Agriculture & Natural Resources Newsletter

December 2022

Happy Holidays from the Extension Office! I hope everyone is enjoying the fall season and gearing up for the holidays. November 1st was my one year work -anniversary here in Campbell County- time has flown by, that must mean I'm having fun! Thank you all for welcoming me home in this position, I've enjoyed serving my home community and I hope to continue to grow the program. If you've attended any programs you've heard me say to let me know if there were programs or field day topics you would like to see.... I mean that! Please reach out with any ideas or questions you might have; if you're curious about it, there's a good possibility other people could benefit from it too. I'll be hosting an **Agriculture Issues Dinner on January 9, 2023 at 6:00 pm** at the EEC for an open discussion of challenges that farmers are facing in Campbell County where everyone is welcome to come and share ideas and discuss opportunities. Please RSVP to the office by January 6th so I can plan accordingly for dinner. Here's to sunshine, healthy livestock, good prices and the occasional rain!

Sincerely,

Michelle Simon

Michelle Simon
Campbell County Extension Agent
for Agriculture and
Natural Resources

Agriculture Agent, Michelle Simon, and Intern, Lacee Trapp at ADM Grainery in Silver Grove, Kentucky at the Harvest Appreciation Day where over 100 farmers were thanked for their service to the agriculture community and received goody bags and a breakfast sandwich.

Upcoming Dates:

December 8, 2022 - 6:00 p.m.
"Off the Grid" Solar program
Environmental Education Center
Daniel Carpenter,
Larue County Ag Agent
Morgan Hayes,
Biosystems and Ag Engineer

December 13, 2022 - 6:00 p.m.
Beef Efficiency Strategies
Environmental Education Center
Dr. Les Anderson,
UK Beef Extension Specialist

Dec. 26–Jan.2, 2023
Extension Office Closed

January 4-6, 2023
Kentucky Cattleman's Association Convention
Lexington, KY

January 9, 2023
Ag Issues Dinner & Discussion
Environmental Education Center

January 29, 2023
NKHN Annual Meeting
Boone County Enrichment Center

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Barge Traffic Restrictions on the Mississippi River and Bulk Agricultural Exports

P. Lynn Kennedy

The Mississippi River provides the United States with a competitive advantage in the export of bulk agricultural commodities. This advantage in transportation costs allows U.S. commodities, including corn and soybeans, to better compete for market share with the product of other countries. Disruption of shipping on the Mississippi River can occur as a result of a variety of circumstances. Various events, particularly hurricanes, have previously suspended barge traffic on the Lower Mississippi River. While the Army Corps of Engineers is charged with maintaining the navigability of the Lower Mississippi River, the possibility of longer-term disruptions resulting from an avulsion of the Mississippi River at the Old River Control Structure has been considered by Lazard and Kennedy (2020). The recent drought conditions have limited the shipment of agricultural commodities on the Lower Mississippi River due to draft limitations. The Ports of South Louisiana typically service over 55,000 barge shipments and 4,000 ocean-going vessels annually. The disruption of river commerce will force producers to consider shipping commodities using more costly alternative modes of transportation. Assuming the Mississippi River to be the most cost-efficient method of transporting soybeans, other modes of transportation to meet global demands will increase total transportation costs. The immediate impact on agricultural exports can be seen through decreased barge traffic and increased barge rates. According to the U.S. Army Corps of Engineers, barge tows that are typically comprised of 36 barges are limited to 25 barges due to the decreased water levels (Kennedy, 2022) which significantly restricts the flow of grain to the Gulf. In addition, the USDA's Grain Transportation Report (2022) indicated that the St. Louis barge rate for the week of November 8, 2022 was 145 percent higher than the previous year and 128 percent higher than the 3-year average. As shown in Figure 1, nearly half of U.S. bulk agricultural exports flow through the Lower Mississippi River and the Ports of South Louisiana. The highest export volumes have occurred from October through January, particularly for the New Orleans Customs District (NOCD). The current drought conditions and resulting restrictions on barge traffic on the Lower Mississippi river will have significant implications for the U.S. agricultural sector. In addition to other supply chain issues that have existed, increased barge rates and decreased river capacity resulting from the abnormally low Mississippi River levels come at the time for peak export opportunity based on historic export data. Depending on the duration of the current drought conditions, these factors will likely combine to put downward pressure on the domestic prices of bulk agricultural export commodities.

