Maximizing Value: Spring Application of Poultry Litter for Grain Crop Production

Spring is here and grain producers across the state are gearing up for planting. One of the many decisions producers have to make before planting is in regard to their nutrient management plan. As I mentioned in the November 2015 issue of the Economic & Policy Update, poultry litter provides a great opportunity as a complete fertilizer and is being produced and used throughout the state in grain production. However, the value of poultry litter can vary greatly depending on the management practices, nutrient content of the litter, soil test data and commercial fertilizer prices.

One of the critical management decisions is when to apply poultry litter. For Kentucky grain producers, you have the option to apply poultry litter anytime throughout the year. Most, if not all of the poultry litter used for grain production is applied in the spring before planting or in the fall after harvest. This is not a choice for some states where poultry litter is used. Grain producers in Maryland and Delaware are mandated by law to apply poultry litter in the spring (if they qualify to apply) and in most cases it must be incorporated. Spring application of poultry litter maximizes plant available nitrogen resulting in the maximum economic value of poultry litter. Rarely does an environmental, agronomic, and economic best management practice align in agriculture like spring application of poultry litter.

As mentioned in the November issue, the average nutrient content of a ton of poultry litter in Kentucky (as received) is 50 lbs of nitrogen, 56 lbs of phosphorous, and 47 lbs of potassium. In addition to three macronutrients, poultry litter contains other beneficial elements such as micronutrients (zinc and copper), other secondary macronutrients (calcium, magnesium, and sulfur), and organic matter which are difficult to quantify in value. For this analysis, the three primary macronutrients (N, P₂O₅, and K₂O) will be used to determine the value of poultry litter. If your soil test recommendations supported the application of poultry litter and you applied or plan on applying this spring, that is equivalent to 40% commercial nitrogen, 80% commercial phosphorous and 100% commercial potassium per ton of poultry litter (as received). Therefore, the nutrients that would be available to the crop from an average ton of poultry litter in Kentucky would be 20 lbs of nitrogen, 45 lbs of phosphorous, and 47 lbs of potassium. With current fertilizer prices of $564/ton for anhydrous ($0.34/lb N), $447/ton for DAP ($0.35/lb P₂O₅) and $340/ton for potash ($0.28/lb K₂O), the average expected value of poultry litter is $36/ton. This value will vary day to day depending on the price of commercial fertilizer. In addition, this is using the average nutrient content of poultry litter. Each load of poultry litter can vary in nutrient content and should be measured to include into the overall nutrient management plan and supplemented with commercial fertilizer as needed.

Incorporating (disking or rain) poultry litter after application this spring can increase the commercial nitrogen equivalent by reducing nitrogen loss into the air by ammonia volatilization, but depends on the time between incorporation and application. Rainfall of ½ inch can reduce loss by moving nitrogen through the soil, but too much rainfall can cause runoff or leaching. If incorporated 2 days or less after application, commercial nitrogen equivalent increases to 60% resulting in an increase in the value of poultry litter to $39/ton. Commercial nitrogen equivalents decrease 5% for every 2 days incorporation is delayed due to ammonia volatilization (3-4 days = 55% commercial N equivalent & $38/ton value; 5-6 days = 50% commercial N equivalent $37/ton value). If you wait over 7 days, the value of poultry litter is similar to if you did not incorporate ($36/ton). If you are in a no-till system and applying poultry litter, it is not recommended to incorporate poultry litter just to gain the extra value.

Since the value of poultry litter is dynamic and always changing, a decision tool is being developed so producers can enter soil test data, nutrient content of measured litter, commercial fertilizer prices, and management practices to determine the value of poultry litter. Look for the “Economic Value of Poultry Litter Tool” on my website coming soon (http://www.uky.edu/Ag/AgEcon/shockley_jordan.php).

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Lessons Learned from the 2014 and 2015 Cattle Markets

The last couple of years have been nothing short of a roller coaster ride for beef cattle producers. We saw prices rise to record levels and then fall as sharply as we have ever seen. A combination of factors such as cattle inventory, production of competing meats, increasing slaughter weights, and international trade were all at play in the market. At the same time, producers were making management decisions in a rapidly changing environment. If the old adage is right and history repeats itself, it’s worth taking a look back to reflect on some things that can be learned.

