Turning Grass into Ca$H:
Opportunities in Grassland Agriculture

October 30, 2018
Christian County Ext. Office
Hopkinsville, KY 42240

November 1, 2018
Clark County Ext. Office
Winchester, KY 40391

Presented by:
Kentucky Forage and Grassland Council
University of Kentucky College of Agriculture, Food and the Environment

Dr. Chris Teutsch and
Christi Forsythe, editors

University of Kentucky
College of Agriculture, Food and Environment

Schedule for both Locations

Turning Grass into Ca$h: Opportunities in Grassland Agriculture

All times local

7:45 am	Registration, exhibits, silent auction and refreshment
8:45 am	Welcome and Introductions – Chris Teutsch
9:00 am	**Measuring profitability - Kenny Burdine, University of Kentucky**
9:30 am	**Considerations for making a profit with stockers - Jeff Lehmkuhler, University of Kentucky**
10:00 am	Break, visit sponsors and silent auction
10:30 am	**Grazing dairies: Challenges and opportunities - Howard Straub, III, Dairy Manager, KBS at Michigan State University**
11:00 am	**Turning grass into CA$H with small ruminants – Ken Andries**
11:30 pm	KFGC Business Meeting
12:00 pm	Lunch
1:00 pm	Forage Spokesperson Contest (Winchester only)
2:00 pm	**Grass finished beef: melding production and marketing - Michael Palmer, Palmer Farms (Hopkinsville, KY location) and Todd Clark, Clark Family Farms (Winchester, KY location)**
2:30 pm	**Keys to optimizing profitability in cow-calf production-TBD**
3:00 pm	**Managing risk in grazing operations - Chris Teutsch and Kenny Burdine**
3:30 pm	Turn in surveys and adjourn

Foreword

The Kentucky Grazing Conference has been a staple in forage outreach in the state of Kentucky for nearly two decades. Each year, we focus on recruiting high quality speakers to address topics relevant to producers now. It is our hope you will find this program informative and beneficial, and will able to take home at least one idea or practice to implement in your program.

The theme of this year's conferences is "Opportunities in Grassland Agriculture". Grassland agriculture represents one of the most sustainable forms of modern agricultural production and the greatest opportunity for new people wanting to enter agriculture. Capital investments and land requirements are relatively low, compared to many other commercial agricultural enterprises.

On behalf of the program committee, we want to thank the Kentucky Forage and Grassland Council for their continued support of this program. Special thanks to the speakers for providing their presentations and papers for the proceedings. This meeting would not be possible without the support of the many exhibitors as well; please take a moment to visit with them during the breaks.

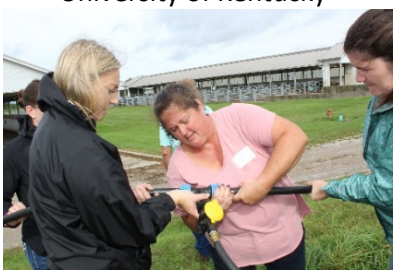
Special thanks are extended to Mrs. Krista Lea for her efforts in program planning and registration. We would also like to extend a special thank you to Mrs. Christi Forsythe for preparing, editing, and printing the proceedings.

I would encourage you to stay up-to-date with the latest forage research and educational programs in Kentucky by subscribing to our online newsletter, *Forage News*, on newly updated and mobile friendly website that can be found at https://forages.ca.uky.edu/ or by simply googling "KY Forages". In addition to the subscription link, you will find a wealth of publications and other resources to improve your forage management and list of upcoming events. We also want to encourage you to use the NEW and Improved KYForages YouTube Channel found at https://www.youtube.com/c/KYForages. This YouTube Channel housed contains hundreds of videos from past conferences and meeting that focus on improved forage and grazing management.

With regards,

Dr. S. Ray Smith
Forage Specialist – Lexington
University of Kentucky

Dr. Chris Teutsch
Forage Specialist – Princeton
University of Kentucky



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Measuring Profitability in Grazing Operations

Kenny Burdine, Ph.D.
University of Kentucky

When producers make investments in extending their grazing season, they do so in order to obtain an economic benefit. These benefits usually include a reduction in the number of days that stored feed (typically hay) is fed, an increase in carry capacity or stocking rate, or an increase in production level (rates of gain, weaning weights, etc). While all of these are potential benefits of improved grazing systems, a reduction in winter feeding days is often the simplest way to start. When the grazing season is extended, winter feeding days are reduced, and this cost savings can be weighed against the additional costs incurred. Simply put, if additional grazing days can be added for less than the cost of winter feeding days, they are a good investment.

Given this basic framework, a good place to start when evaluating the profitability of a grazing program is to estimate winter feed costs per day. In most cases, this will consist of feeding purchased or home-grown hay. For the purposes of discussion in this article, I am going to present some specific estimates for winter feeding costs, but readers should understand that all these things are very "operation-specific" and it is always best to work through estimates using actual production costs for the operation in question.

Most cow-calf operations produce their own hay so we can start there. In these cases, hay production expenses include fertilizer, lime, machinery, fuel, labor, and many other items. Producers should estimate hay costs on a per ton basis, then convert this into a cost per winter feeding day by tracking the amount of hay that cows are consuming through the winter. It's also important to consider storage and feeding losses, as they can greatly increase the actual winter feeding costs. The UK Department of Agricultural Economics has a set of forage budgets that can be accessed at http://www.ca.uky.edu/agecon/index.php?p=29 for producers who would like to use an interactive tool to help estimate these costs.

In order to make the discussion more tangible, I ran a quick estimate for hay costs based on current fertilizer prices. By pricing Urea ($425 per ton), DAP ($550 per ton), and Potash ($375 per ton), N, P, and K prices were estimated at $0.46, $0.41, and $0.31, respectively on an elemental basis. Naturally, these prices can be adjusted in the spring for 2019. I further assumed that 60, 60, and 120 units of actual N, P, and K were applied. I also assumed one ton of lime at $15, custom application at $7 per acre, and charged a $50 land rent. Using an assumed grass hay yield of 3.5 tons per acre, this works out to be roughly $46 per ton.

In addition to these costs, machinery, labor, fuel, and maintenance also represent a significant cost to hay production. Since these are so hard to estimate, custom rates were used for Kentucky. Based on our department's 2018 custom rate survey, complete custom harvest (cut,

rake, and roll) for 1,200 bales was $20. This works out to be an additional $33 per ton for these costs. I am being a little light on details, but based on these assumptions, estimated hay production costs would be $79 per ton. And, it is worth noting that smaller operations are very likely have higher machinery and labor costs per ton than custom operators.

In addition to the cost of hay production (or purchase), the cost of winter feeding days are also impacted by hay storage and feeding losses. A lot of hay can be lost in both cases and the range on these losses can be quite wide. As storage and feeding losses increase, cost per winter feeding day increases, as less of the hay fed is actually consumed by cows. Table 1 below estimates winter feed costs per cow for a 1,300 lb cow consuming 2.5% of her body weight per day. Hay costs (prices) shown are $60, $80, and $100 per ton and estimated storage and feeding losses are 15%, 30%, and 45%. For example, an operation that spent $80 per ton producing hay, then incurred 30% storage and feeding losses, would see estimated winter feed cost per cow of $1.86 per day. Producers should start by realistically accessing where they are on this table in order to understand what winter feeding costs per day likely are for their operations. It is also worth noting that labor and machinery to feed hay are not included in these cost estimates.

Table 1. Estimated Winter Feeding Costs per Cow per Day

	Estimated Hay Production Cost per Ton			
Estimated Hay Storage and Feeding Losses		$60 per ton	$80 per ton	$100 per ton
	15% loss	$1.15	$1.53	$1.91
	30% loss	$1.39	$1.86	$2.32
	45% loss	$1.77	$2.36	$2.95

Assumptions: Mature cow weights 1,300 lbs and consumes 2.5% of her BW per day

Now, let's turn our attention to grazing costs. In virtually all situations, grazing costs per day will be lower than hay feeding costs per day, during the typical grazing season. This is where producers have to think marginally about adding grazing days. It often helps to think about the beginning and end of the grazing season. In other words, are there practices that might allow me to gain some days in the beginning of the grazing season or at the end of the grazing season? Regardless, producers must be sure that they are adding those grazing days at a cost below their winter feeding days. Generally speaking, the first hay feeding days are the easiest to replace. At some point, winter feeding days are likely to become the cheapest alternative, and that is where the producer should stop trying to extend the grazing season.

Sometimes additional grazing days can be added on the same forage base. Often, this comes back to improved pasture utilization. Pasture utilization is one of the most critical factors in grazing economics. It refers to the percentage of the forage production that is actually consumed by the animals. Just as there are losses when storing and feeding hay, there are grazing losses that should be considered. If we can improve forage utilization rates, we can stretch the grazing season and decrease our dependence on stored feed.

Of course, improved utilization isn't free, and these costs should be considered and weighed against those winter feeding costs discussed earlier. Setting up a rotational grazing system will potentially require investment in a fencing and watering system, as well as time spent setting the system up and moving cattle more frequently. Electric fencing (charger, posts, polywire, etc.) is often the cheapest way to set the system up and provides greater flexibility, but producers can also choose to set up paddocks permanently. Similarly, water must be made available in all paddocks, which may require further investment.

Regardless, figure a useful life on these investments, value the time spent setting up and the additional management time (if applicable), estimate the additional grazing days that can be added, and compare the cost of these additional grazing days to the hay feeding days they are replacing. Use table 1 to estimate the value of the winter feeding days that you are likely to replace. For example, if the pro-rated costs of implementing a rotational grazing system were $20 per cow per year, and winter feeding days were costing $1.50 per day, the operation only needs to add an additional 14 grazing days for the benefit of the grazing system to exceed the cost.

Beyond rotational grazing, fall fertilization to stockpile fescue is also a very common practice incorporated by producers to increase grazing days. Nitrogen fertilization can increase fall forage production and stretch the grazing season beyond what it would be without fall fertilization. This practice may work in tandem with rotational grazing, as improved pasture utilization may be the tool that frees up some pasture for stockpiling purposes. When considering the economics of stockpiled fescue, one should consider the cost of the nitrogen, the additional production resulting from the nitrogen, and the all important utilization rate. Figure the cost of additional fall forage production, how much will actually be utilized, and again, put this on a cost per day basis that can be directly compared to the cost of those hay feeding days. Fall fertilization for stockpiling purposes will be more attractive in years when nitrogen response rate is likely be high, nitrogen fertilizer is reasonably priced, and alternative winter feeds (such as hay) are expensive. The Agricultural Economics Department has a publication that looks specifically at fall fertilization for the purpose of stockpiling fescue pastures. A recent guide can be found at:
https://www.uky.edu/Ag/AgEcon/pubs/ProfitStockpilePasturesOld.pdf

From here, there are a large number of potential grazing crops that could provide additional grazing days. For example, as one starts thinking broadly about grazing options, corn grazing is likely something worth consideration. Establishing corn for grazing purposes will represent a significant investment, yet has considerable grazing potential. When looking at an annual grazing crops like corn, one should consider all establishment costs such as seed, fertility, chemicals, and machinery costs. And, once again, additional fencing and water costs, as well as utilization rate should be considered.

