Benefits of Management-intensive Grazing

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Introduction

Producer interest in Management-intensive Grazing (MIG) has increased steadily over the last decade throughout the US. Several factors have been identified as contributing to the resurgence in interest in pasture-based production systems. Reduced production costs, increased animal output per acre, land use efficiency, environmental friendliness, and improved quality of life for farmers and ranchers have all been touted as benefits of MIG. While some of these benefits have been confirmed through planned research projects, other perceived benefits are based primarily on producer experience.

The published definition of MIG is: ‘A flexible approach to rotational grazing management whereby animal nutrient demand through the grazing season is balanced with forage supply and available forage is allocated based on animal requirements.’(Martz, et al., 1999). Being in control of livestock demand and forage supply in context of both time and space is the basis of almost all benefits of MIG.

Basic decisions about what classes of livestock to run on a farm and when birthing occurs dictate the seasonal demand for nutrients by grazing livestock. The types of forage species sown, fertility program, and grazing management determine the forage supply distribution for the grazing season. Level of pasture subdivision and day-to-day grazing management decisions determine how efficiently the forage resource is utilized.

The Benefits of MIG

When we began research in intensive rotational grazing systems at the Forage Systems Research Center in the early 1980's our primary goal was to reduce the cost of production for beef cow-calf systems. Based on producer records, we identified winter feed costs and land cost as the two largest single-item budget line costs in most cow-calf systems. We set out to reduce these costs by extending the winter grazing season and increasing pounds of beef produced per acre thereby lowering the overhead cost per unit of product. Although our research was geared toward beef cow-calf operations, the same basic relationships also held for dairy, sheep, and all other ruminant livestock, including bison and elk, making the research we conducted applicable to a much broader audience. The remainder of this paper explores each of the five benefits identified in the introduction and highlights the benefits of MIG.

Reduced Production Costs

Extending the grazing season: Winter hay feeding is the single most expensive part of being in the cow-calf business in most of the Midwest. While many producers try to justify hay feeding based on snow cover and inability of livestock to graze, long term weather records indicate that snow cover which would actually impede grazing is relatively rare south of a line extending from the Iowa:Missouri border through Springfield, IL, Indianapolis, IN, and across southern Ohio. The reason most cows don't graze in the winter is lack of pasture, not excessive snow cover. While the occasional blizzard can't be controlled, lack of winter pasture is a manageable problem. Having winter pasture is largely a matter of being in control of animal demand and forage supply.

If livestock are allowed access to all of the pasture all of the time, there is little chance for cool-season pastures to regrow in the fall when conditions become more favorable. One of the first benefits of pasture subdivision and control of animal usage is the opportunity to grow high quality fall pasture. What is the value of fall and winter asture compared to hay feeding as an alternative?

Table 1 compares typical costs for overwintering a dry, pregnant spring-calving beef cow in the Midwest with four forage alternatives. Crop residues such as cornstalks or milo stubble offer the lowest per day feed costs for dry cows, but stockpiled perennial pastures offer a longer grazing season of adequate quality forage. Even relatively high-priced winter annuals such as annual ryegrass or cereal grains provide a less expensive alternative than feeding hay. Similar comparisons can be made for any class of ruminant livestock.

Table 1. Daily and seasonal forage costs for alternative wintering strategies at typical yields, costs, and periods of use based on a 100-cow herd.

Forage source	**Hay**	**Corn stalks**	**Stockpiled fescue**	**Rye + ryegrass**
Cost per cow/day	$0.90	$0.05	$0.25	$0.59
Days of use	135	60 / 70 hay	90 / 40 hay	90 / 40 hay
Wintering cost (Based on 130 days)	$118	$66	$57	$83

Winter annual forages can provide extended high-quality grazing for classes of livestock with very high nutrient demands including dairy cows, fall-calving beef cows, and stockers. As the number of paddocks in the grazing system increases, flexibility to use alternative forages also increases. Using no-tilled winter annuals

in chemically killed fescue sod offers a cost effective way of converting endophyte-infected tall fescue pastures to more desirable varieties.

Planning ahead is the key to extending the winter grazing season. Management flexibility in both animal demand and forage options is critical to year-around grazing. Production systems and marketing strategies that reduce animal nutrient demand in late summer make growing fall and winter forage much easier. Multiple paddocks allow greater opportunity for pastures to rest and grow stockpiled forage.

