Dairy Heifer Grazing: Scaling Regenerative Dairy Systems for the Win-Win…Win

Photo: Finn Ryan

Wisconsin has an opportunity to keep more replacement dairy heifers in the state and support grass-based systems as an economic and ecological opportunity. Raising dairy heifers on well managed pastures can improve soil health, water quality, and biodiversity.[1] In addition to ecological benefits, heifer grazing offers cost savings to graziers, supporting viable farm enterprises. Animal health and performance is on par if not improved for heifers raised in managed grazing systems, supplying dairy farmers with successful replacements for their milking herd.[2]

Dairy Farming is Changing Rapidly in Wisconsin

The dairy landscape is shifting rapidly in Wisconsin with a trend towards fewer, but larger farms. This trend often results in transition of acres from pasture and dairy rotations to row crops, worsening ecological outcomes. Also, increasing numbers of heifers from larger herds are shipped longer distances, often interstate, to be raised in large-scale confinement operations.[3]

Dairy Heifer Grazing: The Value Proposition

Dairy heifer grazing can be a viable strategy for all sized farms and provide ecosystem services. Well-managed pastures, often referred to as management-intensive rotational grazing (MIRG), can provide high value and low-cost forage for ruminants.[4] The reduced input costs of heifer grazing compared to confinement systems with TMR feed regimens can increase dairy farm profit margins. Also, connecting dairy farmers with custom heifer graziers opens the possibility for new, more local enterprises that tap into animal husbandry expertise of those who may be exiting milking operations and avert the transition of pastures and dairy crop rotations (such as alfalfa and small grains) to annual row crops, keeping more continuous cover and perennial system on the land. As well, building a more localized heifer replacement system reduces the climate impact and animal stress of shipping heifers long distances, and may reduce the risk of spreading bird flu (H5N1), found in some dairy herds, now leading to greater regulation of interstate cattle shipping and milk testing.

Thinking at the Watershed Level

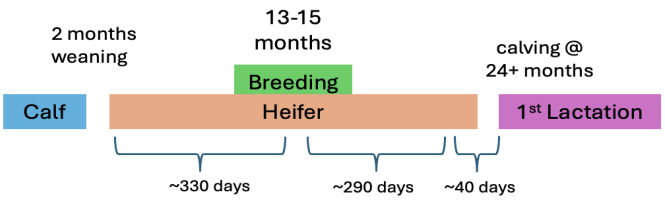
UW-Madison based Grassland 2.0 project, in collaboration with the community-led Eau Pleine Partnership for Integrated Conservation (EPPIC) watershed group, has been working in the Cloverbelt Learning Hub to bring together heifer graziers and farmers considering grazing heifers, county staff, UW Extension and USDA Dairy Forage Research staff to explore the opportunities and challenges of establishing dairy heifer grazing at the farm level and also the watershed level and beyond. The group has used the Grassland 2.0 decision support tools, the Heifer Compass and Smartscape™ and Grazescape™ to model scenarios in priority watersheds. Transitioning acres (1 acre per heifer in the Wisconsin grazing season) from row crops to well managed pasture shows significant water quality and biodiversity, as well as greenhouse gas reductions.

Building Viable Farm Enterprises

Along with ecological benefits, economic analysis shows cost savings for farmers raising dairy heifers in MIRG and potential profit for custom heifer grazing enterprises. The approximate cost of raising a heifer seasonally (assuming 180 days of grazing) in a managed grazing system is $0.99/head/day, compared to $2.50/head/day in a confinement system, a savings of $1.51/head/day.[5] An operation with 100 heifers over a 180-day grazing season could save $27,180. A custom heifer grazier, raising 50 heifers for another farm (cost of $.99/head/day), charging the going rate (say $2.50 head/day) could cover costs and net $16,308 over the grazing season. At $3.00/head/day, the net return to the custom operator would be $21,708. This work also includes consideration of transition costs and return on investment (ROI). Our estimates show a 5-year or less ROI, even when not counting on USDA NRCS or other cost share.[6]

