided into two treatments, feedlot and MIG, with two replicates in each treatment in each of the 3 yr of the trial. The replicates were arranged in a randomized complete block design. There were 36 heifers in each replicate in 2000 and 2002, and 29 heifers in each replicate in 2001. The length of the grazing season varied each year with 145 d in 2000, 127 d in 2001, and 147 d in 2002. The shorter grazing season in 2001 was a result of less forage growth in the spring. In each of the 3 yr, heifers assigned to pasture were transitioned in a training paddock from free choice TMR to pasture over a 10-d period.

Animal performance and cost comparisons were made over the grazing season, not over an entire calendar year. At completion of the grazing season, MIG system heifers were moved into a feedlot, and their performance was no longer monitored. Moving animals into a feedlot or barn after the grazing season has ended is not atypical of MIG systems where grazing is not possible over the entire year.

**MIG System.** The MIG system consisted of 11.3 ha of mature but productive alfalfa stand that was established in 1994 (four cuttings/yr). The land was valued at $210/ha, with the entire cost charged to the MIG system. Pasture was permanently fenced into two large paddocks, using three strands of high tensile electric wire. The large paddocks were further subdivided into smaller paddocks using temporary fencing of polywire and fiberglass fence posts. The smaller paddocks were sized so that the heifers had sufficient forage for a 2- to 3-d period. A MIG goal was to attain a minimum forage availability of 2245 kg DM/ha prior to moving heifers. Paddock size was dependent on the amount of forage present and the size of the heifers. Total construction cost of the fencing ($5775) was amortized over 10 yr, resulting in an annual cost of $577.

Waterlines ran to each paddock, and fresh water was pumped into watering tanks, providing an adequate water supply. Amortizing the $1102 cost of the waterlines and watering tanks over 8 yr resulted in an annual cost of $138. Feed bunks cost $476 and were amortized over 5 yr for an annual cost of $95.

Maintaining an adequate level of forage production is key to a successful MIG system. In yr 1, the SR of six heifers/ha caused poor recovery of alfalfa. The SR was reduced to five heifers/ha for yr 2 and increased to six heifers/ha in yr 3 because of good spring forage growth. The thinning alfalfa stand was interseeded with annual ryegrass and perennial ryegrass prior to grazing in 2001 and perennial and annual ryegrasses were spot-seeded in 2002. Perennial seed was amortized over 5 yr. The cost of the annual ryegrass was fully charged to the year in which it was seeded. Generally, application of nitrogen fertilizer is not required in legume pastures such as alfalfa because the legumes fix nitrogen. Nitrogen fertilizer was applied in the spring of 2001 and 2002 (56 kg/ha) to support the establishment of the inter-seeded grass forage species, and the cost was fully charged to the MIG system in the year in which it was applied.

During the winter in the Upper Midwest, dairy heifers are often housed in feedlot facilities where feeding and manure removal equipment are needed. Machinery overhead is typically 30% of total cost (Lazarus and Selley, 2002). Overhead costs for interest, insurance, and housing were $6.00/h for the skid steer and $7.20/h for the feed mixer truck. Machinery use was recorded daily for 2001 and 2002 trials. Average daily use in 2001 and 2002 was used as a proxy for 2000 machinery use. The skid steer was used 0.30 h/d in 2001 and 0.38 h/d in 2002. The feed mixer truck was used 0.24 h/d in 2001 and 0.33 h/d in 2002. The MIG pasture system used a $1200 electric golf cart to deliver feed to the feed bunks. The cart was amortized over 7 yr for an annual cost of $171.

Although the feedlot was not used during the grazing season, it was used when the grazing season ended. An overhead charge was assessed at 10% of the $7500 market value. The feedlot consisted of three pens, of which two were used in the trial, resulting in a facility cost of $5000 or $500 annually.

Labor logs were used to record the amount of time spent monitoring heifers, moving fences and watering tanks, and bringing feed to the pasture. Because the labor logs were not sufficiently detailed in 2000, the average labor hours of 2001 and 2002 were used as a proxy. Labor was charged at $15/h. Average daily labor in the MIG system was 0.58 h/d in 2001 and 0.32 h/d in 2002. Heifers were monitored and moved less frequently in 2002.

