Mississippi State University Extension Service

ROTATIONAL GRAZING: WILL IT PAY?

The beef industry is important to the agricultural economy of Mississippi. According to the National Agricultural Statistics Service[1], the value of cattle and calf production in Mississippi totaled more than $218 million in 2000, placing cattle fifth in terms of value of sales for Mississippi agricultural and forestry products. This represents the production from 24,000 beef operations managing a total of about 1.1 million cattle.

Cattle production takes place in virtually every part of the state. Beef production is probably more widespread than production of any other commodity. According to the Mississippi Agricultural Statistics Service, cash receipts from cattle and calf sales in 2000 exceeded $1 million dollars in 66 of the state's 82 counties. Because beef production is so important to our state, efforts to improve profits of beef operations have tremendous potential to impact our agricultural economy.

A closer look at cost and return data from beef operations suggests that improving the productivity and use of forages provides a real opportunity to increase net returns for beef producers. One of the best ways to reduce feed costs is to provide more of the herd's nutritional requirements through grazing standing forage. Data from the Iowa State Beef Cow Business Record program illustrates this point very clearly.[2] According to this program's production records from 1995 through 2000, the most profitable 25 percent of producers fed 880 pounds less harvested feed per cow than did the least profitable 25 percent of producers (3,509 pounds/cow compared to 4,388 pounds/cow). Differences in feed costs directly translate into significant differences in the bottom line: the most profitable producers realized an average return to capital, labor, and management of $127/cow, whereas the least profitable producers realized an average return of -$144/cow. Given a climate that permits a much longer grazing season than in Iowa, Mississippi producers should be able to reduce harvested feed needs well below the levels in this example.

Producers who want to change their forage management systems to make their livestock operations more productive are faced with two questions: how do I get more out of my forages, and how much will it pay to do so? The answer to the first question is more-or-less straightforward. The management practices that increase the productivity of pasture-based livestock systems are well known and have been promoted by agronomists and animal scientists for years. Things like fertilizing according to soil test results and controlling access to forages through some type of pasture rotation have been shown to increase the productivity of pasture-based livestock production systems in countless university demonstrations as well as on many working farms and ranches.

The second question – how to make improved forage production systems pay – is much more difficult to answer. It is not enough simply to produce more forage. That forage must be fully used in producing livestock to be of value. Implementing an improved forage production system and making the fullest use of the available forage will involve significant changes in management from traditional continuous grazing of perennial pastures. It may also involve significant capital investment. These two factors – the need for more intensive management and for an increase in capital investment – represent significant barriers to adopting improved grazing systems; however, improved grazing systems often represent a great opportunity for producers to enhance the long-term sustainability of their livestock operations.

If you are considering adopting improved pasture systems, you should note several things. First, recognize that successfully operating improved grazing systems requires a greater commitment to

management than traditional continuous grazing systems. Timely pasture rotation and routine pasture maintenance require a level of management many producers (such as part-time producers with significant off-farm commitments of their time) may find burdensome. In addition to the obvious management obligations, rotational grazing systems can give rise to herd health and nutrition management issues that can be different from those of continuous grazing systems. Increasing beef production per acre in a forage-based production system is generally possible through increasing forage production, improving the efficiency of use, and/or managing stocking rates more closely. However, that does not guarantee increased profits. Without the producer's commitment to acquire new skills and make significant changes, intensive grazing systems are unlikely to be successful.

The second fact to point out is that implementing intensively managed grazing systems will involve additional costs. Improving pastures, putting up fences, and installing watering systems cost money. Recovering these costs will require an offsetting increase in revenue — for example, from increased beef production and/or the sale of extra hay. In spite of these considerations, though, moving to more intensively-managed grazing systems can increase profits and enhance the sustainability of livestock operations.