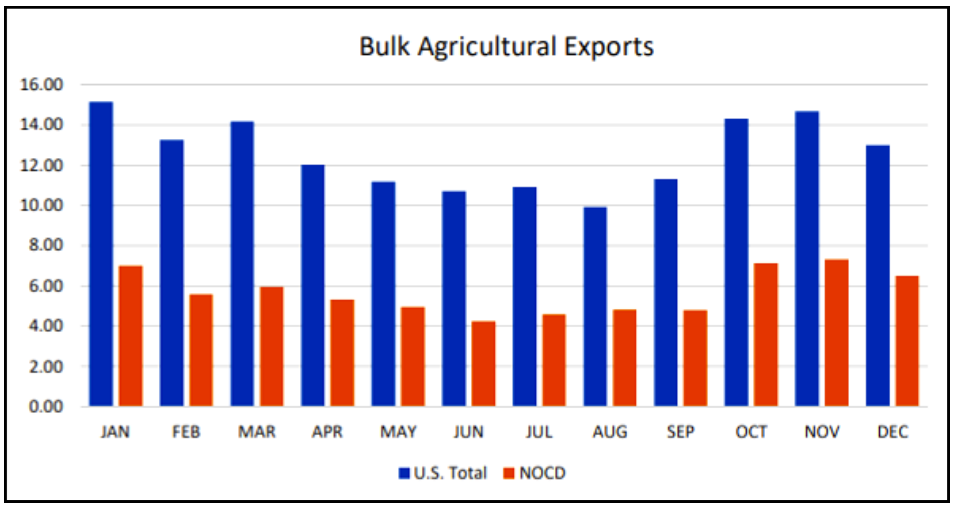

Figure 1. U.S. Total and New Orleans Customs District (NOCD) Bulk Agricultural Exports by Month, Five Year Average in Million Metric Tons.

Source: USDA-FAS (2022). Global Agricultural Trade System (GATS), accessed at https://apps.fas.usda.gov/GATS/ on November 16, 2022.

References:

USDA-AMS (November 10, 2022). Grain Transportation Report, accessed online at www.ams.usda.gov/GTR on November 16, 2022. Kennedy, M. (2022). Mississippi River Barge Movements Restricted Due to Critical Low Water Levels. Progressive Farmer, accessed online at https://www.dtnpf.com/agriculture/web/ag/blogs/market-matters-blog/blogpost/2022/10/03/mississippi-river-barge-movements on November 16, 2022. Lazard, P.M., and P.L. Kennedy (2020). Trouble at Old River: The Impact of a Mississippi River Avulsion on U.S. Soybean Exports. Journal of Food Distribution Research, 51(3): 1-5.

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NORTHERN KENTUCKY
COW-CALF SCHOOL

REFRESH YOUR MANAGEMENT, GROW THE HERD

All classes start at 6:30 pm with dinner and program immediately follows at 7:00 pm.
To register call your local Cooperative Extension Service by November 25

The Bull
Mon, Nov 28 | Kenton CES

The Cow
Weds, Nov 30 | Grant CES

Managing Forages
Mon, Dec 5 | Kenton CES

The Calf
Weds, Dec 7 | Grant CES

The Heifer
Weds, Dec 14 | Kenton CES

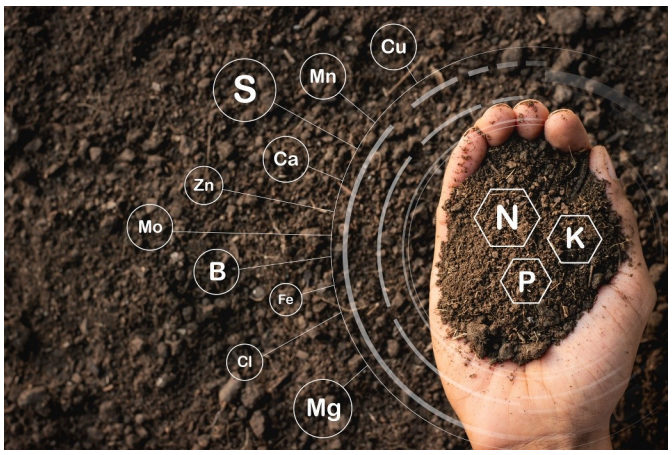
x10D Record Keeping
Mon, Jan 9 | Kenton CES

CALL YOUR LOCAL EXTENSION TO REGISTER OR FOR MORE INFORMATION

Boone CES 859.586.6101	Campbell CES 859.572.2600	Carroll CES 502.732.7030	Gallatin CES 859.567.5481
Grant CES 859.824.3355	Kenton CES 859.356.3155	Owen CES 502.484.5703	Pendleton CES 859.654.3395

Calcium or Lime? Which Raises Soil pH? A Follow-up.