Heifers received supplemental feed while on pasture for the primary purpose of providing additional energy. Owens et al. (1993) showed pastures often are energy-limiting to meet the needs for growing large-framed heifers. The level of supplementation was adjusted during the grazing season to reflect changes in animal needs, forage availability, and quality and to maintain the ADG goal of 0.91 kg. Supplementation was fed at 0.45 kg

**TABLE 1. Pasture and total mixed ration analyses on a DM basis.**

| | 2000 | | 2001 | | 2002 | |
|---|---|---|---|---|---|---|
| Item | Pasture | Feedlot | Pasture | Feedlot | Pasture | Feedlot |
| CP, % | 24.8 | 14.6 | 21.3 | 17.2 | 22.9 | 15.7 |
| ADF, % | 25.4 | 27.8 | 26.0 | 29.1 | 25.9 | 29.7 |
| NDF, % | 30.0 | 36.7 | 31.9 | 37.7 | 29.6 | 37.3 |
| TDN, % | 71.5 | 64.9 | 70.8 | 63.5 | 70.9 | 63.5 |
| $NE_m$ | 0.49 | 0.40 | 0.48 | 0.38 | 0.48 | 0.38 |
| Ca, % | 2.04 | 0.87 | 1.90 | 1.13 | 1.88 | 1.13 |
| P, % | 0.29 | 0.34 | 0.35 | 0.40 | 0.34 | 0.40 |
| K, % | 2.65 | 2.28 | 2.68 | 2.37 | 2.92 | 2.37 |
| Mg, % | 0.41 | 0.36 | 0.45 | 0.28 | 0.40 | 0.28 |

per head daily at the beginning of the grazing season and was increased to 1.36 kg/head, as forage was limiting near the end of the grazing season. Pasture clippings were taken throughout the grazing seasons. Composite samples were analyzed, and the results are reported in Table 1. The relative feed value (**RFV**) of the pasture ranged from 200 in 2001 to 215 in 2002.

Grazing legume pastures can be challenging because of the risk of bloat. An ionophor was included in the supplemental feed in each year, and a bloat block was used only in the first year of the research trial. Two of the heifers on pasture died in 2000; one death was due to bloat, and one was due to a lightening strike. Heifers that died were valued at $775 per head. There were no death losses in either 2001 or 2002 in the MIG system.

**Feedlot System.** Heifers in the feedlot system were grouped in two replicate feedlot pens. They were fed a least-cost TMR, formulated to achieve the target ADG of 0.91 kg. Different types of feed ingredients were used over the course of the 3-yr study. Feed analyses of the TMR are presented in Table 1.

Average daily use of the skid steer and feed mixer truck was reported in the discussion on machinery overhead in the MIG pasture system. In addition to the overhead cost, fuel, oil, repairs, and depreciation costs were included in the feedlot charge. Depreciation was included to account for the decline in equipment value because of use. Total cost for the skid steer was $16.48/h, and total cost for the feed mixer truck was $24.06/h.

As with the MIG pasture system, detailed labor logs were maintained for the feedlot system. Average labor for 2001–2002 was used as a proxy for 2000. In 2001, 0.62 h/d were spend feeding, scraping, and monitoring heifers in the feedlot, and 0.98 h/d were spent in 2002. The greater labor requirement in 2002 was due to the greater number of heifers in the feedlot in 2002.

***Statistical Analyses.*** The performance data were analyzed using the Proc GLM procedure in SAS (SAS, 1989). A multivariate repeated measures model was run by year for ADG by weigh period; replicate was random, and heifer was the repeated measure. A repeated measure univariate model was run for growth, as measured by change in hip height (**HH**); replicate was random, and heifer was the repeated measure. Least squares means were calculated for ADG by weigh period, total ADG over trial period, and growth.

# Results and Discussion

Costs of the feed ingredients and the total cost of each ingredient over of the length of the research trials for the MIG and the feedlot systems are presented in Table 2. Although per-unit feed costs for the MIG system were greater in 2002 than in the other years, total feed cost was less. This was primarily due to corn silage and haylage re-