1) If Calf Prices Seem too Good to be True, They Probably Are
There is a long time adage by agricultural economists that the cure for high prices is high prices. The implication is that producers respond to high prices by increasing production, which then brings down prices. As basic as this may seem, it is easy to get caught up in the euphoria of historically high calf prices and try to find reasons why this time it is different. This time may have been different in terms of how high prices rose, but it was no different in terms of how producers responded to high profits and how quickly these prices came crashing back down. Don’t expect prices that seem too good to be true to last, they never do.

2) The Cattle Cycle Isn’t Dead
Over the last 10 years, many “experts” stated that the cattle cycle is dead or no longer exists. We have never agreed with this logic, and feel part of that reason is that we may define the cattle cycle differently than most people. To us, the cattle cycle is primarily about cow-calf operators responding to profits by expanding their cow herds and the time lag between this decision and the associated supply impact. Two major external events in the last half-dozen years impacted the current cattle cycle, and changed its dynamics. First, historically high grain prices from 2008-2013 caused significant conversion of pasture and hay-ground to row crops. This conversion was occurring during the liquidation phase of the last cattle cycle and thus caused cow numbers to drop quicker than what we would have normally seen in this phase. Second, during a portion of this same time period, 2011-2013, a major drought hit a large section of the Southern Plains and forced a massive liquidation in the cow herd, further dropping cow numbers during the liquidation phase. This was in an area that made up roughly 25% of our entire U.S. beef cow herd at the time.

The combined effect was that cow numbers continued to drop during a time period when they normally would have been expected to start increasing. By 2012, calf prices (and cow-calf profits) were likely high enough to justify heifer retention. However, the combination of severe drought and pasture conversion led to cow-herd liquidation at a time when calf prices would have suggested expansion. As weather improved and cow profits soared in 2014 and 2015, expansion took a firm foothold. This cow herd is currently growing, and doing so at a swift pace as beef cow numbers are up over 4% over the last two years. While it is true that many other factors impact cattle prices than the size of the cow-herd, we are not yet ready to bid farewell to the notion of the cattle cycle.

3) Expansion Isn’t Just About Heifers
Traditional cattle cycle mentality is that expansion comes from heifer retention and this is true from a long-term perspective. However, the age of the cow herd cannot be ignored in the short-run. A factor that drove beef cow numbers so low from 2011-2013 was extremely high cow slaughter. Most of this came from the Southern Plains as they dealt with widespread severe drought. When increased moisture was overlaid with strong calf prices in 2014 and 2015, most of the initial increase in cow inventory came from reduced beef cow slaughter. The overall age of the herd was younger, fewer cows were near the end of their productive lives, and profit was there. It made logical sense to cull fewer cows during these two years and this worked to jump-start the expansion phase of this cycle.

4) The Impact of Competing Meats
In the US, beef, chicken, and pork are the primary consumer meats and 2014 was a banner year for profitability in all three. So, it is no surprise that expansion occurred in all of these markets. However, the pace at which growth can occur in these markets is different. Due to shorter gestation periods and younger age at harvest, pork and poultry producers can increase production much faster than beef producers. It is likely that 2016 will be the first year that we actually see increased beef production (boxed beef), while significant increases have already been seen in the pork and poultry markets. Since these proteins compete in the meat case, beef prices were pressured in late 2015 from increased pork and poultry supplies before beef supply increased significantly.

Continued on page 3
5) Exports are a Double-Edged Sword
There is no doubt that increased exports have a positive impact on price, holding everything else constant. Increased exports reduce domestic consumer supply, which drives prices upward at home. However, over time we respond to these higher price levels with increased production. Then, as shocks occur in international markets that lead to decreased exports, all that extra supply is left on the domestic market, and prices fall. 2015 was a good example of how this can play out. Exports were down drastically due to increased price levels, a stronger US dollar, and weakening economies for some of our trading partners. The decrease in exports piled onto an already decreasing market, with the net effect being a price implosion. This is not to say that we should stop exporting beef. We just need to be aware that exports can cut both ways.