INTENSIVE GRAZING FOR COW/CALF PRODUCERS

In thinking about shifting from a continuous to a more management-intensive grazing system, you should first consider whether or not the long run profitability of the farm will be improved. To do this, a partial budget can be a very useful tool. Basically, a partial budget is made up of four components; two identify changes in the operation that will increase profits, and two identify changes in the operation that will decrease profits. Interpreting the results of a partial budget is very simple: if increased profits exceed decreased profits, then the change is a good one.

1) Changes that Increase Revenue	2) Changes that Decrease Revenue
+ 3) Changes that Reduce Costs	+ 4) Changes that Increase Costs
Increased Profits	Decreased Profits

The difficulty in applying a partial budget to a particular problem is accounting for all cost and return changes that will result. Each profit-changing item must be included to determine whether or not the change to more intensive grazing will be profitable.

Very often, the reason for moving to intensive grazing is to increase revenues (item 1) from the livestock operation. These increased returns will result from selling heavier weights, stocking more head on the same ground, or both.

Cost savings (item 3) may not be an obvious area, but if improved nutrient management leads to reduced fertilizer needs or if pasture clipping or forage harvesting are reduced, you should include these costs. Additionally, costs associated with feeding hay may be reduced, since more forage is harvested by grazing rather than mechanically.

Generally, we would not expect to see decreased revenues (item 2). However, if the plan were to reduce the size of the herd and graze fewer acres, then there might be an entry in the decreased revenue section.

Increased costs (item 4) are often the most obvious items to include in a partial budget. Pasture renovation costs, fencing costs, and water system upgrades are readily identified costs associated with increased rotational grazing. Less obvious, but no less important, are management and labor costs and other costs associated with producing more pounds of meat. Certainly, if rotational grazing adds animals to the herd, then acquisition and ownership costs of the extra animals should be included.

A COW/CALF EXAMPLE

Following is an example of a 70-cow beef operation considering a move to rotational grazing. Keep in mind this is simply "an" example, not "the" example. There is far too much variability in herds, resources, and management to make a blanket statement about the profitability of such a decision.

ABC Farms currently has 70 cows grazing 200 acres of typical Mississippi pasture. The partial budget put together for the farm is based on the assumption that rotational grazing and improved pastures will allow an increase in stocking rates of 30 percent (that is, 21 head). In addition, implementing rotational grazing will reduce nitrogen fertilization requirements and the amount of hay fed through the winter. In spite of the increased revenue and decreased costs, with $300 calves, $700 replacements, and $350 cull cows, this is not a break-even proposition. The operation would lose about $875 on the transition to rotational grazing. Four-hundred-dollar calves present a different story. Profits would increase by almost $1,100 when stocking rates increase by 30 percent. On the next page is a complete summary of the partial budget for this example (assuming $400 calves):

ABC FARMS: *Annualized Partial Budget of Cow/Calf Expansion*

Increased Revenue		**Decreased Revenue**	
Additional Calves	19	None	
Revenue/calf	$400		
Additional Calf Revenue	$7,600	**Increased Costs**	
		Woven Wire Fence	$389
Extra Hay (tons)	18	Poly Tape Fence	697
Revenue/ton	$45	Underground Water Line	265
Additional Hay Revenue	$810	Portable Water System	195
		Pasture Renovation	1,530
		Investment in Cows	1,801
Decreased Costs		Subtotal	$4,877
Reduced N fertilization (30 lbs/ac on 200 acres @ $0.30/lb of N)	$1,800	Additional Labor (15 hrs/mo for 6 months @ $7/hour)	$630
Decreased Hay Feeding (600 lbs/head to 70 head @ $45/ton)	$945	Additional Cow Costs (25 more cows @ variable cost of $180/hd)	$4,500
Increased Profits	**$11,155**	**Decreased Profits**	**$10,007**
Change in Profits: $11,155 - $10,007 = $1,142			

Other assumptions critical to this analysis include investment in new fencing and water facilities of $7,496, costs for overseeding ryegrass of $51/acre on 30 acres, and $14,700 for herd expansion (21 additional cows at $700 per head). Here is a summary of investment in new facilities and equipment, including the calculation of additional costs on an annual basis:

ABC FARMS: *Investment in Rotational Grazing System*

Cow/Calf Example

	Price	Cost	Life	Repair %	Deprec.	Repairs & Maint.	Non-cash Interest
1/2 mile woven wire	$1.05/ft	$2,772	20	5%	$139	$139	$111
2.5 miles poly tape	$0.12/ft	$1,584	5	20%	$317	$317	$63
1/2 mile underground water line	$1.00/ft	$2,640	25	2%	$106	$53	$106
Portable water system	$500	$500	5	15%	$100	$75	$20
21 Cows	$700	$14,700	8	N/A	$919	N/A	$882
Total		**$22,196**					

Total new investment equals $22,196 in this example. From a cash flow standpoint, a five-year loan for this amount at 8% interest would require principle and interest payments of $5,560 per year. The principle and interest payments plus additional variable cost of $6,660 would result in a negative cash flow of about $1,100 per year until the loan was paid off. Here is a summary of this cash flow situation:

ABC FARMS: ***Cash Flow Requirements for Implementation of Rotational Grazing***

Cow/Calf Example

Loan payment		$5,560
$22,196 financed for 5 years @8%		
Additional variable costs		$6,660
Increase in cow variable costs	$4,500	
Additional labor costs	$630	
Annual pasture overseeding	$1,530	
Total additional cash flow requirements		$12,220
Increase in available cash (from earlier table)		$11,155
Net Cash Flow*		($1,065)

** Represents average annual cash flow situation until the loan financing grazing system investment is paid.*

If only the cattle were financed, with other investments financed out-of-pocket, the principle and interest payment would be $3,682. In this situation, a positive cash flow of just more than $800 would appear to be possible.

Remember, this is only one example. Different cost and return assumptions will lead to different results. In addition, different assumptions related to what portion of the new investment is financed and to the terms of that financing could lead to very different cash flow situations. Each situation must be evaluated on its own merit and all changes in revenue and costs must be identified and included.

A STOCKER CALF EXAMPLE

The goal of intensive grazing does not necessarily have to be expanding the cow herd. If you are seeking to diversify into other types of livestock production, you might consider intensive grazing as a means of creating capacity for additional livestock enterprises on the same land base. Grazing stocker calves in addition to the cow herd is an example of this type of system. Seasonally grazing stocker calves could, in fact, be easier to implement than expanding the cow herd. As the previous example shows, expanding the cow herd can lead to a very tight cash flow situation. Either you must repay a large loan (if you financed buying the cows), or you must reduce heifer marketings (if the expansion occurs through increased heifer retention). Either way, an uncomfortably long period of low or negative cash flows can result from the move to intensive grazing. This may be the case even if intensive grazing is expected to improve the long-run profitability of the farm.

Beginning a stocker operation may have less of an impact on cash flow because you keep calves for a relatively short time and then re-sell (or sell for the first time in the case of retained calves). Thus, cash flow is generated more quickly than with brood cows. In addition, in grazing-based stocker systems, there is minimal cash outlay for feed.

In spite of these points, stocker operations are not for everybody. Stocker operations tend to be quite capital intensive. That is, they can tie up much of a farm's equity. Producers with limited equity may find it difficult to finance a stocker operation. In addition, management challenges in a stocker operation can be significantly different from those in a cow/calf operation. For example, monitoring herd health and treating illnesses in a timely and effective manner are absolutely essential to the success of a stocker operation. This requires experience and technical skill that cow/calf producers may have to acquire.

To illustrate how beginning a stocker operation may affect the rotational grazing decision, we will look at the ABC Farms partial budget again. In this case, though, instead of increasing the size of the cow herd by 30%, the owners of the farm are considering running stocker calves on ryegrass pasture. In this example, 300-pound stocker calves will be purchased each year for grazing from the beginning of November through the end of April.