In the case of something like corn, one should also consider the opportunity costs of that ground. For example, if we are converting some pasture ground to corn for grazing purposes,

there is a value to the grazing ground. Or, if this is additional ground, we should consider what it might be worth if used to produce corn for grain or rented to a grain producer for that purpose. Similar to how I approached average winter feeding and grazing days, I would also suggest that the costs of additional grazing days on the corn ground be put on a cost per cow per day basis, so they can easily be compared to winter feed costs. This same approach can be applied to any potential annual grazing crop. Other warm season annuals would be forages like Sorghum Sudan or Pearl Millet.

In general, I would make a couple general overlying comments. First, when considering corn, or some of these other summer annuals, sticker shock can be significant. The cost outlays are much higher than what is seen for typical forage crops. However, the production capabilities are also much greater. This makes it very important that costs be scaled to a cost per day so that they can be compared to winter feeding days on an "apples-to-apples" basis.

Second, one should not underestimate the importance of utilization rates. A common mistake that is made when considering grazing costs is to estimate the dry matter production, but not discount that for utilization rate. For example, one might correctly estimate costs and accurately estimate forage intakes and figure a cost per day based on those two factors. However, this would greatly underestimate costs as it effectively assumes 100% utilization. For example, if utilization rates are 66%, then 1.5 lbs of forage must be produced for every lb of intake. When grazing, forage utilization is just as important as forage production. Further, the more money that is spent establishing a new grazing crop, the greater the loss is from underutilization. Put simply, greater forage investments likely justify more effort to improve utilization rates.

Regardless of how one approaches grazing, the key is to look at everything marginally. For any change in the grazing program, estimate the additional expenses, and compare those to the addition benefits (which may be an increase in income or a decrease in expenses). Specifically, if one can add grazing days at a lower cost than the winter feeding days being replaced, profitability can be improved. Livestock producers have faced some incredible challenges over the last several years and the forage program is one area where producers should look for opportunities to improve their bottom line.

References:

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Considerations for making a profit with stocker cattle

Jeff Lehmkuhler, Ph.D.
University of Kentucky

Introduction

The southeast is home to more than 7.3 million beef cows (USDA 2018). At an estimated 80% weaning rate and 20% heifer retention, the southeast region would be expected to produce more than 4.6 million feeder calves that would go to market in 2018. The cow-calf industry in the region provides an opportunity for the stocker and backgrounding operations to co-exist. Much of the land in the region is best suited for forage and pasture production, which at the current moment, provides a low cost feed for adding pounds to light weight feeder cattle. Yet, the stocker and backgrounding segments are subject to market volatility and the economic risk is greater than the cow-calf segment. The economic risk makes these systems less attractive and being successful financially is challenging.
Definitions

For this paper, the stocker and backgrounding enterprises will be defined as follows. Stocker cattle enterprises aggregate the many small groups of young, light weight feeder calves that are marketed in the region into larger, uniform lots. Management is applied which may include castration, dehorning, aborting, administering preventative health protocols and other husbandry practices that were neglected prior to marketing to add value. This segment adds weight to light weight feeder cattle utilizing pasture forages without or with a small amount of grain/concentrate supplementation. This last point is what differentiates the stocker enterprise from backgrounding enterprises.

Backgrounding enterprises are similar to stocker operations in that the focus is securing small lots of light weight feeders and applying management to upgrade the value when marketed in the future. The contrast between these two industries is backgrounding enterprises are confinement or semi-confinement operations that are not seasonal and they rely heavily on low cost conserved forages and commodity feedstuffs. The main difference is confinement versus pasture-based production systems.

Aggregation is likely the greatest area that these enterprises capture financial gains. Kentucky's 1 million beef cow herd is spread out over some 38,000 beef operations. These figures reveal the average beef cow-calf operation manages slightly less than 30 cows. The average weight spread of a calf crop will exceed 200 pounds between the lightest and heaviest calf resulting in multiple lots at selling in addition to the split based on sex. It would not be uncommon for 28

calves to be separated into four or more marketing groups. Arkansas and Wisconsin feeder cattle market studies reported that 94% and 82% of feeder cattle lots contained 5 or fewer calves (Barham and Troxel, 2005 and Halfman et al., 2009, respectively). Market research clearly demonstrates that fewer calves in a group at marketing bring less price than larger groups that approach 50,000 pounds. As simple as it seems, the ability for stocker operations to sort cattle into more uniform type and weight marketing groups is one of main value addition mechanisms.

Calf Type

In a 2010 NAHMS survey, 60% of feeder calves marketed had not been weaned prior to marketing. A study of feeder cattle sold in Arkansas markets reported that 14% of lots were bulls and only 3.3% of all lots sold were preconditioned calves (Barham and Troxel, 2005). Halfman et al. in 2009 reported that only 5% of lots marketed in a Wisconsin market were announced as being weaned illustrating a similar trend in the Midwest that few feeder calf lots are marketed as weaned. Managing calves through the weaning phase is another area that the stocker and backgrounding enterprises can capture value. One could argue this is also an area that operations could lose money if calves are not managed properly leading to high morbidity and mortality.

Purchasing bulls has been an avenue many stocker and backgrounding programs have found a way of adding value. Bulls typically sell for a discount in relation to steers, though this is not always the case. The discount offered for bulls is due to the fact that bulls after castration perform less than steers for 14-30 days post-castration. Additionally, these calves tend to have a greater morbidity and mortality rate compared to steers associated with the stress from castration. These factors are frequently built into the prices offered at purchase. However, following the recovery period from castration, these now steers, will perform well and at the time they are remarketed have gained in value when sold at the higher steer price. This is one of the most basic management value capturing opportunities the stocker and backgrounding industries capture.

Some stocker operations find value in heifer procurement. Due to lower performance and feed conversion rates, heifers are discounted in price compared to steers. In some instances, the discount may be large enough that stocker operations can find a greater profit margin than steers. Additionally, many stocker operators will purchase heifers for the opportunity to diversify marketing options in the future. A steer only has one market, the feedlot. A heifer could be developed into a replacement female or be marketed to a feed yard. During years of herd expansion, stocker operations may choose to develop and market replacement heifers as they receive a greater value over a feeder heifer.

Lastly, the common industry term of upgrading can be a mechanism of capturing value. This often applies to a USDA feeder calf grading system of muscling. The numeric system is 1-5 with heavy muscled calves receiving a 1 and very light muscled, dairy-type calves receiving the

higher values. Light muscled feeder calves receive a greater price discount due to the anticipated lower meat yield. In many instances, the genetics are present for improved muscling than what is observed in these light feeders. Malnutrition often is the cause for lighter muscling and following a period of increased nutritional plane, these feeders calves will increase in muscling score by a point. At the time of remarketing the feeder calves purchased as a muscle score 3 are then sold as a 2 improving their value. This is a smaller opportunity for value addition, but nonetheless another mechanism to increase profitability.

Health & Management

Unweaned, light weight calves are a higher risk category from a health perspective. The stocker cattle manager must be prepared to manage this type of calf to be successful. Early detection of sickness is key. In many instances, bovine respiratory disease (BRD) is the major challenge operators must manage. However, this is a multi-faceted disease that includes viral and bacterial pathogens along with nutritional status. Many operations may observe treatment rates of 20-50%.

To manage health challenges, the manager will need to consult with their local veterinarian. In doing so the veterinarian and producer can establish a valid patient-client relationship. This process should include development of health protocols. These protocols will include vaccination products for respiratory disease, clostridial diseases, internal and external parasites and other preventative health procedures. Additionally, the development of treatment protocols for BRD, pinkeye, footrot, bloat and other disorders should be established. This will allow the producer to know which product to use in the second and third treatments for BRD.

The relationship with the veterinarian should also include an evaluation of treatment success rates. The evaluation of repulls/retreats from the veterinarian can allow for determining if health protocols need to be altered to improve success rates. The greater the success rate from the first treatment, the lower the risk of a mortality as well as a reduction in medication costs for retreats. Fecal floats can be performed 14 days following treatment for internal parasites to determine efficacy rate as well. The veterinarian is an often overlooked tool for improving profits in a stocker enterprise.

Forage Management

Likely the simplest forage management consideration to improve profitability of a stocker operation is to ensure adequate forage is available so that intake is never limited. Appropriate stocking rates will need to be managed to ensure forage doesn't limit intake and subsequently performance. Stocking rate will vary depending on the size of the animal, forage species production potential, soil fertility, soil moisture and other factors.

Dilution of fescue infected with the wild-type endophyte is another management consideration. Pasture evaluation to determine the percentage of fescue in the fields as well as the percentage

of infected fescue will allow for making management decisions. Often we naturally assume pastures are 100% infected tall fescue when in reality the infection rates may be 80-90% and other forage species such as bluegrass, clover, bermudagrass and other forages may be present. A simple pasture renovation for diluting fescue that is recommended often is interseeding of clover. Recent studies indicate that the clover effect on animal performance may not be solely due to dilution, but could be also be due to other physiological responses.

Maintain desirable forages for cattle. Although cattle can be trained to consume weeds, in stocker operations the continued turnover of livestock with new calves limits this strategy. Thus, concentrate on maintaining soil fertility and interseed pastures as needed to ensure thick diverse sward of forage is available for grazing. Visit with an agronomist and / or weed specialist to determine effective weed control strategies. In many cases, this will likely not be just mowing.

Technology

As with many other agricultural enterprises, technology allows for the opportunity to improve profit margins. There are fewer technologies available for stocker operations, but there are very effective technologies to consider. Examples include growth promoting implants, ionophores, eartags that monitor temperature/movement, drones, and other items. With any technology, the decision to use or avoid should be based on economic and ethical rationale. One can choose not to use a technology even though it doesn't make economic sense if the technology has not been proven to be safe or would negatively impact health and well-being of the animals or other individuals. Growth promoting implants and ionophores are likely the two most heavily research proven technologies that stocker enterprises have available to them today.