Dr. Edwin Ritchey, Extension Soils Specialists — Dr. John Grove, Professor of Agronomy/Soils Research and Extension — Dr. Chris Teutsch, Extension Forage Specialist



Earlier in the year we wrote a Corn & Soybean News article *(Calcium or Lime? Which Raises Soil pH?)* discussing the differences between calcium and lime and how they influence soil pH. A study stemmed from several agriculture extension agents and ag retailers receiving questions about a "liquid calcium" (Advanced-Cal, AgriTec International) product that claimed to adjust soil pH using a fraction of the ag lime rate. For example, claims were made that 2 to 4 gallons of Advanced-Cal per acre was more effective at adjusting soil pH than a ton or more of agricultural limestone per acre. The liquid calcium product is calcium chloride (CaCl2) which has no liming ability (Equation 1).

Equation 1.

$$CaCl_2 + 2H^+ \rightarrow Ca^{2+} + 2H^+ + 2Cl^-$$

To neutralize acidity, the proton (H+) must be consumed/neutralized. The neutralization reaction, when calcitic limestone is used, is shown in Equation 2.

Equation 2.

$$CaCO_3 + 2H^+ \rightarrow H_2CO_3 \text{ à } H_2O + CO_2 + Ca^{2+}$$

The acidity, H^+, in Equation 1 remains after the addition of $CaCl_2$, but in Equation 2 the proton (H^+) is neutralized to form water by the carbonate present in the limestone. A liming product MUST contain carbonates (CO_3^{2-}), hydroxides (OH^-), or oxides (O^{2-}). Carbonate forms (agricultural limestones) are the most common source used in agricultural production. The calcium, magnesium or other ions associated with limestone have nothing to do with the neutralizing reaction.

Field and lab incubation studies were established concurrently in the summer of 2021 and ended approximately one year later. The field study was at 16 locations with 3 reps and the laboratory incubation study, with 4 reps, was done at the UKREC. The same treatments were used for both studies: an untreated check (nothing applied), liquid calcium at 5 gal/acre, pelletized lime (RNV 83), and agricultural lime (RNV 79). Both pelletized and ag lime were applied at 2 ton RNV 100 equivalent lime/acre, adjusting the rate for the product RNV. Field study soil samples field study were collected prior to treatment application, again approximately 3 months later and again approximately 12 months later. The incubation study used a Crider silt loam soil with an initial pH of 5.2. Soils were placed in 4-oz specimen cups with small holes in the cap to allow for gas exchange. Cups were maintained at 80% water filled pore space by weight until just before the 6-month sample date, when the building was destroyed by the tornado. Samples were recovered but cup moisture wasn't maintained for the 12-month samples. Destructive sampling occurred at 1, 3, 6 and 12 months. Results for the field study are reported as the average soil pH across locations and as the change in soil pH due to the sites having different initial soil pH levels. Results for the incubation study are reported as average pH across the reps. Data was analyzed using SAS version 9.4 (Cary, NC).

The chemistry associated with the neutralization reaction in equation 2 was confirmed by the field and laboratory studies (Table 1 and Table 2). Further, the lack of pH change in the liquid calcium and check treatments in these experiments is due to the lack of proton (acidity) neutralization, as indicated in Equation 1. The soil pH 3 months after treatment application had increased with both agricultural and pelletized limestone application, but not in the un-treated check and liquid calcium treatments. The lime materials increased soil pH by 0.30 to 0.43 pH units, while the check and liquid calcium amended soil pH decreased slightly during the first three months (Table 1). The lime materials had increased soil pH by 0.67 to 0.77 units approximately 12 months after treatment applications. The check and liquid calcium treated soils both exhibited slight increases in pH about one year after application, but this was not due to a treatment effect, but rather to an environmental effect. There can be