Referring to the partial budget in the earlier example and the assumptions in the second example, all fencing and watering equipment will remain the same. In addition, $1,500 will be spent on handling/feeding facilities for the stockers. The budget below assumes 40 acres of prepared seedbed ryegrass will be planted each fall, which should provide enough grazing for 80 calves. Note that the stocker purchase is given in the increased cost portion of the partial budget.

ABC FARMS: *Annualized Partial Budget of Seasonal Stocker Operation*

Increased Revenue		**Decreased Revenue**	
Fall Stockers	78	None	
Revenue/calf	$450		
Revenue from Fall Stockers	$35,100		
		Increased Costs	
Extra Hay (tons)	18	Woven Wire Fence	$389
Revenue/ton	$45	Poly Tape Fence	697
Additional Hay Revenue	$810	Underground Water Line	265
		Portable Water System	195
Decreased Costs		Ryegrass Planting	2,240
Reduced N fertilization (30 lbs/ac on 200 ac @ $0.30/lb of N)	$1,800	Facilities	360
		Stockers (80 @ $350/head)	28,000
		Labor ($5/head)	400
		Variable Costs ($30/head)	2,400
Increased Profits	**$37,710**	**Decreased Profits**	**$34,946**
Change in Profits: $37,710 - $34,946 = $2,764			

In this example, implementing intensive grazing along with a seasonal stocker-grazing program increases profits by about $2,700. Cash flow implications are also significant. Buying stocker calves each year requires $28,000 in this example, although that will obviously vary from year to year, depending on the cattle market. Total investment in facilities and fencing/watering equipment is $8,996 (cost of fencing and watering equipment plus an additional $1,500 invested in facilities). Financed for five years, this results in an annual payment of $2,253. Additional variable costs (including interest on calf purchases) and labor total $2,800. In addition, the cost of planting ryegrass each year (40 acres @ $56/ac) is assumed to be paid out-of-pocket as well. The total annual cash flow requirement for the operation is, therefore, just more than $35,000 ($2,253 loan payment + $2,800 additional variable costs + $2,240 ryegrass planting cost + $28,000 calf purchases). Thus, in this example, positive cash flow is possible. Obviously, this cash flow will be affected by the profitability of the stocker operations in any given year as well as by the terms of financing on the investment in facilities and fencing/watering equipment.

The examples presented here illustrate the importance of budgeting production and price parameters that are realistic for the individual farm. General statements about the value of rotational grazing could be misleading because of very significant differences in pasture quality, field layout, water availability, and management ability among farms. What can be stated categorically is that the economic benefits of rotational grazing depend on the cattle price as well as costs of implementing the system. Producers who implement rotational grazing need to be aware not only of how this management change will affect the long-run profitability of their operations but also of how their cash flow will be affected in the short- and intermediate run. Herd expansion, in particular, may have a pronounced negative effect on cash flow, depending upon how the expansion is financed and/or the time frame over which the expansion occurs.

For additional information on fencing systems and associated costs, see Gerrish, Jim, "Fence Systems for Grazing Management," Arkansas Grazing Manual, 5th ed., University of Arkansas Cooperative Extension Service; Turner, L.W., C.W. Absher, and J. K. Evans, Planning Fencing Systems for Intensive Grazing Management, ID-74, University of Kentucky Cooperative Extension Service, 1997; or Mayer, Ralph, Estimated Costs for Livestock Fencing, FM 1855, Iowa State University Extension, February 1999.

[1] Data taken from Meat Animals: Production, Disposition, and Income, USDA-NASS, Washington DC, April 2001; and Cattle, USDA-NASS, Washington DC, January 2001.

[2] From 2000 Summary: Iowa Beef Cow Business Record, IBC-16, Iowa State University Extension, July 2001.

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Publication 2299

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. JOE H. MCGILBERRY, Interim Director (500-03-02)