**TABLE 2. Feed costs for MIG and feedlot systems.**

| | 2000 | | 2001 | | 2002 | |
|---|---|---|---|---|---|---|
| Item | $/mt | Total cost | $/mt | Total cost | $/mt | Total cost |
| | | | MIG | | | |
| Cracked corn | 63.60 | 313 | 68.95 | 401 | 79.80 | 383 |
| Focus feed | 239.99 | 1233 | 249.44 | 897 | 249.37 | 981 |
| Hay | 76.20 | 979 | 95.51 | 1260 | 81.28 | 568 |
| Corn silage | | | | | 20.32 | 65 |
| Haylage | | | | | 45.72 | 146 |
| Bloat block | | 280 | | 0 | | 0 |
| Total feed cost[a] | 2805 | | 2558 | | 2143 | |
| | | | Feedlot system | | | |
| Feed corn | | | 98.95 | 261 | 79.80 | 380 |
| Focus feed | 239.99 | 1849 | 249.44 | 1350 | 249.37 | 1441 |
| Hay | 76.20 | 2623 | | | 81.28 | 1997 |
| Corn silage | 20.32 | 1969 | 20.32 | 1458 | | |
| Haylage | 36.58 | 1195 | 43.18 | 2346 | 45.72 | 5,169 |
| Beet pulp | | | 8.25 | 1458 | | |
| Total feed cost | 7636 | | 5427 | | 8987 | |

[a]Total feed costs reported are for the entire group of heifers for grazing season/research trial only.

**TABLE 3. Heifer performance summary.**

| | 2000 | | | 2001 | | | 2002 | | |
|---|---|---|---|---|---|---|---|---|---|
| Item | Feedlot | Pasture | $P>\|t\|$[a] | Feedlot | Pasture | $P>\|t\|$ | Feedlot | Pasture | $P>\|t\|$ |
| Heifers, no. | 72 | 70 | | 58 | 58 | | 72 | 72 | |
| Days on trial | 145 | 145 | | 127 | 127 | | 147 | 147 | |
| Initial BW | 217 | 218 | 0.70 | 256 | 246 | 0.04 | 242 | 237 | 0.65 |
| Ending BW | 349 | 353 | 0.35 | 372 | 360 | 0.02 | 382 | 369 | 0.03 |
| Initial hip height (cm) | 114.6 | 114.4 | 0.71 | 119.2 | 119.1 | 0.90 | 118.6 | 118.7 | 0.10 |
| Ending hip height (cm) | 127.3 | 127.7 | 0.41 | 131.1 | 130.7 | 0.62 | 133.5 | 131.7 | 0.02 |

[a]$H_o$ $Mean_{feedlot} = mean_{pasture}$.

placing more costly cracked corn and hay. As a result of this substitution, 0.9 mt less cracked corn and 7.9 mt less hay were fed in 2002 than in 2001. Differences in total feed costs reflect not only differences in ingredient costs but also differences in the amount fed each year. Total amount fed differs because both SR and length of grazing season varied in each year of the trial.

Initial BW, HH, and body condition score (**BSC**) were obtained for each animal on entering the research trial. Heifers were weighed every 28 d while on trial. Final BW, HH, and BCS were taken. In addition to animal performance, feed, labor hours, health cost, and machine use were tracked for each treatment to compare costs between the feedlot and MIG pasture systems.

**Feedlot *vs* MIG Pasture Comparison.** Initial and final BW and HH for each treatment for each yr are presented in Table 3. Heifers were younger going into the trial in 2000 (7.1 mo) than in 2001 (8.3 mo) or 2002 (8.1 mo); hence, they were a lesser BW. In 2001, heifers entering the MIG system were 10 kg lighter ($P$=0.04) than the feedlot heifers and 12 kg lighter ($P$=0.05) at the end of the trial. There were differences in the ending BW and height of the heifers in 2002, where the feedlot heifers were 13 kg heavier ($P$=0.03) and 1.8 cm taller ($P$=0.04) than the MIG heifers.

Least squares means are presented in Table 4 for ADG for each of the five weight periods, total ADG, and growth over the grazing period. Total ADG was not significantly different in 2000 or 2001 between the feedlot and MIG systems ($P$=0.09 and $P$=0.23, respectively). In 2002, the MIG had statistically significant less ADG than the feedlot system ($P$=0.01). Heifers in the feedlot systems exceeded the target ADG of 0.91 kg, and the MIG heifers met the ADG goal. Feed intake in the feedlot appeared to be greater in 2002. As a result, the levels of protein and energy intake resulted in greater growth for the feedlot heifers as seen by greater ending HH and BW than the MIG heifers.