Buy Them Right

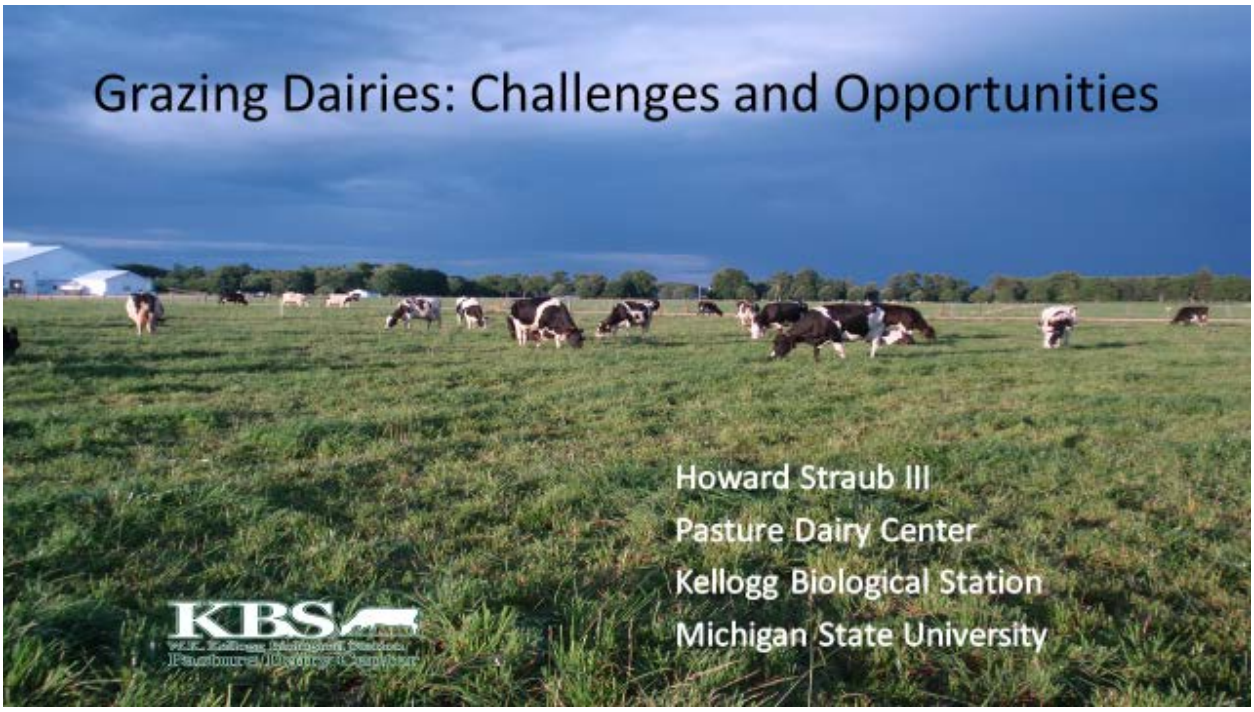
I have often heard it said that the money is made in the stocker enterprise at the time the cattle are purchased. Essentially, this refers to the industry being a thin margin business. Cattle can be contracted or another form of economic risk management strategy can be utilized to protect market risk. Little changes will occur in feed/pasture prices, health products, and other inputs over a short period. Knowing the possible market price and input costs allows one to work out a budget. This budget process will identify the purchase price that one can offer for calves. Strict adherence to the purchase price will increase the opportunity for making a profit. I was once told by a farmer-feeder after I mentioned determining the break-even price on a set of feedlot steers the following "I don't do anything to breakeven. If I can't make money doing it why would I work so hard to make nothing." This was early in my career, but has been engrained in me since. When working through the budgets, be sure to include a realistic return per head when determining your purchase price.

Conclusion

Though this is a vague overview of the basics that may impact profitability of a stocker enterprise, it should lay the ground work of the items to evaluate for those considering entering the stocker industry. The stocker industry can be very rewarding, both from a lifestyle and financial stance. However, this higher risk business is not suited for everyone. Contemplate your management strengths and determine if this industry is the right choice for you.

Grazing Dairies: Challenges and Opportunities

Howard Straub, III
Dairy Manager, KBS at Michigan State University



Quick History of the Pasture Dairy Center

- 2007 The Kellogg Foundation donates $3.5 million to Michigan State University's Kellogg Biological Station for the construction of a grazing dairy research center.
- An Automated Milking System was included in the design. Lely Group NV was chosen to provide the Robots, Service, and Support.
- On July 7th, 2009 milking with just 79 cows and 2 robots
- As of October 1st , 2018 the robots have completed 900,500 successful milkings.
- We operate mostly from crop, meat, and milk sales!

KBS
W.K. Kellogg Biological Station
Pasture Dairy Center

Production Improvements or Marketing – Where are your Opportunities?

Do you have areas in your system where you can improve pasture production? How about labor efficiency? Are there other cost savings available for your facility?

Are there opportunities to improve your marketing from you dairy enterprise? Is there room in your current contract to diversify sales? What other products can you sell to bring in additional incomes streams? Can you increase income from existing income streams?

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Production Improvement - Know Your Pastures!
- How much grass do you have? Which paddocks are the most productive?
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Feed Wedge
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Pasture Dairy Center


Production Improvement - Know Your Pastures!
- How much grass do you have? Which paddocks are the most productive?
- Using this system to track and measure our pastures, we produce as much dry matter per acre as we do in our better alfalfa fields. Nearly 6 DM tons Acre!
- Do you (or can you) irrigate your pastures? Do you know when to irrigate?
W.K. Kellogg Biological Station
Pasture Dairy Center

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Pasture Dairy Center

Production Improvement - Know Your Pastures!

- How much grass do you have? Which paddocks are the most productive?

- Using this system to track and measure our pastures, we produce as much dry matter per acre as we do in our better alfalfa fields. Nearly 6 DM tons Acre!

- Do you (or can you) irrigate your pastures? Do you know when to irrigate?

- Advanced solutions to soil moisture are being developed!

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Can Measure Soil Moisture up to 2 Meters Deep!

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Production Improvement - Know Your Pastures!

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- Advanced solutions to soil moisture are being developed!

- How about summer annuals or cover crops?

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Production Improvement - Know Your Pastures!
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- Do you (or can you) irrigate your pastures? Do you know when to irrigate?
- Advanced solutions to soil moisture are being developed!
- How about summer annuals or cover crops?
- Cover crop balage provides all of our winter forage needs for yearling heifers and dry cows!
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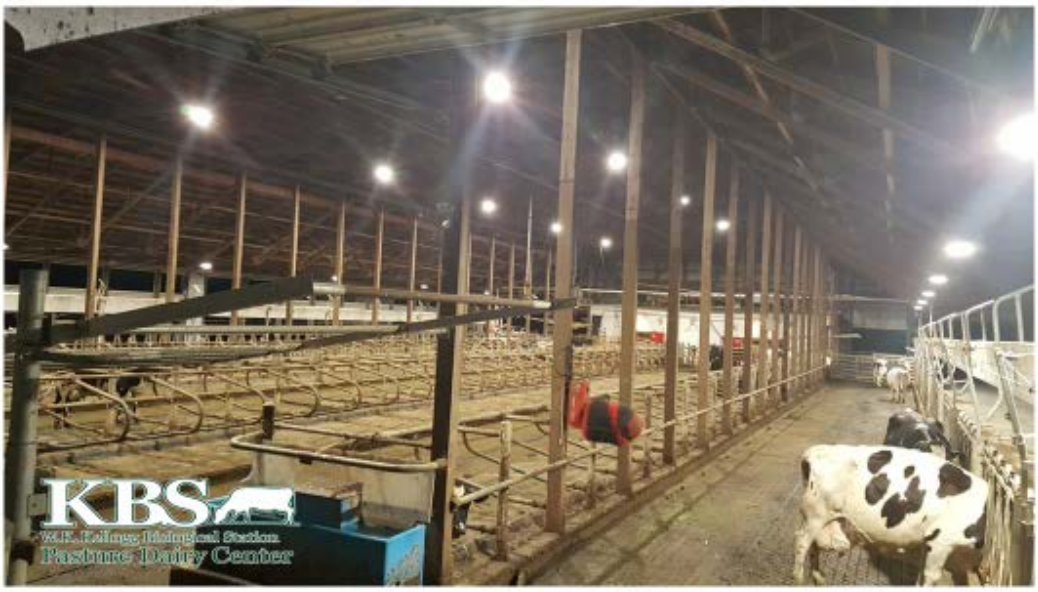
Any Other Production Side Opportunities?

- How are your utility costs? Any rebates available for upgrades?



Replacing the HP Sodium lights reduced the usage by 6000w and improved the lighting. Utility covered almost 50% of cost. Payback less than 1 year!


Current Marketing - More Challenge Than Opportunity?
- Do you know your milk marketing contract (or agreement) inside out? What clauses in the agreement can trigger its end? How much time can you really guarantee a market for your milk?
- Are you allowed to process a portion of your milk through a farmstead operation such as a bottling plant, creamery, or cheese house?
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Current Marketing - More Challenge Than Opportunity?

- Do you know your milk marketing contract (or agreement) inside out? What clauses in the agreement can trigger its end? How much time can you really guarantee a market for your milk?

- Are you allowed to process a portion of your milk through a farmstead operation such as a bottling plant, creamery, or cheese house?

- Can you partner with a local business or school to test and build a market? ....The Hatcher Model

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Dairy Marketing - More Than Just Milk

Do you raise any steers on your facility? Have you thought about marketing Grass Fed Beef?

Are you located in a tourist area? Can you market a "Farm Experience"? How about an Air B&B?

If you sell your bull calves, can you breed your late calving or low genetic stock to beef bulls to increase their value?

Are you an excellent heifer raiser? Can your pastures support addition stock from other operations? Can you see yourself just raising calves or heifers?

W.K. Kellogg Biological Station
Pasture Dairy Center

Additional Photos

KBS
W.K. Kellogg Biological Station
Pasture Dairy Center

KBS
W.K. Kellogg Biological Station
Pasture Dairy Center

Turning Grass into Cash with Small Ruminants

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As agriculture continues to change, it is important to consider sustainability before starting or expanding any enterprise. One critical factor in any animal agriculture enterprise is controlling feeding costs. Most research indicates feeding is the largest expenses in any livestock enterprise. However, nutrition is critical to overall productivity and the income of the enterprise. Because of this, producers need to find ways to improve nutrient availability while minimizing costs to optimize production and profitability for their livestock enterprise.

This is especially critical for small ruminant production. Their smaller size actually increases nutritional demands which means diets for sheep or goats need to be of higher quality in many cases. Fortunately, small ruminants have the ability to be more selective in their diets when grazing and they have adapted to select a higher quality diet when given the opportunity. They also prefer different forage types, which can provide higher nutritional intake under specific grazing programs.

As with cattle, nutritional demands in sheep and goats change over time; thus, they need different levels of nutrition based on the stage production. Table 1 shows the nutritional needs of a 120 lb. doe or ewe during different stages of production. These needs require different management practices and possible use of different forage combinations. Combining warm and cool season forages and the possible use of annuals with different grazing management practices can result in a very productive and effective grazing system for small ruminants.

Table 1. Nutritional needs of sheep and goats at different stages of production (NRC 2007).