Pasture-based dairying: One of the most exciting areas in grazing today is pasture-based dairying. Not only are substantial feed cost savings realized, but improved cow health and longevity have also been reported. For the small to mid-size dairy facing the question of expansion or exiting the industry, pasture-based production offers another viable alternative.

One of the most difficult concepts for dairy producers to accept is that lower milk yield can be more profitable than higher milk yield. Cost of production is an equally important part of the profit equation as is income. Depending on pre-grazing level of milk production, some dairies actually experience increased milk yield while others experience a decrease. While grazing certainly doesn't solve all financial problems in the dairy business, it does offer great opportunity for the open-minded producer looking for a better way to make a living.

Increased Animal Output

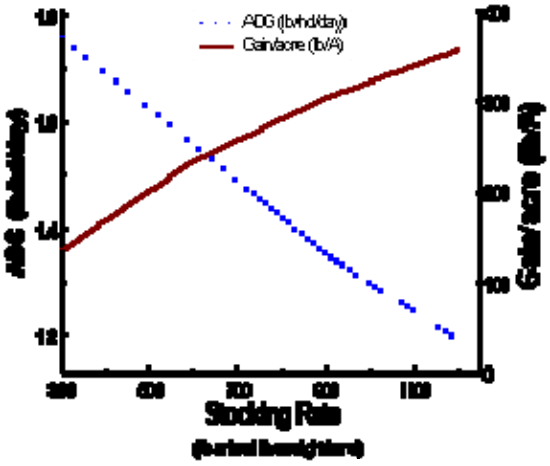

Figure 1. Beef gain per acre increases as stocking rate increases while individual average daily gain declines.

Most research that has compared MIG to more traditional grazing methods usually shows no improvement in individual animal performance but a substantial increase in livestock output per acre. Tightly controlling grazing usually results in reduced waste due to fouling and trampling and increased utilization rate. Initially, the downside of increased utilization rate is reduced forage intake due to decreased opportunity for selectivity by the grazing animals.

In the short term many graziers mistake increased utilization rate due to higher stocking rates as increased carrying capacity. If the land is stocked heavier than it can support, long-term productivity declines. If properly managed, higher

utilization rates can also lead to denser swards and higher forage quality which help offset performance loss associated with reduced intake and ultimately do lead to higher carrying capacity. The key difference between land exploitation and land enhancement is knowing when to use high stocking rates and when to rest land.

Individual animal performance can be improved with MIG but it is a long term process resulting from improved pasture availability and quality. Managing forage intake and maintaining high quality pasture are what generate high animal performance. Intake is largely controlled by bite size and bite size is largely determined by availability of quality forage. While we often stress allowing adequate rest period to let pasture reach a certain height, our research shows that post-grazing residual availability is four times more important for determining intake through the grazing period as is pre-grazing forage availability. Just remember, it is more important what the paddock looks like when the stock leave it than when they went in.

Improved Land Use Efficiency

Animal output from the whole farm or ranch can be increased by utilizing every acre optimally. On most undeveloped pastures there are areas of overuse and areas of under use. One of the greatest benefits of MIG is controlling where animals spend their time. Proximity to water is the single most important factor determining where animals spend their time. Areas closest to water tend to be the most heavily grazed locations while those most distant from water tend to be less well utilized. The distance at which animal use patterns change is surprisingly short.

We conducted a three-year trial from 1992 through 1994 to evaluate the effect of travel distance to water and pasture shape on grazing distribution. The main results of that study are easily summarized in Figure 2. Even on pastures as small as ten acres and travel distance a little more than one-quarter mile to water, the pattern of overuse and under use are very apparent. Development of multiple watering sites does as much more increasing land use efficiency as almost any other practice. Dr. Dick Hart, a noted range scientist in Wyoming, concluded that almost all livestock benefits attributable to rotational grazing in a rangeland environment were attributable to shortening their travel distance to water.

In our study using a 160 acre grazing unit with sixteen paddocks, we found a 17% increase in carrying capacity for paddocks where travel distance was kept less than 800 feet compared to paddocks of the same size but with travel distance of 1400 feet. Planning water developments should come ahead of subdivision fencing in MIG systems to optimize land use efficiency.