Although both systems met the ADG target of 0.91 kg, there were differences between the systems in ADG throughout the trial. First period ADG was significantly greater in the feedlot in each year ($P$<0.0001 in 2000 and 2001; $P$= 0.001 in 2002). This result reflects heifers learning to graze during the first 28-d period. The fifth period ADG was significantly greater for the MIG system in 2001 ($P$<0.0001) and 2002 ($P$=0.001) as the level of pasture supplementation increased in September and October in both these years. In 2001, 16 mt of hay were fed to the MIG heifers, and cracked corn supplementation was doubled from 0.45 to 0.91 kg/d per head. The MIG supplementation in 2002 included 4.5 kg of corn silage and 4.5 kg of haylage per head daily in October. It is important to realize that supplementation in an MIG pasture system will be variable year to year as it is dependent on pasture condition. In 2002, forage availability in the MIG system was limiting, and increased supplementation was required.

Heifer growth, as measured by change in HH, was significantly greater in the feedlot system only in 2002 ($P$<0.0001), where the feedlot heifers gained 1.9 cm more in height than the MIG heifers. In fact, heifer growth in the feedlot in 2002 was greater than feedlot growth in the 2 previous yr by at least 2 cm.

Daily cost per head is a key factor in the growth potential of MIG systems for raising dairy heifers. Costs per head per day for each system for the length of the grazing season are presented in Table 5. Recall that grazing season and SR varied across the 3 yr. The costs were less in the MIG pasture system than in the feedlot system in each of the 3 yr. The difference in daily costs between the feedlot and MIG systems ranged from \$0.04 per head in 2001 to \$0.64 per head in 2002. Although these differences seem small, taken over a 140-d grazing season and 72 head, advantage

**TABLE 4. Least squares means by weight period.**

| Item | 2000 | | | 2001 | | | 2002 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Feedlot | Pasture | *P*>\|t\|[a] | Feedlot | Pasture | *P*>\|t\| | Feedlot | Pasture | *P*>\|t\| |
| First period ADG | 0.86 | 0.61 | <0.0001 | 1.19 | 0.80 | <0.0001 | 1.11 | 0.84 | 0.001 |
| Second period ADG | 0.87 | 0.94 | 0.13 | 1.22 | 0.99 | <0.0001 | 0.77 | 0.61 | 0.002 |
| Third period ADG | 1.12 | 1.05 | 0.16 | 0.67 | 0.79 | 0.03 | 1.02 | 0.76 | <0.0001 |
| Fourth period ADG | 0.70 | 1.34 | <0.0001 | 0.82 | 0.98 | 0.002 | 0.57 | 0.67 | 0.21 |
| Fifth period ADG | 0.87 | 0.66 | <0.0001 | 0.50 | 0.97 | <0.0001 | 1.34 | 1.63 | 0.001 |
| Total ADG | 0.91 | 0.93 | 0.09 | 0.92 | 0.90 | 0.23 | 0.95 | 0.90 | 0.005 |
| Growth (cm) | 12.7 | 13.3 | 0.12 | 11.9 | 11.6 | 0.63 | 14.9 | 13.0 | <0.0001 |

[a]$H_o$ $LSM_{feedlot} = LSM_{pasture}$.

to the MIG system ranges from $403 in 2001 to $6451 in 2002.

The effects of stocking rate and length of grazing season were evident in the greater costs in 2001. Specifically, the annual fixed cost for fencing ($577) and pasture (210/ha) were spread over fewer days and fewer heifers in 2001 than in the other 2 yr. The pasture charge was $0.10 per head greater, and fencing cost were $0.05 per head greater, in 2001 than 2002.

Feed cost and machinery costs are two expense items that greatly differ between the two production systems. Over the 3 yr, average daily feed cost per head was $0.49 less for the MIG system. In the MIG system, this feed cost only includes the cost of supplemental feed provided to the heifers on pasture. If the pasture charge and fencing cost were included in the feed cost, then average daily feed cost for the MIG pasture system increased to $0.65 per head. Midwest heifer growers have an annual average throughput of 565 heifers. If these animals were grazed over a 140-d grazing season, the total feed savings would be $9492.

Lesser costs for the MIG system translated to greater net returns relative to the feedlot systems. Allowing the animals to harvest the forages can increase profitability of the system. Gloy et al. (2002) found New York dairy farmers utilizing grazing systems were equal if not more profitable than farmers not using grazing systems. Similar results were obtained on dairy farms in Michigan (Dartt et al., 1999), where MIG dairies were more profitable than confinement systems.