Table 1. Soil pH 0, 3 and 12 Months After Field Application. Data is averaged over 16 field sites.					
	----------Soil pH----------			----------Change in Soil pH----------	
Treatment	**Initial soil pH (<0.854)**	**Soil pH (3 m) (<0.001)**	**Soil pH (12 m) (<0.001)**	**Change in 3 m² (<0.001)**	**Change in 12 m³ (<0.001)**
Check	5.76 a[1]	5.64 a	5.87 a	-0.10 a	0.11 a
Liquid Calcium	5.76 a	5.71 a	5.83 a	-0.02 a	0.08 a
Pelletized Lime	5.82 a	6.07 b	6.48 b	0.30 b	0.67 b
Ag Lime	5.76 a	6.16 b	6.51 b	0.43 b	0.77 b

[1] **Different letters within a column indicate significant differences at the 0.01 probability level.**
[2] **Change after 3 months (soil pH at 3 months—initial soil pH)**
[3] **Change after 12 months (soil pH at 12 months—initial soil pH)**

Table 2. Soil pH After 1, 3, 6 and 12 Months of Laboratory Incubation. Initial pH was 5.2.				
	----------Incubation Time in months and (Pr>F) ----------			
Treatment	1 (<0.001)	3 (<0.001)	6 (<0.001)	12 (0.001)
Check	5.20 a[1]	5.05 b	4.99 a	5.10 a
Liquid Calcium	5.25 a	5.00 a	4.98 a	4.98 a
Pelletized Lime	5.93 b	6.30 d	6.45 b	6.26 b
Ag Lime	6.10 b	6.20 c	6.38 b	6.20 b

[1] **Different letters within a column indicate significant differences at the 0.01 probability level.**

seasonal variation in pH due to soil moisture levels, largely associated with soluble fertilizer salts remaining in the soil. The use of a salt solution to determine pH helps to reduce this variation but does not remove 100% of this variation. It is very apparent that liquid calcium was not effective in raising soil pH as compared to the lime materials. The full neutralization reaction of limestone takes between 2 to 3 years in field settings.

The laboratory incubation results support those found in the field experiment (Table 2). The lime materials increased soil pH after 1 month, relative to the check and liquid calcium treatments. These results were also observed at 3, 6 and 12 months of incubation. Soil moisture was maintained at approximately 80% pore filled volume until shortly before the 6-month sampling, an F4 tornado destroyed the building where the incubating samples were stored. The samples were recovered but their 80% pore filled volume status was not maintained for the rest of the experiment. The drier soil conditions in the 12-month samples could explain why the lime material treatments showed a slight pH decrease over that time period. This does coincide with field observations over the same time period.

Soil acidity is neutralized by the consumption of protons, not the addition of calcium. The results of this study support the chemistry in Equations 1 and 2. Liming acid soils should be based on products that contain carbonates, oxides or hydroxides, the associated RNV, and using an application rate based on soil pH and buffer pH - NOT the amount or form of calcium present in a product.

Autumn Winds

Jane Marie Wix - NWS Jackson, KY

You could feel the breeze beginning to pick up as autumn progresses. In fact, winds increase across a large portion of the United States during the autumn months. To our north, in the Great Lakes region, strong winds lead to dangerous lake conditions known as the "Gales of November". But why does the wind seem to get stronger when the temperature drops? According to meteorologist John Wheeler of WDAY television in Fargo, during the autumn, winter, and spring, the absence of sunlight in the higher latitudes makes it extremely cold, while the tropics remain warm and…well…tropical. This enhanced temperature gradient across the United States leads to a stronger Jet Stream and larger air pressure differences between weather systems, both of which lead to more air movement in general.

These more noticeable differences in air masses during the autumn months may also lead to stronger frontal passages and storm systems. Multiple strong wind events during the autumn months have caused damage, injuries, and even deaths across the Commonwealth. While weather reporting stations, such as the Kentucky Mesonet, measure wind speeds and gusts accurately, you can also estimate the wind speeds you are encountering by using the Beaufort Wind Scale.

Given this scale, it is also understandable why the National Weather Service sets a threshold of 58 mph (50 kts) for severe thunderstorm warnings, as this is the speed at which damage is most likely to occur.

> *"Those that can bend with the wind will weather the storm."*
>
> -Unknown.