Building a Dairy Heifer Supply Chain

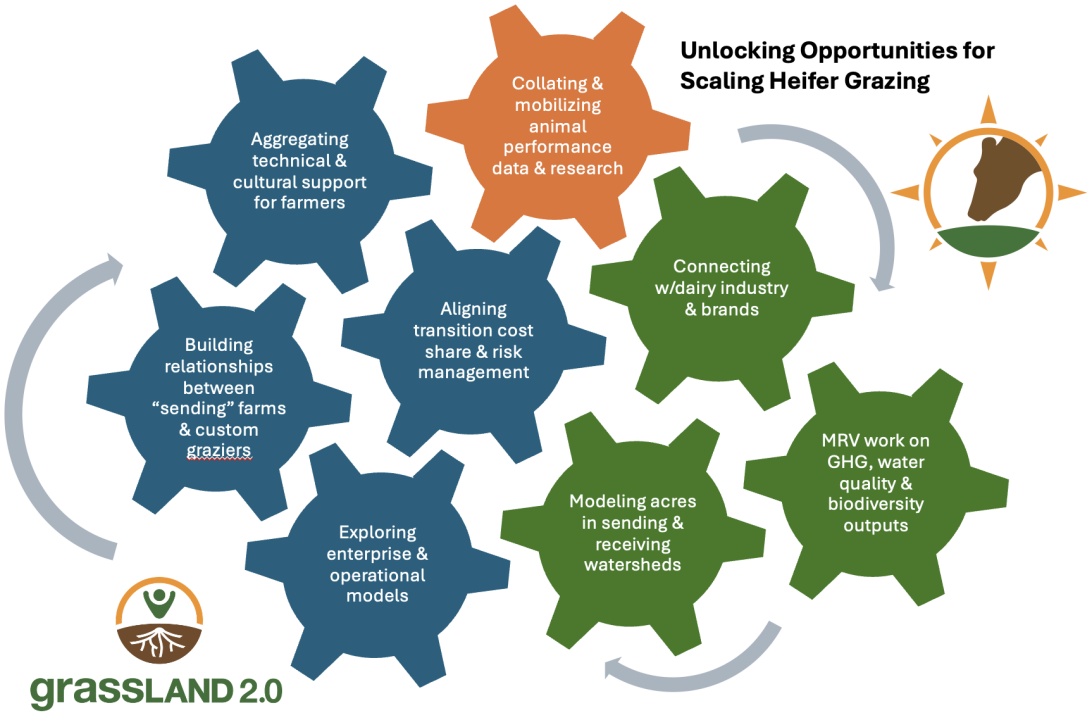
The Cloverbelt group has also undertaken development of a logistics model for a dairy heifer supply chain. We have been using a 38% replacement rate in our calculations. What is the size of the groups of heifers being raised? What is the cadence of when "sending farms" would deliver their animals to custom graziers? There are several operational models that may work for different sending farms and custom operators, depending on what part of the heifer lifecycle might be the best fit.



Another key area of engagement in the scaling of dairy heifer grazing is with dairy brands, processors and the dairy industry as a whole. The market forces that can support and incentivize these transitions is also critical. Many dairy brands, processors, and the dairy industry as a whole have made ambitious GHG commitments.[7] Grassland 2.0 is engaging with partners to understand the monitoring, reporting, and verification (MRV) of heifer grazing activities that would need to be established to meet the dairy industry demands.

Unlocking Opportunities for Watershed-Based Transformation

We have identified the key scaling components in the figure (left).These different "gears" are interdependent and may spin at different speeds at different times. The farmer and technical service focused components (represented in blue in the figure) form the core work. We also identify the need for interaction with market-based action (represented in green), as well as the importance of animal performance research (in orange).



Looking at the statewide opportunity for dairy heifer grazing, the 2022 USDA Ag Census reports for Wisconsin 615 farms with 500 cows or more, for a total of 706,794 milking cows. If you take the 38% replacement rate and assume a 20% adoption rate, that would be 53,716 grazed heifers. At 2 acres pasture/heifer/year that is over 104,000 acres of land that could be maintained in perennial systems. If you conservatively figure you can either save (for someone raising their own heifers on grass) or profit (for a custom heifer grazier) $1/head/day, grazing dairy heifers in Wisconsin is a $19,606,340 value proposition. If we extrapolate out the milk production from these heifers that will enter dairy herds as lactating animals, this represents over 1.45 billion pounds of milk/year, using an assumption of 27,000 lbs/cow/year. It will be important to not only think like a watershed but also a milkshed when building the opportunities for valuation and monetization of the ecological and other benefits of this production system change of moving heifers on to well managed pasture that could reach dairy produce markets.