Stage of Production	Sheep (120 lb. Ewe)			Goat (120 lb. Doe)		
	DM (kg)	CP (g/d)	TDN (kg/d)	DM (kg)	CP (g/d)	TDN (kg/d)
Maintenance	1.75	79	0.56	1.9	82	0.6
Early Gest.	2.52	129	0.80	2.38	140	0.76
Late Gest.	2.75	173	109	2.54	206	0.76
Early Lact.	3.01	281	1.20	2.91	207	0.93
Mid Lact.	2.23	235	1.03	1.87	208	0.99
Late Lact.	3.00	182	0.95	1.67	166	0.89

DM: dry matter; CP: crude protein; TDN: total digestible nutrients

Another factor to consider is differences in diet choice when planning a grazing program. Small ruminants tend to prefer a variety of plants in their diet and they can be very selective in their grazing habits. A number of studies have been published on the percentage of grass, forbs, and

browse in the diets of ruminant animals. The most comprehensive study was conducted in Texas by Lyons et.al. (1996). They reported that grass made up 81% of cattle diets but only 61% of sheep and 45% of goat diets. In contrast, browse made up only 7% of cattle diets while it was 22% of the diets of sheep and 43% of goat diets.

These preferences also provide an opportunity for producers. This can open other opportunities for producers as they can be used as part of pasture renovation or prescribed grazing programs. In a study conducted in Carter Co. KY, we saw a significant increase in grass in the sward after grazing hill side pastures with goats (Bebe et.al. 2014). This increase and the corresponding decrease in browse was achieved with an increase in overall production of the land as measured by pounds of animal sold. The goats were able to graze in areas that would not have been possible to mow or spray without using hand or aerial application.

When considering overall production management, rotational grazing programs and plans are very important for the overall health and productivity of small ruminants. Both sheep and goats have issues with parasites. Resistance of parasites to chemical treatments is a growing problem. Through appropriate grazing management, we can reduce exposure of the animals to parasites. Specifically, by using rotations of 14 days or less and keeping the forage grazing height above 6 inches, we can reduce the exposure of animals to parasites.

Another aspect of a good grazing plan that can reduce parasite issues is the inclusion of some alternative forages. The first is the use of annual forages. Annual forages are always a “clean” field in terms of parasites when the animals are first placed on it. The added nutrition and growth habits improve overall productivity of the animals and helps break the cycle of parasite infection.

In addition to annuals, some alternatives plant species have the ability to reduce parasite loads directly. Sericea Lespedeza (*Lespedeza cuneata*) has been shown to reduce parasite load in goats and sheep. It is also a high quality warm season perennial, and small ruminants consume it better than cattle. Forage type chicory is another alternative forage that has high quality and has potential to reduce parasite loads.

A final forage option, especially for goat producers, is grazing invasive woody species, including multiflora rose, bush honeysuckle, and autumn olive. These plants have potential as a forage, but grazing these plants also offers an opportunity to utilize areas on a farm that would otherwise not be productive. The issue with these plants is that they often are grazed out within 3 to 4 years. While this is good for land management, it is more difficult to manage these plants as a reliable forage and they must be replaced at some point. In land management for these plants, it is important to remember that the seed bank will allow them to return over time if the area is not maintained.

Finally, small ruminants can be a profitable if managed properly. There are several grazing programs that can enhance the overall profitability of these animals. Alternative forages are

very important in the overall forage system for small ruminants. Rotational grazing practices in a systematic approach is critical to the overall success of a forage-based small ruminant production system. Prescribed grazing for land management can also increase profitability and create alternative income sources for some producers. Selection of the proper species and breeds as well as individuals within the different breeds is also critical to success.

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Grass Finished Beef: Melding Production and Marketing

Michael and Stacie Palmer
Palmer Farms Beef, Almo, KY

Palmer Farms Beef is a family farm near Murray KY, owned by Michael and Stacie Palmer. We produce, and retail around 40 beef per year. We homeschool our two teenage sons Will, 15, and Teshome 14, who help with the day to day cattle management. We have one daughter Jessie who is 18, and has decided to stay on the farm and expand the business through social media, and a new line of products. Along with our beef, we partner with other small farms to offer our customers pastured pork, and chicken as well. We take great pride in providing healthy, delicious meat to people in our community, state, and across the country. From genetics, to marketing, we are constantly thinking outside the box, to make our business unique, and profitable. We have come a long way since retailing 6 open heifers in 2011, but our goal is still the same, and that is to provide our customers a great product, and to make them feel appreciated.

Figure 1. Teshome, Jessie, and Will Palmer.

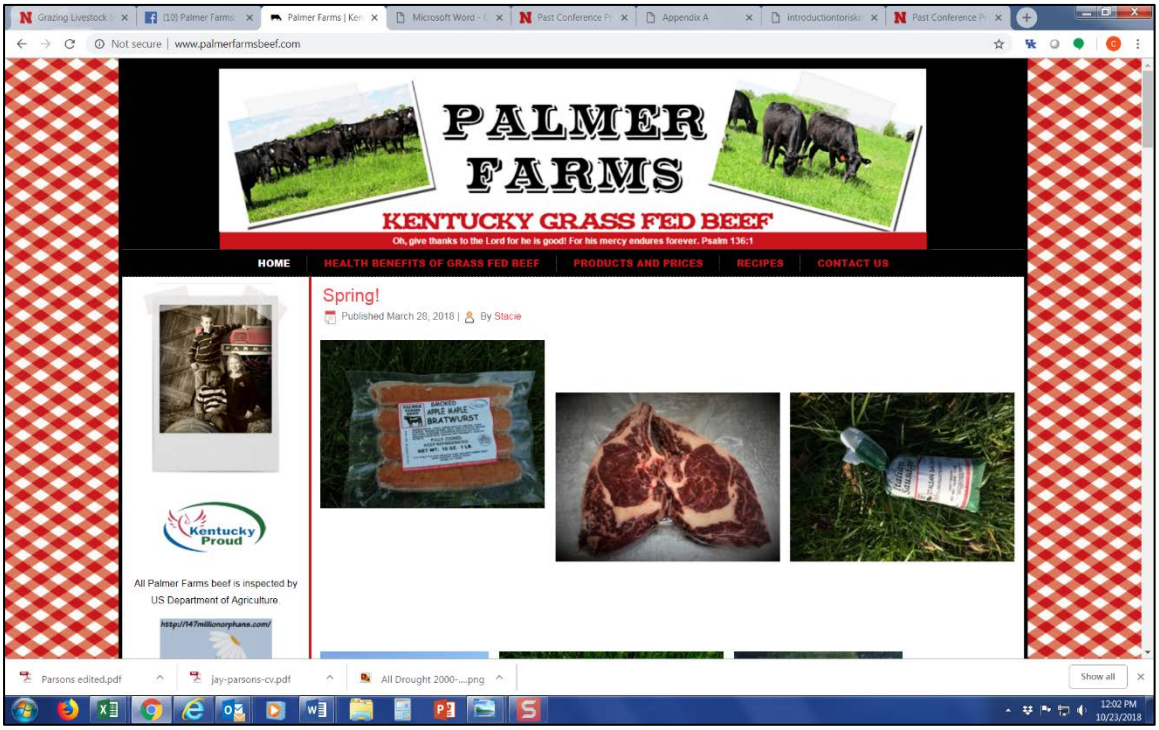


Figure 2. Palmer Farms webpage plays a major role in our direct to consumer marketing.

Figure 3. Transforming high quality forage (annual ryegrass) to high quality grass-finished beef.

Figure 4. Hosting UK Forages working group in May 2017.

Grass Finished Beef: Melding Production and Marketing

Todd Clark
Clark Family Farms
Winchester, KY


GRASS
FINISHED VS. ?
CLARK
CLARK FAMILY FARMS
BEEF BRISKET
Safe Handling Instructions
NET WT. 4.71 LBS


CLARK
CLARK FAMILY FARMS
GROUND BEEF
Kentucky Proud
PRODUCT OF THE USA
KEEP REFRIGERATED OR FROZEN
Safe Handling Instructions
NET WT. 1.02 LBS
HAVE YOU EATEN YOUR
OWN
Product?

IT DEPENDS……

#1
KNOW YOUR MARKET(S)

- What are expectations of the Market?
- Rules/Audits?
- Size and Quantity?
- Supply expected year round?

GRASS FED

MARKET
MAY HAVE ADDITIONAL
REQUIREMENTS
OUTSIDE OF HOW THE
ANIMAL WAS FED.

MY MARKET

- WHOLE FOODS
- 1.GAP CERTIFIED EVERY 15 MONTHS
- 2. HAULING RECORDS, FARM MANUAL, WEANING AGE AND CASTRATION AGE
- 3. AND THE NO'S…….
- ANTIBIOTICS, ADDED HORMONES, IONOPHORES, ORGANOPHOSPHATES

#2 PLAN BASED

ON
Market Demands

- Genetics play a huge role (maybe as much as half the equation)
- Feed plays a huge role (maybe as much as half the equation)
- Management of the above two, plays a huge role!

GENETICS

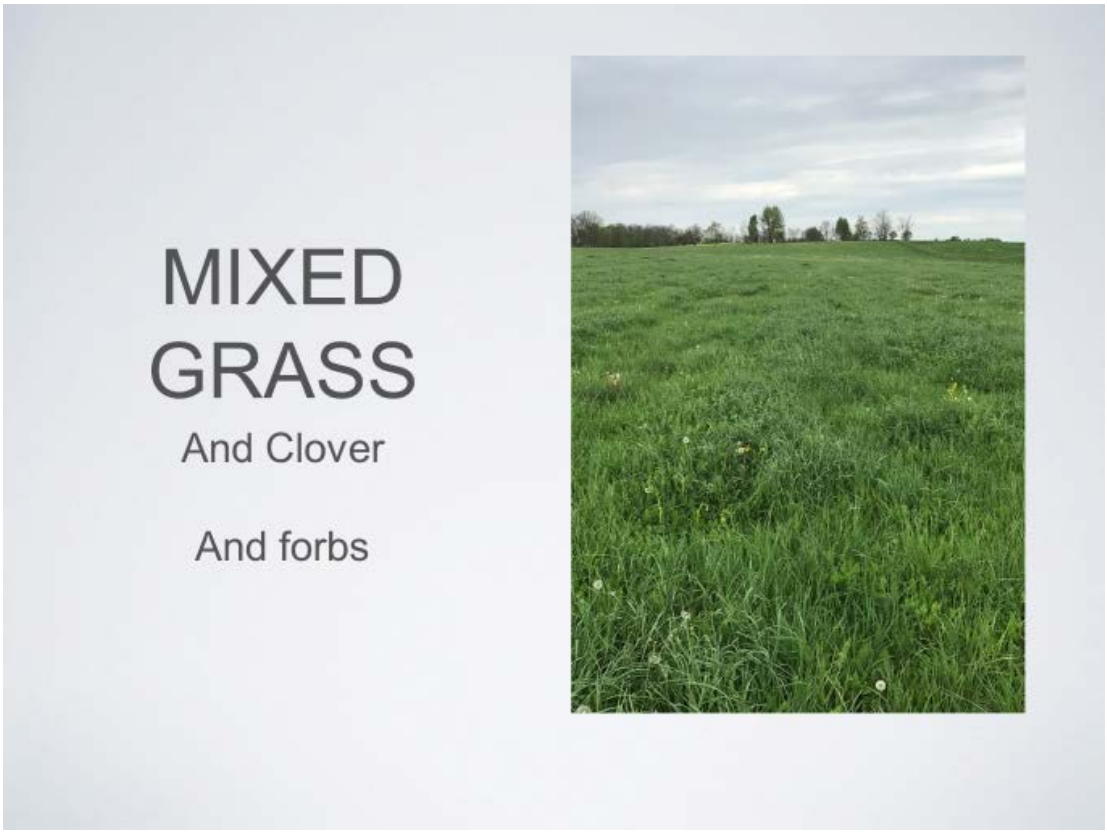
- Some breeds are better suited than others
- Frame size
- Grass background
- Depth and Capacity

LOTS OF BREEDS AND CROSSES
CAN WORK!