You can help prepare for the strong winds ahead and hopefully prevent damage to your property, or worse, by taking the following steps:

- Trim tree branches away from your house and power lines.
- Secure loose gutters and shutters.
- Identify an interior room of your house, such as a basement or

Beaufort Wind Chart – Estimating Winds Speeds

Beaufort Number	MPH Range	MPH Average	Terminology	Description
0	0	0	Calm	Calm. Smoke rises vertically.
1	1-3	2	Light air	Wind motion visible in smoke.
2	4-7	6	Light breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	11	Gentle breeze	Leaves and smaller twigs in constant motion.
4	13-18	15	Moderate breeze	Dust and loose paper is raised. Small branches begin to move.
5	19-24	22	Fresh breeze	Smaller trees sway.
6	25-31	27	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult.
7	32-38	35	Near gale	Whole trees in motion. Some difficulty when walking into the wind.
8	39-46	42	Gale	Twigs broken from trees. Cars veer on road.
9	47-54	50	**Severe gale**	**Light structure damage.**
10	55-63	60	**Storm**	**Trees uprooted. Considerable structural damage.**
11	64-73	70	**Violent storm**	**Widespread structural damage.**
12	74-95	90	**Hurricane**	**Considerable and widespread damage to structures.**

interior bathroom, that you can take shelter in during high wind warnings.

- If you live in a mobile home, identify a sturdy building you can go to if NWS issues a high wind or severe thunderstorm warning.
- Charge batteries of all essential items such as cell phones and booster packs, weather radios and power tools such as a reciprocating saw, which you might need to clear debris.
- Update your emergency kit and be sure to include enough food and water to last for 3 days for each person in your home. Acquire flashlights, spare batteries, and generator fuel if you use backup generators.
- Make a list of items outside your home you will need to tie down or put away so that they don't blow away or fly through a window. When NWS issues a high wind or severe thunderstorm watch,

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Mason Bee Masonry

Learn about mason bees and build a mason bee house!

February 14 at 10:00am –OR– March 9 at 1:00pm

Only register for ONE event

Campbell County Extension Office: 3500 Alexandria Pike
Highland Heights, KY 41076

Registration Required: visit https://campbell.ca.uky.edu or call 859-572-2600

Only ONE bee house per family

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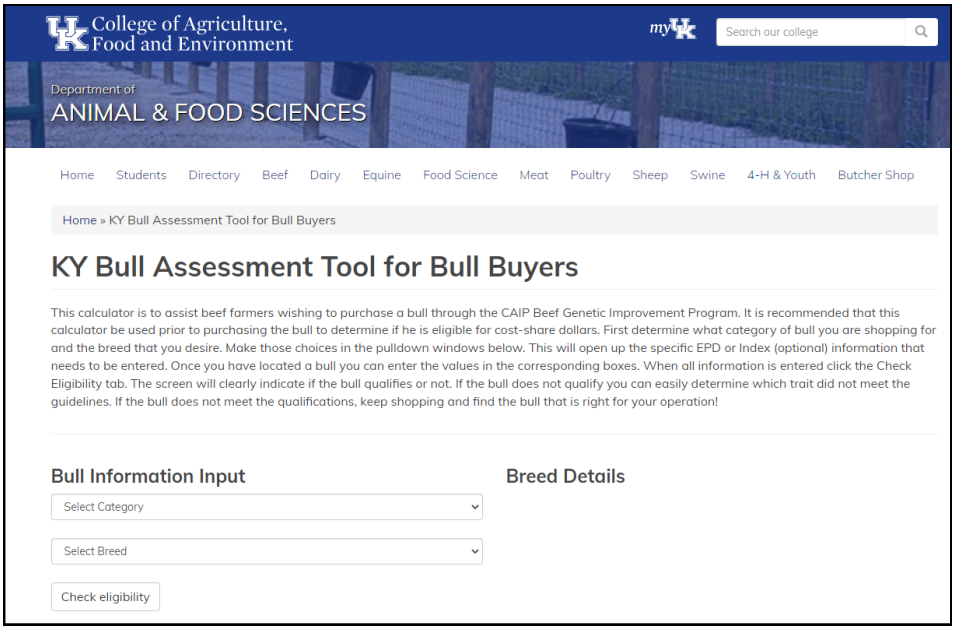
Disabilities accommodated with prior notification.