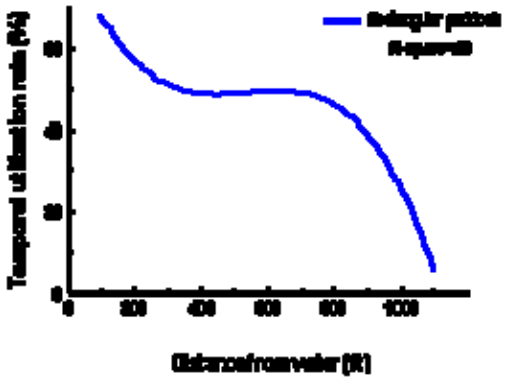

Figure 2. Travel distance to water significantly affects pasture utilization rate.

To put this study in better perspective, increasing carrying capacity by 17% on a 160 acre unit is the same as buying 27 more acres. If land costs $700 per acre, the purchase price for 27 acres would be $18,900, not including any interest or closing costs. This means you could afford to spend $118 per acre for each of your existing 160 acres to get the same result. Expected development costs for the 160 acres if configured optimally for grazing distribution would be $42/acre for water and $28/acre for fence, including both materials and labor. Land price for the 27 additional acres would need to be less than $415 per acre to match the $70/acre projected development cost. Another advantage for developing your existing pastures is no increase in property tax.

Environmental Quality

Most of the environmental problems associated with grazing livestock are due to the continuous presence of livestock in a particular location and unrestricted access to critical areas. Once livestock are brought under control and their activities become regulated, almost all types of environmental degradation are reduced or eliminated. Functional riparian areas, quality wildlife habitat, and clean water can all be byproducts of managed grazing.

Streambank degradation and water fouling are two real concerns for fisheries biologists working with clear flowing trout streams all across the US. While many have advocated fencing all the livestock out of riparian areas, other innovative stream managers have found that controlled grazing by cattle can actually enhance streambank shape and manage vegetation to provide a better trout habitat than livestock exclusion. Once again timing and degree of use are the critical issues.

Research conducted by Paine and Undersander in Wisconsin demonstrated how MIG could be used on dairy farms to improve habitat for numerous species of grassland birds. When animal access is controlled, specific areas of preferred nesting habitat can be deferred from grazing during the nesting season. This has been a commonly used practice by many wildlife managers for enhancing nesting success of MIGratory waterfowl.

Nutrient management is an issue facing all phases of agriculture today. Confinement dairies spend a tremendous amount of capital and labor on manure management. One of the very significant advantages of pasture based dairies is reduction to near elimination of manure handling facilities and chores. Allowing

animals to disperse there own manure makes a lot of sense but there are certain challenges that must be considered to keep livestock from creating nutrient hot spots in the pasture.

In a grazing situation, manure distribution is typically not uniform across the entire pasture. Location of water, shade, supplement feeding sites, and prominent landscape features all affect where livestock spend their time and subsequently excrete dung and urine. Stock density also plays a major role in manure distribution with high stock density producing more uniform distribution than lower stock densities. Shorter grazing periods in smaller paddocks are the most effective tool for increasing stock density.

Shade and water are the two most significant manure magnets in the pasture. Keeping travel distance to water under 800 feet will help keep manure distribution more uniform and minimize manure concentration around watering sites. Either abundant shade or no shade provides for best manure distribution. Paddocks with limited shade pose the greatest risk for manure concentration points. The more evenly dispersed manure is and the more uniform the pasture vegetation cover, the lower the risk of nutrients running off and contaminating surface water.

Quality of Life

Perhaps the MIG benefit that is hardest to place an economic value on is quality of life, but it is the benefit that producers seem to appreciate the most. The labor demands of a pasture-based dairy are significantly less than those of a confinement dairy and the type of labor required is much more appealing to many people. No where is this more apparent than with those producers wanting to introduce their children to the farming operation. Moving temporary electric fence is a much safer task than chopping a load of silage.

For the beef producer the reduction in hay making and winter hay feeding is a relief. Planned grazing that significantly lengthens the grazing season shortens the winter work day. As with the grass-based dairy, the type of labor needed for MIG is much lower key than operating equipment.

Summary

The benefits of MIG are multiple, some clearly economic and others less easily measured but of equal importance to many producers. Reducing stored feed costs by extending the grazing season is clearly the greatest economic benefit. Increased production on both an animal and land basis are also clear cut economic benefits. Improvement in wildlife habitat or water quality are not as easily accounted for but are viewed as benefits to all of society, not just the livestock manager. Living a more enjoyable life may be the greatest benefit of all when we look back on our days.