FEED

What type of pasture?

ALFALFA/OG


MIXED
GRASS
And Clover
And forbs

THE GOAL IS TO KEEP THEM FULLY FED.

ACKNOWLEDGE ISSUES

- Lots of obstacles
- 1.Winter
- 2.Skipping a Year for initial payment
- 3.Learning what works and what doesn't
- 4. Additional class of animal on farm

THANK

YOU!

Keys to Optimizing Profitability in Cow-Calf Production -

Rooster's Beef, 3 Generations of Farming & Beef

William and Becky Slaton
47 Lanham Drive, Madisonville, KY 42431
Roostersbeef@bellsouth.net

Rooster's Beef ultimately began with our family farm -Rocky Bluff Farm - now owned by William and Becky Slaton. It is the cattle producer for our beef sold. The farm is named after two Natural Rock Formations on our property. We have several acres of pasture and including some wooded acres. With rotational grazing and intense management, we are able to have 65 cows in a spring calving group, 15 cows in a fall calving group, 3 bulls, 13 replacement heifers, unweaned calves and 12 calves on finisher feed. We also rent ground to raise and put up our own hay.

William and his father JW (Rooster was his nickname), had farmed together since William was about 15 years old. Their focus was on raising Angus Cattle and their own hay. In the early 90's they raised and showed Angus Cattle locally and out of state. Actually, those animals turned into the base of our cow/calf operation. Rooster's health declined over the years and William assumed more responsibility until he was essentially managing the farm with Rooster's vocal input only.

Near the end of his life, Rooster was aware of this two children's planning to start a business selling individual packaged beef that they raised, but no name had been chosen. As Rooster was diagnosed with leukemia and was only expected to live a short time; our plans were put on hold. He passed away in March of 2015. We wanted to always remember Rooster's legacy and contributions by

naming our company **Rooster's Beef** - in honor of our father. It was one of the most fulfilling business decisions we have made.

Today, William and Becky (his wife) fully manage the cattle operation. William and Becky are both Master Cattleman Graduates and have Agriculture Degrees from Western and Murray State respectively. They focus on high quality cattle genetics and conservation efforts of the lands in their care. Their farm is a second generation owned cattle farm with the third generation (their children) involved in the daily care of the livestock.

William and Becky wanted to sell USDA Inspected individually packaged beef locally. They partnered with William's sister, Carolyn Hall to market and sell their beef. Carolyn has a Bachelors in Marketing from Western Kentucky University, and years of experience as a bookkeeper, which compliments the Rooster's Beef side of the business as well. Alice (their mother) is very proud that two of her children are working together continuing something that she and her husband began many years ago with a few cows to clean up their farm.

Try our beef, we 100% Guarantee you will love it! That's why we offer our guarantee because after 3 generations, we know beef and it's that good!

Managing Risk in Grazing Operations

Chris D. Teutsch and Kenny Burdine
UK Research and Education Center Princeton and UK Agricultural Economics

Risk is an inherent part of agricultural production systems. Crane and coworkers (2013) identified five primary areas of risk in grazing operations: 1) MARKETING risk, 2) PRODUCTION risk, 3) LEGAL risk, 4) HUMAN risk, and FINANCIAL risk. These types of risk are described in the accompanying publication entitled "Controlling Risk in Grazing-Based Production Systems" by J. Parsons. This article will discuss the risk associated with "production" in grazing systems, focusing specifically on managing drought in grass based production operations.

In Kentucky and other transition zone states, drought is part of our agricultural landscape. The drought monitor has been tracking drought in the U.S. since the early 2000s and classifies drought as moderate, severe, extreme, and exceptional (Table 1). Since 2002, some part of Kentucky has experienced a "moderate" drought 11 out of 16 years (Figure 1). "Severe" drought has occurred seven out of 16 years and "extreme" drought five of 16 years (Figure 1). Therefore, drought should not be a surprise, but rather an anticipated and planned for occurrence for grass based operations in the Commonwealth.

Table 1. Description of drought categories and potential impacts (U.S. Drought Monitor, 2018).

			Ranges				
Category	Description	Possible Impacts	Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	Going into drought: ▪ short-term dryness slowing planting, growth of crops or pastures Coming out of drought: ▪ some lingering water deficits ▪ pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	▪ Some damage to crops, pastures ▪ Streams, reservoirs, or wells low, some water shortages developing or imminent ▪ Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	▪ Crop or pasture losses likely ▪ Water shortages common ▪ Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	▪ Major crop/pasture losses ▪ Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	▪ Exceptional and widespread crop/pasture losses ▪ Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

Grazing operations in the Kentucky should give serious consideration to developing a comprehensive drought management strategy. A little planning up front could save a whole lot of money and emotional agony in the future. Drought management plans will be a lot like a grazing systems, no two will be exactly the same. The strategy that is used will depend on the resources of the farm and its long term goals. The remainder of this article will outline some strategies that could be used either alone or in a combination.

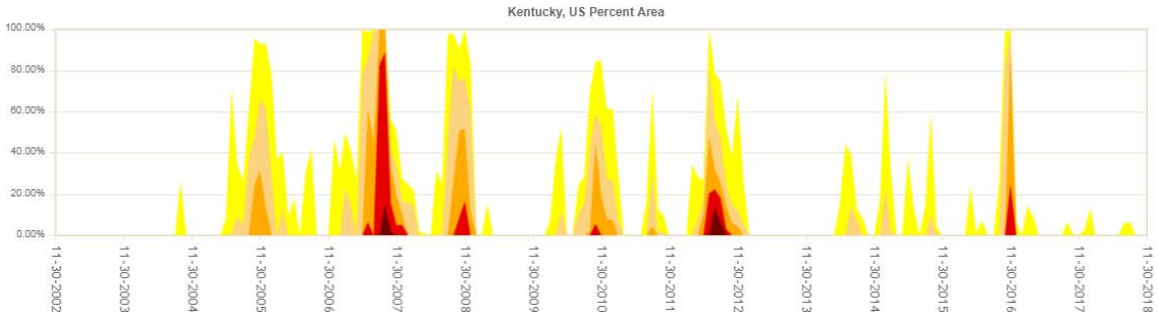


Figure 1. Drought impacts expressed as percent area impacted by various drought categories for Kentucky from 2002 to 2018 (U.S. Drought Monitor, 2018) .

Implement rotational grazing. That doesn't sound like much of a drought management strategy, does it? The first thing a grazier that has switched from continuous to rotational grazing will tell you is that his pastures grow longer into a drought and recover faster after the rain finally comes. This point is really driven home years with "moderate" drought stress. Producers using rotational grazing have grass when their neighbors do not. The reason for this is that rotationally grazed plants have larger and healthier root systems that find water deeper in the soil profile. In addition, rotationally stocked pastures have higher energy stores in the plant that allow them to persist during periods of low or no growth and regrow after the drought ending rain finally comes. Implementing rotational stocking is not just a drought management strategy, but probably the most important one.

Incorporate deep-rooted legumes into pastures. Interseeding legumes into pastures increases pasture quality, brings nitrogen into the grassland ecosystem, AND extends grazing during a drought. The most commonly used legume would be red clover. The primary advantage of red clover is that it has great seedling vigor and can be easily frost seeded into pastures. Alfalfa possesses a deeper tap root and is more drought tolerant than red clover, but takes more effort to get into a sod. Alfalfa mixes well with a variety of grasses like orchardgrass and matua. The most drought tolerant legume and our only truly perennial warm-season legume is sericea lespedeza. Sericea has an extremely deep taproot, but its major limitation is poor seedling vigor making it difficult to incorporate into an established sod. Once established, sericea has amazing drought tolerance. One additional note on sericea

Figure 2. Deep rooted legumes such as alfalfa can add drought tolerance to grazing systems in the transition zone of the United States.

is that it is higher in tannins, which can make the it less palatable. In order to maintain forage quality and palatability, it should not be allowed to get taller than 15 inches.

Incorporate warm-season perennial grasses into grazing system. Warm-season grasses will produce about twice as much dry matter per unit of water when compared to cool-season grasses. There are a number of perennial warm-season grasses that can used, but in western Kentucky the most productive, persistent, and tolerant to close and frequent grazing is bermudagrass. Bermudagrass requires management to be productive, which means it needs to be grazed frequently to keep it vegetative and it needs nitrogen. Other perennial warm-season grasses include the native grasses such as big and little bluestem, Indian grass, switchgrass, and eastern gammagrass. A downside to native grasses is that they can be difficult to establish and manage. In addition, they tend to be more productive in late spring and early summer, often competing with cool-season forage species for utilization.

Incorporate warm-season annual grasses into grazing system. Warm-season annual grasses like pearl millet, sorghum-sudangrass, and crabgrass can provide high quality summer grazing. The primary disadvantage with summer annual grasses is that they need to be reestablished every year, which costs money and provides the chance for stand failure. The exception to this is crabgrass that develops volunteer stands from seed in the soil. Although most people don't realize (or want to admit it) crabgrass has saved many cows during those dry summers in transition zone states like Kentucky. Research has shown that crabgrass responds well to improved management and can produce 2 to 3 ton/A of highly digestible forage.

Figure 3. Warm-season annual grass and legumes and provide high quality summer grazing and can be used as part of pasture renovation sequence.

Stockpile cool-season pastures for summer grazing. Deferring grazing on some of your cool-season pastures in the spring allows biomass to accumulate. The quality of this growth will be lower, but can be used to bridge short-term drought periods. In a study conducted in Virginia, novel endophyte tall fescue pastures were either clipped or not clipped at the boot stage (mid-May) and 60 lb N/A was applied. Growth was allowed to accumulate until August when pastures were grazed with weaned calves. Calves grazing the clipped pastures gained around 1.4 lb/day compared to 1.1 lb/day for calves grazing the unclipped pastures. This is simple strategy of deferring grazing on some pastures in the spring could be used as a drought management tool on most farms in the transition area of the United States.