KY Bull Assessment Tool for Bull Buyers

http://afs.ca.uky.edu/beef/KBAT-buyers

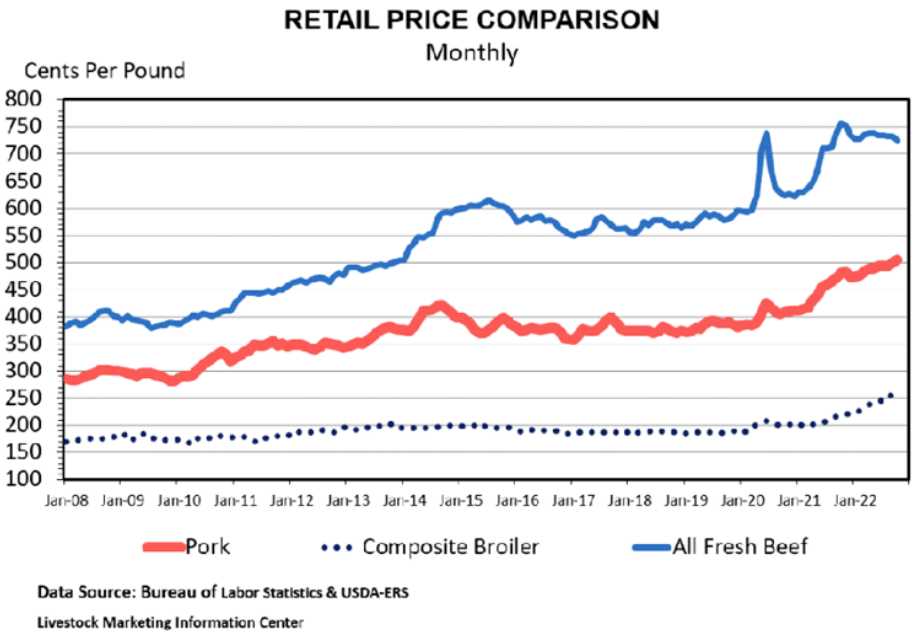
This calculator is to assist beef farmers wishing to purchase a bull through the CAIP Beef Genetic Improvement Program. It is recommended that this calculator be used prior to purchasing the bull to determine if he is eligible for cost-share dollars. First determine what category of bull you are shopping for and the breed that you desire. Make those choices in the pulldown windows below. This will open up the specific EPD or Index (optional) information that needs to be entered. Once you have located a bull you can enter the values in the corresponding boxes. When all information is entered click the Check Eligibility tab. The screen will clearly indicate if the bull qualifies or not. If the bull does not qualify you can easily determine which trait did not meet the guidelines. If the bull does not meet the qualifications, keep shopping and find the bull that is right for your operation!



Do Beef Prices Drive Consumption or Does Beef Consumption Drive Prices?

– Dr. Kenny Burdine, Extension Professor, Livestock Marketing, University of Kentucky

I open a lot of my Extension programs by showing the retail price chart seen below and discussing general trends in production levels for our three main meats (beef, pork, and chicken). By the end of 2022, pork production is going to be down year-over-year and the increase in broiler production is going to be relatively small. Beef production will actually be a little bit higher than last year, primarily due to very high cow and heifer slaughter. However, that trend is likely to reverse in a big way for 2023 and we should see a reduction in beef production of 5% or more.



As I walk through this discussion, someone in the audience will sometimes ask something like, "given that retail beef prices are already very high, and production is likely to get even smaller next year, will retail beef prices get so high that consumers move away from purchasing beef at the grocery store?" When this comes up, the person asking the question is genuinely concerned that beef could price itself off the average plate. I thought this idea would be worth discussing in this week's article.

I want to begin by looking at this question from a slightly different angle. The question comes from the perspective that price is fixed and price is what determines consumption levels. At the individual household level, this is largely true. A consumer makes purchase decisions at a retail location based on the prices they see. If the beef product they wanted was higher than expected, and a better buy was perceived to be had on another product, that consumer may well choose to purchase a competing product. But, I like to think about this from more of a macro perspective.

Most economists would argue that consumption is primarily a measure of production levels, and those production levels are largely fixed in short run. The number of cattle on feed, and the eventual number that are harvested, really determine beef production for a given time period. That level of production will either be consumed domestically or exported. So, beef production really ends up determining how much beef is consumed in a given period of time. If beef consumption isn't keeping pace with production, retailers and restaurants will adjust prices upward or downward such that the market clears.

If we go back to that individual at the grocery store, they may well purchase something different that week if they perceive beef prices to be too high relative to other products. If enough people do that, the retailer is sent a message and they have to adjust those prices in response. And this occurs at retail locations all across the county. Consumers send messages through their purchasing patterns. By looking at it this way, prices become a reflection of consumer willingness to pay for beef. If beef production increases, the additional beef will be consumed. The question really comes down to what price level is needed to absorb the additional production. And if beef production decreases, prices likely have to adjust upward to ration out the tighter supply levels.