6) Learn to Manage Price Risk
Few people predicted cattle prices would increase as quickly as they did during 2014 or decrease as quickly as they did in 2015/2016. These price swings represented hundreds of dollars in cattle revenue and meant the difference between profit and loss for many stocker/backgrounders. They also represented over $300 in value per calf for cow-calf operators. Many producers, especially those in the first few years farming, simply can't self-insure this type of market risk. Cattle producers who could have self-insured against the normal volatility of a typical cattle cycle need to learn to manage today's price risk and volatility through futures markets, LRP insurance, forward contracts, or any other means available. This will mean that in some years money will be left on the table, but other years it will avoid huge losses that could destroy the financial well-being of the operation. For more information on using the futures market as a tool to manage price risk in feeder cattle see the following publication: http://www.uky.edu/Ag/AgEcon/pubs/ext2013-0128.pdf.

7) Don't Take a Short-Term Perspective on Long-Term Decisions
While we don’t think many people expected calf prices to stay in the $2.50 per lb range forever, most of us were surprised how sharply prices came down in 2015. The folks hit hardest by this drop will be the ones who made decisions in the last couple years as though calf prices were going to stay at $2.50 for years to come. As was discussed in lesson #1, if there is one certainty about agricultural markets it is that abnormally large profits won’t exist for long. Supply will increase until profits reach more normal levels. Long term investments in land, breeding stock, equipment, facilities, etc. need to be made from a long term perspective. It appears that a lot of producers made investments over the last couple of years based on the assumption that those incredibly high prices were here to stay.

Possibly the most extreme example of this is bred heifer prices. Given reasonable cow maintenance costs, weaning weights, and weaning rates over the life of the heifer, calf prices would have needed to stay above $2 per lb for 5-8 years to justify the prices that were being paid for bred heifers. This was the focus of an article in the November 2015 issue of Cow Country News and a decision aid created to help determine what can be paid for bred heifer given the users assumptions and cost estimates. It can be found at the following link: http://www.uky.edu/Ag/AgEcon/pubs/BredHeifer.xlsx.

These examples aren’t just limited to breeding stock. Similarly, it is easy to justify purchasing a new piece of equipment during a year of abnormally high profits on the basis that you can avoid paying taxes by using a Section 179 depreciation allowance. But also understand that decision will impact your long-run profitability negatively if it is a piece of equipment you could really do without.

Summary
While there is no simple success recipe for cattle producers to follow, we felt the last couple years provided an excellent opportunity to reflect on what we saw and what we can learn. While it is impossible to know if, and when, we might see markets like we saw in 2014 and 2015, it would be naïve on our part to assume that we would never see something like that again. Many of the "lessons learned" we discussed in this article apply to all cattle cycles, but the extreme market swings of the last year or two amplified their importance. We’ve heard it said before that challenging times show whom the better managers are and we believe this will play out in the next few years. The producers who made wise decisions over the last couple years will be the ones who are in the best position moving forward with lower prices. Hopefully, by reflecting on some things learned during this time period, we will be less likely to make some of the same mistakes the next time it comes around.

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Summer Stocker Outlook for 2016

With the warmer temperatures and the start of spring grass growth, stocker operators are contemplating placement of calves into summer programs. As is often the case, calf prices have risen over the last several weeks as we have gotten closer to grazing time. Some operations likely placed calves during the winter, with the intention of purchasing stockers before the typical spring price peak. However, many more will place calves as pastures green up in the coming weeks. It is imperative that stocker operators pay careful attention to the market, their costs, and what can be paid for stocker calves this spring.

Last summer (2015) was a challenging year for stocker operators who chose not to utilize some form of price protection on the calves they grazed. Many of them gave back a considerable share of the profit they made during 2014 as the feeder cattle market dropped sharply from summer through the end of the fall of last year. However, stocker operators who protected sale prices were able to see positive returns last year as the market was offering profit opportunities in the spring. We actually feel like many stocker operators were a bit overconfident following 2014 and took on more risk because of it. The last two years were excellent examples of how much volatility can be present in feeder cattle markets during the summer. While it is impossible to predict the direction of feeder cattle markets in the current year, producers can use the current CME© feeder cattle futures market as an indication of what can be paid for calves to be placed on grass this spring and sold this fall. The purpose of this article is to assess the likely profitability of summer stocker programs for 2016 and establish target purchase prices for calves based on a range of target return levels.