Irrigate pastures. Irrigating your pastures can increase dry matter production by about 50% in a normal year and much more than that in a dry year. This option works best where irrigation infrastructure already exists for other crops (tobacco or row crops). The economics of investing in irrigation for grass based operation can be questionable and will depend on the type of operation. The best grass to irrigate during the summer months is a warm-season perennial grass such as bermudagrass. One common misconception is that irrigating a cool-season grass will make it grow in the summer. Cool-season grass growth is limited by not only moisture, but also temperature. Once temperatures exceed 70 F, cool-season grass growth greatly slows and even stops in some cases. In contrast, warm-season grasses do not even reach peak growth until 90 F. Research has shown that warm-season grasses will produce about twice growth per unit of water used.

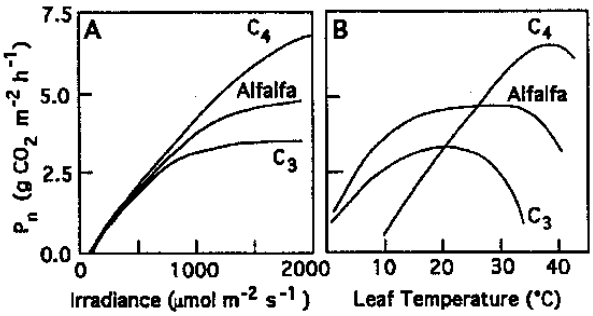


Figure 4. Impact of light intensity and temperature on photosynthetic rate of cool- (C3) and warm-season grasses (C4), and alfalfa (Nelson, 1995).

Feed hay. The most efficient way to harvest forage is with the animal. In Kentucky, we should strive to reduce hay feeding in our grazing systems. This doesn't mean that we won't ever need hay. It does mean that in some cases you are better off to let someone else make it. Drought is certainly one of those cases that hay will be required. A common problem with the hay feeding strategy is that when you need it, everybody needs it and there is little to go around. On top of these problems it is likely to be expensive! One thing to think about is buying hay during a good year and storing it under cover. It is kind of like having money in the bank, although it is not accruing interest. Hay that was well cured will keep for years if it is kept off the ground and out of the weather. A key to successfully using hay is to start to feed it before pastures have been overgrazed. Hay feeding should be done in one paddock so that damage from overgrazing is confined to this area.

Utilize commodities to extend pastures. Commodities such as brewer's grain, corn gluten, and soybean hulls can be used to supplement and extend hay and pasture during drought periods. Things to consider are the availability, storage, handling, feeding, and price of commodities. The ability to readily get commodities and efficiently feed them is critical if they are going to be a key component in your drought management strategy.

Stock for five-year drought. Having a perpetually light stocking density that underutilizes pastures in most years, but gets you through drought years can be drought management strategy. However, this strategy requires that you have a lot of land area and will tend to reduce profit per acre in most years. From an economic standpoint, this probably not your best option.

Wean and sell calves early. This has a two-fold effect, first it reduces the number of grazing units and the total forage needed, and second it reduces the nutritional requirements of the brood cows. The downside is that you are selling calves when the prices are low. If using this strategy, it is important to sell calves before markets become saturated and local prices decrease.

Sell cows. This could be a good time to get rid of those older cows that you have been meaning to cull. However, selling your better animals is probably one of the least desirable drought management strategies. If you have invested time and money developing a superior herd, you are probably not real eager to sell those animals when prices are low. In addition, if you sell off a considerable portion of your herd it may take years to build back up to that level. However, if this is the management strategy that you have chosen then you need to sell at the set time. By doing this you may limit losses by beating the flood of animals that typically enter the market as the drought worsens.

Once you have settled on a drought management strategy, it is important that you are ready to implement it in a timely manner. If you are selling cattle, sell them before the price is rock bottom. If you are feeding hay, feed it before the cattle loose condition and pastures have been damaged from overgrazing. To accomplish this, you will need to set quantifiable benchmarks. These could be days with out rain, available forage on hand, days on hay, pounds of weight loss or change in condition. Regardless of what you have set as a benchmark you need to be ready to implement your drought plan when you reach it.

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Parsons, J. Controlling Risk in Grazing Based Production Systems. University of Nebraska Center for Grassland Studies, Lincoln.

APPENDIX A
Controlling Risk in Grazing-Based Production Systems

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Department of Agricultural Economics
University of Nebraska-Lincoln

INTRODUCTION

Agricultural producers make decisions in the presence of risk every day. It is generally not a matter of determining if risk is present, but rather, what the risks are and what, if anything, you can do about them. It is important to understand that risk/risk management isn't all about negative consequences or the prevention thereof. The international definition of risk is: "the effect of uncertainty on objectives" (ANSI/ASSE/ISO 31000 (Z690.2-2011) Risk Management Principles and Guidelines, 2011). This definition is first and foremost objective focused, meaning that risk, and consequently risk management, should be focused on what you are trying to achieve. Identifying risks, then, becomes a task of identifying uncertainties that have an effect on what you are trying to achieve. These risks are usually thought of as uncertainties that could prevent you from achieving your objectives. However, they could just as easily be risks that, when taken, increase the probability that you will achieve your objectives.

Risk is an inherent part of agriculture. For each decision, there is a risk-return tradeoff. If there were no risk, there would not be any returns to successfully managing it. Producers who are good at managing risk can gain a competitive advantage by doing so, and thus increase their net profits over the long run.

SOURCES OF RISK IN AGRICULTURE

There are five main sources of risk in agriculture: marketing/price risk, production risk, institutional/legal risk, human risk, and financial risk (Crane, Gantz, Isaacs, Jose, & Sharp, 2013). The first four are classified as business risks, which means that they are risks inherent with being involved in the business of agriculture. They are risks that are present even if you are 100% equity capitalized. That is, even if you don't have any debt whatsoever, they are present. Financial risk is the risk that is present when you owe somebody money.

MARKETING RISK

Marketing risk is any event that leads to variability in the prices paid for inputs and/or received for production outputs by the agricultural firm after committing to a plan of action. Access to

markets can also be considered a market risk. In a grazing livestock production system, there are two main areas to be concerned about when it comes to marketing risk: the price of feed and the price of livestock. When you make a commitment to raise livestock for a living, you are going to have certain investments in your operation including the livestock themselves, certain infrastructure surrounding those livestock, and a commitment to feed and grow the livestock to an endpoint for sale. Any fluctuation in the prices associated with these items is a marketing risk to the producer.

Typical contributing factors to marketing risk in a grazing-based production system include: national and regional supply and demand relationships; consumer demand for the output product; seasonal effects; and government programs that affect pricing. However, the end result is the same in that you have market price volatility to deal with and marketing decisions to make about when to buy inputs and sell outputs and how to go about doing it.

PRODUCTION RISK

Production risk is any event that leads to fluctuations in the quantity and/or quality of output produced. In grazing livestock production systems there are several major contributing factors to production risks including: weather, pests, diseases, genetics, and the quality of inputs.

Dry or cold weather will likely reduce the amount of forage growth and raise the cost of production for the operation. You will either need to supplement feed (raising costs) or experience lower output weights (reducing revenue). In either case, the cost per unit of output you produce will go up, meaning you will need a higher output price to compensate for it or profits will go down.

Pests and diseases can have a similar effect on raising costs of production to that of dry or cold weather. You will either be confronted with increased costs associated with treatments, or suffer decreased revenues because of lower outputs due to death loss or lack of performance. Unfortunately, you may have both of these effects occur despite your best efforts.

Finally, quality of inputs is also a contributing factor to production risk. Genetics can be considered an input and, certainly, poor quality genetics can result in poor performance and output. Feed quality is another area to be concerned about. Whether it is harvested feed or grazed forage, poor quality feed will reduce performance and drive up the cost of production. On the bright side, high quality feed and good genetics can result in high performance and positive outcomes.

Production risk is typically an area where producers can make a difference with diligent planning, monitoring and action items that keep their animals performing in the black.

INSTITUTIONAL/LEGAL RISK

Institutional risks are risks to the business that come from people outside the business. Sometimes this category of risk is called legal risk. Sometimes it is also called social risk. In short, it changes the rules of the game.

In addition to the threat of lawsuits, contributing factors to institutional risk include uncertainty about changes in social attitudes or conditions, changes in regulations and rules, changes in enforcement of rules and regulations, and changes in government programs. These may be things that appear beyond the producer's control, and many of them are, but they are things that can have a big impact. A lot of what you can do about them involves controlling the impact of them on your operation if they occur.

HUMAN RISK

Unlike institutional risk that comes from people outside of your organization, human risk comes from people within your organization. Examples of human risk include the risk of people getting injured on the job, the risk of losing a key person, and the uncertainty around job performance by people involved with and contributing to the operation.

Human risks tend to be things that impact the operation infrequently but have a big impact when they do happen. They derive directly from the people involved in the operation, but they can be very difficult to anticipate, and thus difficult to manage at times.

FINANCIAL RISK

Financial risk is the extra risk and added variability that comes about from the financial obligations associated with being leveraged. Anything that can affect your ability to meet your financial obligations is a contributing factor to financial risk.

Production and market risks would certainly be contributing factors, but so would things like the risk of losing a lease. If you have a production system and the infrastructure in place to produce on a certain level under the assumption that you have access to a certain amount of land, and suddenly a lease is pulled out from under you, you could find yourself scrambling to meet the production levels needed to meet your cash flow needs and satisfy your financial obligations.

Other contributing factors to financial risk include interest rate uncertainty, access to capital, unstable financial partners, and anything else that could severely hinder cash flow.

STRATEGIES FOR MANAGING RISK

There are many management actions you can take and tools you can employ to manage risk. Diversification is a major strategy for managing risk that can take a number of forms including diversified production (producing more than one product for sale or producing similar products in different ways) and diversified marketing (different products, marketing multiple times

during the year, or reaching multiple markets). In short, not putting all of your eggs in one basket is called diversification. Having said that, we usually think of diversification as an action or a tool for managing risk more so than a strategy.

When we think of strategies for managing risk, the following five things come to mind as primary strategies for managing risk.

AVOID IT

One strategy for managing risk is to completely avoid it. This is impossible in a comprehensive sense, but plausible in isolated situations. For example, if you don't like the institutional and financial risk associated with relying on rented pasture resources, you can avoid the risk by simply not renting any pastures. Obviously, this could have a large effect on how you structure your business, but it does erase the uncertainty around rented pastures, namely, pricing and availability.

REDUCE IT

Reducing risk can be done in a couple of different ways. You can reduce the probability of something bad happening that keeps you from achieving your objectives or you can reduce the impact if it does.

Either way, the net effect is that it will increase the probability of you achieving your objectives. If you think back to some of our earlier examples, we can articulate some actions a person might take to reduce some of those risks. For example, weather and markets are two things that may be out of your control in terms of controlling the probability of something happening. However, there are actions you can take to reduce the impact of drought, for example. You can stockpile some feed resources. You can take out rainfall insurance. You can stock your range with a mix of cows and growing cattle with the option of taking the growing cattle to a feedlot if range conditions fall short of expectations. Each of these actions wouldn't stop a drought from happening, but could lessen the impact on you if it did.