Another measure of system productivity for growing livestock in a MIG pasture system is kilograms of BW gain per hectare. This measure

**TABLE 5. Cost comparisons across years ($/d per head)[a].**

| Item | 2000 | | 2001 | | 2002 | | Average over 3 yr | |
|---|---|---|---|---|---|---|---|---|
| | Feedlot | Pasture | Feedlot | Pasture | Feedlot | Pasture | Feedlot | Pasture |
| Feed | 0.73 | 0.28 | 0.74 | 0.35 | 0.85 | 0.20 | 0.77 | 0.28 |
| Labor | 0.17 | 0.10 | 0.16 | 0.15 | 0.20 | 0.08 | 0.18 | 0.08 |
| Machinery | 0.15 | 0.07 | 0.19 | 0.09 | 0.20 | 0.08 | 0.18 | 0.08 |
| Facilities | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| Bedding | 0.07 | | 0.12 | | 0.11 | | 0.10 | |
| Fencing | | 0.08 | | 0.15 | | 0.10 | | 0.11 |
| Pasture charge | | 0.23 | | 0.32 | | 0.22 | | 0.26 |
| Seed | | | | 0.06 | | 0.02 | | 0.03 |
| Fertilizer | | | | 0.05 | | 0.03 | | 0.03 |
| Health costs | 0.03 | 0.04 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Death loss | | 0.15 | | | | | | 0.03 |
| Total cost | 1.17 | 0.97 | 1.26 | 1.22 | 1.41 | 0.77 | 1.28 | 0.99 |
| Net return/ha | $286 | | $39 | | $478 | | $268 | |

[a]Costs are reported for the length of the grazing season only.

is a function of the SR and the rate of gain of individual animals. Gain per hectare was 828, 584, and 822 kg in 2000, 2001, and 2002, respectively. Gain per hectare was least in 2001, the year that had the lesser SR and shortest grazing season.

**Returns Per Acre for Pasture System.** Heifers can be thought of as a crop being produced on pasture. If the MIG system for growing dairy heifers is to be a viable option on land suitable for crop production, per-acre returns must be comparable with crops that could be grown on that land, such as corn, soybeans, and alfalfa hay.

Wolf (2002) observed that 52% of professional heifer growers had contract payments based on a daily per-head charge. The contract rate for the analysis of the current study was $1.28/d per head as per the professional heifer grower's payment contract. Net revenue per head was the difference between the contract rate and the total daily cost per head shown in Table 4. Net returns per hectare were calculated as net revenue per head × number of head × number of days grazing/hectares of pasture. Net returns per hectare ranged from $39 in 2001 to $478 in 2002. The lesser returns in 2001 are the results of a lesser SR and the shorter grazing season of 127 d.

If MIG systems are to be adopted in the Upper Midwest, more hectares of improved pasture may be needed. This could result in converting highly productive row cropland into pasture. Because labor costs have been accounted for in the MIG system, they must be accounted for in the crop costs. In addition, some crops are eligible for government payments and were included in the returns. Net returns per hectare with government payments and labor charges for corn, soybeans, and alfalfa hay in Minnesota and the MIG heifer grazing are presented in Table 6. Crop returns were obtained from the University of Minnesota, Center for Farm Financial Management farm financial records database (2003).

**TABLE 6. Returns ($/ha) for cropping enterprises.**

| Item | 2000 | 2001 | 2002 | Average over 3 yr |
|---|---|---|---|---|
| Corn | –$45 | M$139 | $74 | –$76 |
| Soybeans | $87 | $40 | $96 | $76 |
| Alfalfa hay | $200 | $194 | $282 | $225 |
| Grazing dairy heifers | $296 | $52 | $496 | $264 |

Returns per hectare for the MIG system exceeded the returns for corn and soybeans in each of the 3 yr, even with the government payment included for corn and soybeans. The lesser SR in 2001 saw the MIG pasture system returns fall below that of alfalfa hay. In years when an adequate SR can be maintained, the returns from the MIG heifer system surpass returns for corn, soybeans, and alfalfa hay.

## Implications

The MIG system can be a viable production system for raising dairy heifers. Crop producers can benefit from raising a crop of heifers. Including forages into row crop rotations can have economic and environmental benefits. Custom heifer growers have a viable alternative to feedlot systems. The cost savings of the MIG system over the feedlot makes it a competitive system. There is also perceived benefit of having a more animal welfare and environment friendly system with MIG as compared with feedlots. As custom heifer growers look to expand to meet demand, the MIG system might face an easier time in permitting land use. There is also opportunity to use the MIG system for grazing dairies that outsource heifer raising. Heifers that have the opportunity to learn to graze should have an easier transition into a grazing herd than those heifers that were raised in a feedlot and brought into a grazing herd.

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