The *Grassland 2.0* project has been working with farmers, nutritionists, agency technical support providers and researchers to scale dairy heifer grazing in the Upper Midwest as part of place-based, strategic action to build regenerative dairy systems. This document is a summary of several years of collaborative work. The focus on dairy heifer grazing came out of community conversations in the Grassland 2.0 Cloverbelt Learning Hub in central Wisconsin and these ideas are being developed with farmers, nutritionists, and staff from county, USDA, non-profits and the University of Wisconsin-Madison.

For more in-depth coverage of the issues brought up in this paper and a full list of citations, we are happy to share our longer white paper, that includes details from the Cloverbelt Learning Hub dairy heifer grazing scoping work. Contact Sarah Lloyd, Grassland 2.0, Supply Chain Specialist, lloyd1@wisc.edu, 920.210.7335

Endnotes

1. Dietz, C.L., Ruark, M.D., Jackson, R.D., Sanford, G.R., 2024. Soil carbon maintained by perennial grasslands but lost in field crop systems over 30 years in a temperate Mollisol according to longitudinal, compaction-corrected, full-soil profile analysis. Communications Earth & Environment 5, 360 and Rojas-Downing, M. M. et al. 2017. Resource use and economic impacts in the transition from small confinement to pasture-based dairies. Agricultural Systems. 153:157-171.
2. Kalscheur, KF, Camisa Nova, CHP.; Jaramillo, D, and Brink, GE. 2024. "Win-win for dairy farms: Heifers raised on pasture reduce cost and produce more milk at first lactation." *IGC Proceedings (1993-2023)*. 74. Ongoing research at the University of Wisconsin-Madison's Marshfield Agricultural Research Station with the USDA Dairy Forage Research Center is assessing the performance of grazed heifers compared to those reared in confinement fed with Total Mixed Ration (TMR) systems. The research team is replicating a smaller study (see figure below), showing that when entering a confinement milking herd, heifers raised on MIRG had higher dry matter intake and milk production in the first lactation.
3. Results from the WI Department of Agriculture Trade and Consumer Protection 2024 Dairy Producer Survey show 37% of herds of 1000+ cows "have cows/calves raised outside of Wisconsin". States reported were CO, IA, KS, MN, NE, ND.
4. Oates, L.G., Undersander, D.J., Gratton, C., Bell, M.M., Jackson, R.D., 2011. Management-intensive rotational grazing enhances forage production and quality of subhumid cool-season pastures. Crop Science 51, 892-901. 10.2135/cropsci2010.04.0216 and Paine, L.K., Undersander, D., Casler, M.D., 1999. Pasture growth, production, and quality under rotational and continuous grazing management. Journal of Production Agriculture 12, 569-577.
5. Rudstrom, M., Chester-Jones, H., Pas, Imdieke, R., Johnson, D., Reese, M., Singh, A., 2005. Comparison of economic and animal performance of dairy heifers in feedlot and pasture-based systems. The Professional Animal Scientist 21, 38-44. Calculations based on analysis of UMN farm management database FINBIN by Grassland 2.0 collaborator Jim Munsch.
6. This is based on Grassland 2.0 collaboration with FoodSystem 6 to analyze cash flow and return on investment of several scenarios, as well as developing options around EQIP bridge loans and revenue balancing strategies.
7. See https://www.usdairy.com/sustainability/environmental-sustainability/net-zero-initiative, A joint effort, led by DMI and NMPF is the F.A.R.M. program has a new (v.3) of their Environmental Stewardship standard https://nationaldairyfarm.com/dairy-farm-standards/environmental-stewardship/. Initial modeling that Grassland 2.0 worked on in collaboration with Carbon Yield showed a 10.8% reduction of greenhouse gas emissions