The risk of losing a lease can be mitigated by putting lease agreements in writing and writing them in such a way that they are multi-year commitments with appropriate conditions. This would definitely reduce the probability of losing a particular lease.

The risk of people getting injured on the job can be reduced by properly training and supervising employees to reduce the probability of injury occurring.

TRANSFER IT

Risk can be managed by transferring it outside the business organization. One of the more common ways of doing this is through insurance products. A producer pays a premium to an insurance firm in exchange for the insurance firm accepting liability for losses beyond a limit that the producer is unwilling to accept. The insurance company maintains a diversified portfolio through reinsurance mechanisms and by pooling risks over many people or types of

coverage so it can afford to pay for individual losses when they occur. The producer receives piece of mind knowing that they are only liable for a certain portion of the possible risk impact. We will take a look at some particular insurance products in the next section of this paper that may be of interest to producers with grazing-based production systems.

INCREASE CAPACITY TO BEAR IT

The fourth strategy for managing risk is to increase your capacity to bear it. It was mentioned earlier that one way to reduce the impact of drought is to stockpile feed resources. This is an example of increasing the capacity to bear risk. Having extra help on hand or having extra money in the bank are two other examples of increasing the capacity to bear risk. This strategy is somewhat like saving for a rainy day. It is building a cushion so that if a risk impact occurs, you can bear through it and move on in decent shape.

ACCEPT IT

The final strategy for managing risk is to accept it. In some cases, you may be comfortable not doing anything about the risk other than accepting it and taking the chance with the opportunity at hand. It may be that there is very little you can do about it or that the actions you can take involve more cost than you are willing to expend for the treatment effects they would provide you in risk mitigation. For example, sometimes insurance premiums are more expensive than we are willing to pay for the protection the insurance product provides. Another example would be employee benefit programs that would increase the morale of your workforce and decrease the probability of losing a key employee but that are cost prohibitive for you to provide. You may choose to accept the risk of employee turnover rather than incur the large expenses necessary to mitigate it.

SPECIFIC RISK MANAGEMENT TOOLS FOR GRAZING-BASED PRODUCTION

The origins of crop insurance in the United States dates back to the Dust Bowl and the Great Depression of the 1930s, but it wasn't until the turn of the century about 15 years ago that insurance products for livestock producers began to be developed. They are continuing to be developed today. The USDA Risk Management Agency (RMA) was created in 1996 to administer the Federal Crop Insurance Corporation (FCIC) programs and other non-insurance-related risk management and education programs that help support U.S. agriculture. In addition to RMA, some insurance and disaster program assistance is available through the USDA Farm Service Agency (FSA). I will briefly discuss a few of the main ones to be aware of below.

RAINFALL INDEX - PASTURE, RANGELAND, AND FORAGE INSURANCE (RI - PRF)

Rainfall Index – Pasture, Rangeland, and Forage insurance (RI-PRF) is an insurance product administered by RMA that is designed to protect against deficits in precipitation. To insure land under RI-PRF, it must be intended for use under livestock grazing or haying. The insurance intervals are two-month intervals that run through the calendar year.

With RI-PRF, the producer is insuring based on the Expected Grid Index representing the average precipitation data for the Grid ID during the index interval based on National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC) data from 1948 to present. The grids are roughly 17 miles by 17 miles, and each grid has an historic precipitation index calculated for each of the two month intervals dating back to 1948. RI-PRF insurance provides producers with the opportunity to insure up to 90% of the Expected Grid Index for their chosen intervals. If the current year calculated precipitation index for an insured interval falls below the insured level, the producer purchasing the insurance would receive an indemnity payment based on the amount of the deficit and the dollar value insured. RI-PRF is the closest thing to weather insurance that producers currently have available.

Producers interested in using RI-PRF are encourage to visit the RMA website to access more information including a grid locator, decision support tool, and all of the historical indices. The direct link to the RMA PRF insurance page is http://www.rma.usda.gov/policies/pasturerangeforage/. The signup period for RI-PRF ends on November 15 and the insurance is in force for the following calendar year.

RAINFALL INDEX – ANNUAL FORAGE INSURANCE PLAN

The Rainfall Index – Annual Forage Insurance Plan is a new pilot insurance program from RMA first offered for 2015 for the states of Nebraska, North Dakota, South Dakota, Kansas, Oklahoma, and Texas. This product provides coverage for fall-planted annual forage crops used for livestock feed or fodder.

Like RI-PRF, the Annual Forage Insurance Plan is based off of rainfall index data provided by NOAA CPC. However, sign up for the product takes place during the summer (July 15 deadline) and coverage options span from September 1 of one year through September 30 of the following year. It is designed to meet the needs of those producers planting annual forage crops for use as a fall or spring grazing resource. It also has a decision support tool, historical indices, grid locator and other documentation available online at http://www.rma.usda.gov/policies/ri-vi/annualforage.html.

NONINSURED CROP DISASTER ASSISTANCE PROGRAM (NAP)

The Noninsured Crop Disaster Assistance Program (NAP) is administered by the USDA's Farm Service Agency (FSA). NAP provides producers of non-insurable crops with at least some basic or catastrophic coverage when a low yield, loss of inventory, or prevented planting occurs due to natural disasters. The catastrophic coverage level is 50% of approved yield for all applicable acres, with losses below that covered at 55% of the approved market prices. Eligible crops include those for which the catastrophic risk protection level of crop insurance is not available, and include crops planted and grown for livestock consumption.

When purchasing NAP, producers pay a service fee that is the lesser of $250 per crop or $750 per producer per administrative county, not to exceed a total of $1,875 per producer with farming interests in multiple counties. The 2014 Farm Bill authorized the FSA to offer producers

"buy-up coverage," which allows a producer to select higher levels of yield protection (55%, 60% or 65%) with 100% price level coverage. Unfortunately, buy-up coverage is not available for those crops and grasses intended for grazing. Limited-resource producers, beginning farmers, and socially disadvantaged farmers may request a waiver of service fees and reduction of "buy-up" premiums.

NAP coverage is available for alfalfa, alfalfa mixture, native grass rangeland, and other forage acreage intended to be grazed. Leased land is only eligible if the lessee has a risk in the production of the crop acreage or the lease conveys control of the crop acreage to the lessee. The NAP price for grazing is established nationally on an animal unit basis, and then the stocking rates are established on a state by state basis by the respective FSA State committees. Producers interested in the possibility of using NAP should contact their local FSA office or visit http://www.fsa.usda.gov.

LIVESTOCK FORAGE DISASTER PROGRAM (LFP)

The Livestock Forage Disaster Program (LFP) is also administered by USDA's FSA. Under LFP, livestock producers can receive financial compensation for grazing losses when pasture or rangeland under their control has been classified by the U.S. Drought Monitor as being in a county under a qualifying drought-related event for the designated period of time required under the guidelines of the program. This is a single peril (drought) disaster assistance program with payment rates established by FSA on a per head basis.

Of interest to producers may be the fact that the 2014 Farm Bill made LFP a permanent program. More information about LFP can be found on the FSA website or by contacting your local FSA office.

LIVESTOCK INDEMNITY PROGRAM (LIP)

The Livestock Indemnity Program (LIP) is another disaster assistance program made permanent by the 2014 Farm Bill and administered by USDA's FSA. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather or attacks by animals reintroduced into the wild by the federal government. Providing proper LIP documentation to your local FSA office to report a notice of loss and application for payment is dependent upon keeping accurate and complete inventory records throughout the year. Keeping good records is an important risk management practice, and this importance becomes readily apparent when these records provide access to benefits from government programs like LIP that are designed to keep people in business through tough times brought on periodically by extreme weather events.

LIVESTOCK RISK PROTECTION INSURANCE (LRP)

Livestock Risk Protection Insurance (LRP) is a single-peril insurance product insuring against downward movements in national market prices for livestock. LRP is available for lightweight (< 600 pounds) feeder cattle, heavier weight (600-900 pounds) feeder cattle, and fed cattle (> 900 pounds). LRP insurance contracts operate much like a European put option in that they provide

a price floor on the basis of a national market price index in exchange for a premium paid for the coverage. The determination of the outcome is only done at the end of the contract period and indemnities are paid to the contract holder if the actual index price falls below the selected coverage price.

LRP is administered by RMA with many different coverage periods and price levels offered on any given day for cattle, swine, and lamb. To learn more about LRP, producers are encouraged to visit the RMA website at http://www.rma.usda.gov/livestock/ or contact an authorized provider of Livestock Price Insurance. I also encourage you to consult two University of Nebraska-Lincoln NebGuides available on LRP-Feeder Cattle (http://ianrpubs.unl.edu/live/g1723/build/g1723.pdf) and on LRP-Fed Cattle (http://www.ianrpubs.unl.edu/epublic/live/g2257/build/g2257.pdf).

USDA NATURAL RESOURCES CONSERVATION SERVICE (NRCS) PROGRAMS

One final set of programs to mention is the programs offered by USDA's Natural Resources Conservation Service (NRCS). There are too many programs available from NRCS to do justice to them in just a short note, but many of these programs provide some risk management protection in the form of improved production practices supplemented by financial assistance at the time of implementation or annual payments over a prescribed period of time.

An example of an NRCS program that could provide risk management protection is the Environmental Quality Incentives Program (EQIP). EQIP is a voluntary program that provides producers with technical and financial assistance to plan and implement conservation practices through contracts that can last up to ten years. These practices can address natural resource concerns and/or improve soil, water, plant, animal, or air resources on agricultural land. The payments for participating in the program can provide solid financial footing for implementing production practices that improve the resiliency of the farm or ranch over the long haul. This is just one of many programs that producers might tap into to help them manage risk over the long run.

You can find out more about EQIP and other NRCS programs at http://www.nrcs.usda.gov.

WRAPPING IT UP

Managing risk has never been easy on America's farms and ranches. In a grazing-based production system, producers are relying on a whole lot of biology to come together in a productive fashion in a very exposed environment. It is important to look at risk management as an area of focus in which you can earn a competitive advantage by being persistent and open-minded in willingness to address it.

In this document, I have outlined the five areas of risk to think about on a regular basis and five different strategies to consider when dealing with risk in your operation. I have also briefly described several different programs or insurance tools that might aid you in your effort to

manage risk in your operation. However, the most important thing to remember is that you build a more resilient and a more profitable operation for the long haul by being an effective risk manager. This does not have to involve reliance on disaster or insurance programs sponsored by the government, but they are definitely tools to consider in your deliberations about what is right for your operation.

At the end of the day, though, the decisions come down to what you feel is right for you. How much risk are you willing to expose yourself to, and for those risks you are not comfortable with, what are the best risk management tools and policies to implement to help you manage the risks you want to address?

WORKS CITED

ANSI/ASSE/ISO 31000 (Z690.2-2011) Risk Management Principles and Guidelines. (2011, February). American National Standard. Des Plaines, IL, USA: American Society of Safety Engineers.