Fall CME© feeder cattle futures (adjusted for basis) are typically the best way to estimate likely feeder cattle values for fall, which is the expected revenue for a summer stocker program. Grazing costs including pasture costs, veterinary and health expenses, hauling, commission, etc. can be estimated and subtracted from the expected value of the fall feeders. Once this has been done, a better assessment can be made of what can be paid for stocker cattle this spring in order to build in an acceptable return to management, capital, and risk.

Key assumptions for the stocker analysis are as follows: 1) Graze steers April 1 to October 1 (183 days), 1.5 lb/day gain (no grain feeding), 2% death loss, and 4% interest on calves. Given these assumptions, sale weights would be 775 lbs and 875 lbs for 500 lb and 600 lb purchased calves, respectively. Using a $159 CME© futures contract for October 2015 to estimate sales price, a 775 steer is estimated to sell for $151.50 and an 875 steer is estimated to sell for $145.50. This amounts to a $6 per cwt price slide for heavyweight steers. We have reduced price slide expectations from last year as the feeder cattle market is at considerably lower levels than it was one year ago. These sale prices are also based on the assumption that cattle are sold in lots of 40 or more head. Stocker operators who typically sell in smaller lots should adjust their expected sale prices downward accordingly.

Estimated costs for carrying the 500 and 600 lb steers are shown in Table 1. Most of these are self-explanatory except the pasture charge. Stocking rates of 1.0 acre per 500 lb steer and 1.2 acres per 600 lb steer were assumed in arriving at these charges. The pasture charge accounts for variable costs such as bush-hogging, fertilizer, and re-seeding. The last of these pasture costs are on a pro-rated basis and are considered a bare-bones scenario. Sale expenses (commission) are based on the assumption that cattle will be sold in larger groups and producers will pay the lower corresponding commission rate. However, producers who sell feeders in smaller groups will pay the higher commission rate which will likely be around $40 per head based on the revenue assumptions of this analysis. This continues to be a challenge for small operators in this high priced market. Any of these costs could be much higher in certain situations, so producers should adjust accordingly.

### Table 1: Expected Variable Costs 2016

<table>
<thead>
<tr>
<th></th>
<th>500 lb Steer</th>
<th>600 lb Steer</th>
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</thead>
<tbody>
<tr>
<td>Pasture Charge</td>
<td>$25</td>
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<tr>
<td>Vet</td>
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<td>$20</td>
</tr>
<tr>
<td>Interest</td>
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<td>$21</td>
</tr>
<tr>
<td>Death Loss</td>
<td>$20</td>
<td>$22</td>
</tr>
<tr>
<td>Sale</td>
<td>$16</td>
<td>$16</td>
</tr>
<tr>
<td>Haul</td>
<td>$15</td>
<td>$18</td>
</tr>
<tr>
<td>Mineral</td>
<td>$10</td>
<td>$12</td>
</tr>
<tr>
<td>Other (water, etc)</td>
<td>$10</td>
<td>$12</td>
</tr>
<tr>
<td><strong>Total Variable Costs</strong></td>
<td><strong>$136</strong></td>
<td><strong>$151</strong></td>
</tr>
</tbody>
</table>

*Note: Interest varies slightly by purchase price.*

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Of course, it is highly likely that your cost structure will be different than that presented in Table 1. If this is the case, simply shift the targeted gross profit up or down to account for this. If your costs are $25 higher per calf, then you would shift each targeted profit down by one row: For example, you would use the $125 gross profit to estimate a $100 gross profit. Another way to evaluate this is that a $1 increase in costs would decrease the targeted purchase price by $0.20 per cwt for 500 lb steers and $0.17 per cwt for 600 lb steers.

It is important to note that the gross profits in Table 2 do not account for labor or investments in land, equipment, fencing, and other facilities (fixed costs). Thus, in the long-run, these target profits need to be high enough to justify labor and investment. In many locations, calf markets are already at levels that would place expected returns on the lower end of the range analyzed. This is all the more reason that stocker operators should carefully think through their budgets and make rational purchasing decisions.

While the current calf market is nowhere near where it was last spring, it is still a historically strong spring market. Further, there is potential for calf prices to move even higher in the next few weeks. So, summer grazers will have a lot of money invested in calves that are placed into grazing programs this spring. Furthermore, if we have learned anything over the last few years, it is that feeder cattle markets are highly volatile, especially during the corn growing season. Thus, price risk management will be critical as calves are placed this spring and stocker operators seek to protect downside price risk.