Crane, L., Gantz, G., Isaacs, S., Jose, D., & Sharp, R. (2013). Introduction to Risk Management. Understanding Agricultural Risks: Production, Marketing, Financial, Legal, Human. Extension Risk Management Education and USDA-Risk Management Agency.

ONLINE RESOURCES

University of Nebraska-Lincoln: http://farm.unl.edu
http://beef.unl.edu

RightRisk Education Team: http://www.RightRisk.org

U.S. Department of Agriculture
- Farm Service Agency: http://fsa.usda.gov
- Risk Management Agency: http://rma.usda.gov
- Natural Resources Conservation Service: http://nrcs.usda.gov

APPENDIX B

2019 AFGC Annual Conference

January 6-9, 2019 • Hyatt Regency at the Arch • St Louis, MO

"Forages: Yesterday, Today, and Tomorrow"

AFGC 2019 HIGHLIGHTS

January 6, 2019—Sunday

11:00am-1:30pm	AFGC Board of Directors Meeting
1:30pm-5:00pm	Exhibitor Set Up, Silent Auction Set Up & Monday Poster Set Up
1:30pm-5:00pm	Registration Open
3:30pm-5:30pm	NIRS Consortium Workshop 1. Alfalfa Workshop 2. NIRS User Q&A with Bill Brown and Bobbi Jo Anderson
3:30pm-5:30pm	Forage and Grassland Foundation Board Meeting
5:30pm-6:30pm	AFGC Board Reception (Invitation Only)
5:30pm-6:30pm	NIRSC Board Meeting

January 7, 2019—Monday "Producer Day"

7:00am	Collegiate Room Open
7:00am-4:00pm	Registration Open
7:00am-7:45am	Exhibits, Silent Auction, Photo Contest, Forage ID Contest, Hay Judging Contest, Forage Analysis Judging Contest
7:00am-7:45am	Poster Presentations (Author's Present)
8:00am-9:00am	**Welcome, Breakfast, and Opening Keynote Forages Yesterday, Today and Tomorrow by Dr. Garry Lacefied**
9:15am-11:15am	**Workshop: Top 5 Forage Management Practices That Provide the Best Return on Investment to Grazing Managers** ***Sponsored by Corteva Agrisciences*** We will survey both producers and producer-facing forage professionals to determine what top 5 management practices producers have adopted that give the best return on investment. Once we identify these topics we will chose five forage/livestock professionals from across the industry to cover topics in the symposium.
11:30am-12:00pm	AFGC Business Meeting
12:00pm-1:00pm	Luncheon (U.S. Secretary of Agriculture Sonny Purdue invited; NRCS Chief to be invited; Missouri Ag Secretary to be invited)
1:00pm-2:30pm	Workshop: "Soil Health Measurement and Understanding" ***Coordinated by Alan Franzluebbers*** Overview of current soil health metrics will be presented, along with why they are important in forage and grazing lands. Changes in forage management and soil-test biological activity will be described from a local farm operation. Workshop: "The Business and Science of Producing Milk on Pasture" ***Coordinated by Ted Probert*** This session will feature an overview of pasture-based milk production systems, including a producer discussion detailing pasture-based dairy management. The presentation will center on business objectives, farm and forage management, and emerging technologies utilized in these systems. • Dr. Stacey Hamilton, University of Missouri Extension Dairy Specialist • Zach Ward, CEO, Grasslands Consultants, LLC • Bernie Vandalfsen, Pasture-based Dairy Producer Volunteer Presentations—(topic group)
2:30pm-3:15pm	Break, Exhibits, Silent Auction, Forage ID Contest, Hay Judging Contest, Forage Analysis Judging Contest
2:30pm-3:15pm	Poster Presentations (Author's Present)
3:15pm-5:30pm	FORAGE SPOKESPERSON COMPETITION ***Sponsored by Tucker Family Farms***
5:45pm-6:45pm	Mixer in Exhibit Hall
5:00pm-7:00pm	NIRSC Membership Meeting
5:45pm-6:45pm	Forage Bowl Playoff
7:00pm-8:00pm	Affiliate Council Leadership Meeting

2019 AFGC Annual Conference

January 6-9, 2019 • Hyatt Regency at the Arch • St Louis, MO

"Forages: Yesterday, Today, and Tomorrow"

AFGC 2019 HIGHLIGHTS

January 8, 2019—Tuesday "Youth Day"

6:30am-7:00am	Tuesday Poster Set-Up
7:00am	Collegiate Room Open
7:00am-3:00pm	Registration Open
7:15am-8:00am	Exhibits, Silent Auction, Photo Contest, Forage ID Contest, Hay Judging Contest, Forage Analysis Judging Contest
7:15am-8:00am	Poster Presentations (Author's Present) Emerging Scientist Poster Competition
8:00am-9:15am	NATIONAL FORAGE BOWL COMPETITION with Breakfast
9:15am-9:45am	Break, Exhibits, Poster Presentations, Silent Auction, Photo Contest, Forage ID Contest, Hay Judging Contest, Forage Analysis Judging Contest Emerging Scientist Poster Competition
9:45am-11:15am	Workshop: "Getting Started Without Inheriting It or Marrying It" ***Coordinated by Wesley Tucker*** NIRS Consortium Workshop: Forage Testing Yesterday, Today, and Tomorrow 1. David McIntosh: The importance of dry matter in forage testing and what this means to the researcher and producer 2. Bill Brown and Bobbi Jo Anderson: What do the NIRS numbers mean? Volunteer Oral Presentations—(topic group)
11:30am-12:30pm	Competition Awards Luncheon
12:45pm-2:15pm	Workshop: "Alliance for Grassland Renewal" ***Coordinated by Jerome Magnuson*** NIRS Consortium Workshop: Forage and Animal Nutrition 1. Future dairy nutrition considerations 2. Representation of metabolziable protein fractions Volunteer Oral Presentations—(topic group)
2:15pm-3:00pm	Break, Exhibits, Silent Auction, Photo Contest, Forage ID Contest, Hay Judging Contest, Forage Analysis Judging Contest
2:15pm-3:00pm	Poster Presentations (Author's Present)
3:00pm	Silent Auction Closes *Collect items at AFGC registration desk by 4pm!*
3:00pm-5:00pm	EMERGING SCIENTIST COMPETITION *Sponsored by Dow AgroSciences*
3:00pm-4:30pm	NIRSC Membership Meeting
4:30pm-5:30pm	NIRSC Board Meeting
5:15pm-6:15pm	"Hot Topics" Session
6:30pm	Banquet Seating Begins
7:00pm-8:30pm	AFGC Awards Banquet

January 9, 2019—Wednesday

7:00am-10:30am	AFGC Board Meeting
7:30am-9:30am	NIRSC Board Meeting
8:30am-10:30am	NRCS Workshop

Competition Deadlines:

Emerging Scientist:
October 15, 2018 for nomination, November 15, 2018 for interpretive summary's or paper submissions

Forage Bowl:
November 1, 2018

Forage Spokesperson:
November 15, 2018

Youth in Forage Management Essay:
December 1, 2018

Photo Contest:
December 1, 2018

NOTES

NOTES

Don't Make a Mistake-CALIBRATE!!!

College of Agriculture, Food and Environment
Grain and Forage Center of Excellence

www2.ca.uky.edu/grazer

KADF KENTUCKY AGRICULTURAL DEVELOPMENT FUND

KBN KENTUCKY BEEF NETWORK, LLC

1) Read your drill's operators manual to learn where the adjustments for leveling, seed depth, and seeding rate are located.
2) Ensure that seed tubes are not blocked by spraying them out with an air hose and running a wire through them. DO NOT SKIP THIS STEP!!!
3) Use the "Seeding Rate Chart" on the drill to determine the initial drill setting and set the drill accordingly.
4) Select the proper gear box setting or drive gear for the desired target seeding rate based on the manual.
5) Place a small amount of seed above each opening in the drill box.
6) Lower the drill to engage the seeding mechanism.
7) If calibrating the drill in place, jack up the drive wheel just far enough off the ground so that it can be rotated.
8) Turn the seeding mechanism until seed comes out. Make sure that seed is coming out of each disk opener.
9) Disconnect three to five seed tubes from the disk openers.
10) Place and secure a collection container on each seed tube. A sandwich bag secured with a rubber band works well.
11) Pull the drill 150 feet OR turn the drive wheel the number of revolutions it would take to travel 150 feet.
    a. Revolutions can be determined by using the following formula: Number of Revolutions = 150 / (3.14 x Diameter of the Drive Wheel in feet).
12) Carefully remove collection containers.
13) Tare the scale for an empty collection container and then weigh and record in grams each collection container with the seed in it.
14) Add the seed weight for each collection container together and divide by the number of seed drop tubes collected to get the AVERAGE weight per disk opener.
15) Compare the AVERAGE weight per disk opener to the grams of seed/disk opener found in Table 1 for the desired seeding rate and row spacing.
    a. If the collected weight is within 10% of the target weight found in Table 1, then you are finished.
    b. If the collected weight is more than 10% different than the target weight found in Table 1, repeat steps 7 to 12 after adjusting seeding rate setting on drill.

Items Needed to Calibrate Drill:

1. Tape measure (150 feet)
2. Flags to mark stopping and starting points
3. Gram scale with 0.1 gram accuracy
4. Plastic sandwich bags
5. Rubber bands
6. Screwdriver and pliers

Table 1. Grams of seed to catch per disk opener in 150 feet for given combinations of disk opener width (inches) and seeding rate (pounds/acre).

	Seeding Rate in pounds/acre																						
Distance between Disk Openers	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**25**	**30**	**35**	**40**	**50**	**60**	**80**	**90**	**100**	**120**	**140**	**160**	**180**
inches	grams of seed/disk opener to catch in 150 feet																						
6	1.6	3.1	4.7	6.3	7.8	9.4	10.9	12.5	14.1	15.6	19.5	23.5	27.4	31.3	39.1	46.9	62.5	70.4	78.2	93.8	109.4	125.1	140.7
7	1.8	3.6	5.5	7.3	9.1	10.9	12.8	14.6	16.4	18.2	22.8	27.3	31.9	36.5	45.6	54.7	72.9	82.0	91.1	109.4	127.6	145.8	164.1
7.5	2.0	3.9	5.9	7.8	9.8	11.7	13.7	15.6	17.6	19.5	24.4	29.3	34.2	39.1	48.9	58.6	78.2	87.9	97.7	117.3	136.8	156.3	175.9
8	2.1	4.2	6.3	8.3	10.4	12.5	14.6	16.7	18.8	20.9	26.1	31.3	36.5	41.7	52.1	62.6	83.4	93.8	104.3	125.1	146.0	166.8	187.7

A YouTube video on grain drill calibration can be viewed on the KYForages YouTube Channel at https://www.youtube.com/c/KYForages