Hedging, through the sale of futures contracts, provides solid downside risk protection, but will subject the producer to margin calls if cattle prices increase. This was a serious challenge for many who employed this strategy during the summer of 2014. Entering a cash forward contract with a feedlot or order buyer, or offering cattle through internet sales with delayed delivery, will reduce or eliminate price uncertainty, but will also limit marketing flexibility should weather conditions necessitate sale at a different time. Finally, strategies such as put options and Livestock Risk Protection (LRP) Insurance offer a less aggressive strategy that provides some downside price protection, but more ability to capitalize on rising prices.

Regardless of what makes the most sense for the individual producer, time spent considering price risk management is likely time well spent in these volatile markets. Links to two publications on using futures markets to manage price risk in feeder cattle and a publication on the use of Livestock Risk Protection (LRP) Insurance, can be found on the livestock page of the UK Agricultural Economics website: http://www.uky.edu/Ag/AgEcon/extcrops-livestock.php. The best way to ensure profitability is to budget carefully and to manage downside price risk. It is our opinion that if you are not occasionally leaving some money on the table through your risk management strategy, you are probably taking too much risk in your operation.

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Precision Conservation Management Program Announced

Record Keeping in Tough Times

Spring, the time of year farmers look forward to and start to get the itch to begin field work. As farmers make way to their tractors, they have more to ponder with crop prices on the decline and a not too promising crop outlook for the next few years. Margins are tighter this year and producers are aware; however, awareness and action are not the same. All the expenses mentioned in “A Concerned Economist’s Perspective Liquidity and Budgeting” in the January 2016 edition of the Economic & Policy Update will be easier to track over time with good records. The importance of record keeping will increase as farming heads into tight times and action needs to be taken.

The better records are kept, the easier it will be to make sound business decisions going forward. There is no clear cut answer for all operations. To make good use of records, it will benefit farmers to keep up with income items along with cash expenses and economic costs. Economic cost is the opportunity cost of using the resource for something other than farming.

Yield monitoring from year to year will assist in having an actual average yield to use in calculating breakeven costs. Watching prices of commodities and market fluctuations will play a vital role in profitability. Some cash income will be harder to estimate; for instance, government payments are projected to be less in the coming years than they were in 2015. Crop insurance may become less of a protection if income is projected to be low and there is not a decrease/fall in revenue during the crop year.

As you track cash expenses from year to year, trends will form and you can see where excess expenses can be reduced. For instance, having good soil fertility records on different farms will allow for more variable rate application of crop inputs to possibly reduce those expenses in the upcoming years. Researching machinery leases versus owning equipment could be one way to reduce machinery repairs and depreciation, if the cost of the lease per acre is less than the repairs. Knowing what the total cash expenses are will allow one to calculate the minimum price needed to breakeven.

Meeting economic costs is as important as meeting cash expenses to sustain the operation during tight times. There is an opportunity cost of tying up money in inputs, owning land, and equipment. A charge for operator labor needs to be accounted for because you don’t want to work for free. As everyone knows farming is not cheap, and if your money was not tied up in farming, it would be invested in something else. A breakeven price would ideally include these economic costs.

Other items that need to be covered over time are a margin to grow the operation in the future and family living expenses. Some families have become accustomed to high incomes in the last few years and it will be hard to pull those expenses back down.

Having good records for the whole operation should lead to better records by farm and enterprise. Now is the time to understand whether each farm is making a profit or at least able to cover cash costs. If a rented farm is not yielding profitable outcomes, decisions will need to be made whether to keep the farm or let it go. The rental agreement may need to be renegotiated or options for making the farm more efficient may need to be considered. When looking at cutting acres, fixed costs should be monitored more closely because as acres decrease those costs will increase. For example, machinery expenses will need to be addressed to see if downsizing some equipment will lower that cost. Next, looking at enterprising budgets allows a farmer to know if each crop or livestock enterprise is making money. This will allow the farmer to decide if a new direction is needed or where the farmer can improve each enterprise.

As net farm incomes decreased this past year and predictions are similar for the next couple of years, it is important to analyze the operation and see where one can “pinch pennies.” This task is more easily done if accurate financial records are kept and realistic projections are made. If you have questions about the financial situation of your operation, feel free to contact your local Kentucky Farm Business Management Specialist.

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