I walked through this simply to say that I view price as the more fluid element of this discussion. If retail beef prices are high, it is likely a reflection of the relative value consumers place on beef. If retail beef prices get "too high" consumers will respond and the prices will adjust accordingly. While price may determine consumption at the household level, I would argue that consumption determines price at the overall market level.

Making EPDs Understandable

Jason Duggin, Dylan Davis, and Pedro Fontes—UGA Beef Team

Expected progeny differences (EPD) are essential tools in the beef industry. Thus, it is important to understand their basic usage in beef herds. By utilizing the following key steps, EPDs can be readily understood. Let's overview the following three steps to better understand how to use them effectively.

1) Know the Unit of Measure

a. Each EPD is a relative measure of a particular trait. EPDs are reported in the unit of measure in which they are recorded. For example, birth weight, weaning weight, yearling weight, and carcass weight are reported in lbs. Other examples include ribeye area which is in square inches; scrotal circumference is reported in centimeters; marbling is reported in marbling scores. More examples are listed below in Table 1.

b. When we understand the unit of measure, we can better understand what is being evaluated and ultimately how to use the EPD. Evaluators can then more readily know whether the lower or higher number is more advantageous in a given situation. More lbs. are generally advantageous. However, more lbs. at birth can eventually lead to higher incidence of dystocia.

2) Take the Difference

a. EPDs were initially designed to use in the comparison between two individual animals. Hence the name, Expected Progeny Differences. If we evaluate two bulls for growth performance using the weaning weight (WW) EPD, we simply look at the EPD reported for each bull and subtract one from the other to see the projected difference in their respective progeny for a given trait.

In the example, if Bull "A" is used in the same group of cows as Bull B, Bull A should sire calves that are on average 10 lbs. heavier at weaning compared with Bull B. There are two key terms in the previous statement, "should" and "on average". EPDs are not guarantees, but with all environmental impacts being equal, EPDs are predictors of genetic differences between two animals for a specific trait. It is important to realize that cattle with low accuracy EPDs such as yearling bulls may have significant adjustments as new records are available. A yearling bull with a 50 lbs. WW EPD may only have a 44 WW EPD after additional records are submitted to the breed association. One way to reduce the risk of unproven animals is to purchase bulls and heifers with Genomic enhanced EPDs. These cattle will have higher accuracy EPD and the improved confidence that comes with it.

Bull A 50 WW

Bull B - 40 WW

10 WW

3) Understand the Need

Understanding the need is a key part of utilizing EPDs judiciously. There are multiple considerations in this point.

a. Not all EPDs will be utilized equally across herds. In some herds, the use of docility may not be a high priority as the herd is already very docile, but in others it may be a primary decision-making tool that ranks high on the list of needs.

b. Small differences are often insignificant to make a meaningful impact. For illustration, the example weaning weight comparison described previously has 10 lbs. of difference. This difference across a calf crop should have measurable impact over the course of 3 to 5 years assuming the genetic difference holds over time with newly reported information. However, a difference of 1 or 2 lbs. is economically insignificant. Instead, it would be more prudent to consider other EPDs, visual characteristics and individual performance measures. Even a 5 or 10 lbs. difference should not be considered if other characteristics negate the added value in weaning.

c. When using EPDs as a selection tool, many EPDs should be evaluated at one time. Producers must keep their overall management and marketing goals in mind during the process. For example, producers often want to improve growth performance in their calf crop. However, for herds wanting to retain replacement heifers, other EPDs such as Heifer Pregnancy (HP), Mature Weight (MW), and longevity will also need to be considered. In these situations, it may be beneficial to choose a bull that yields a moderate improvement in growth without sacrificing fertility and input cost.

When comparing EPDs between animals, they must be of the same breed or hybrid breed. Angus and Hereford, nor SimAngus and Simmental can be directly compared. This is a quick overview of how to use Expected Progeny Differences. If you have additional questions about specific EPDs and their usage, please don't hesitate to reach out.

Known bale weights are critical this year

By Mike Rankin

As a hay industry, there are still a number of hay sales that occur "by the bale." Yes, it's easier, but if the sale is made without factoring in bale weight and moisture, there's a good chance the buyer is paying either too much or not enough.

You've probably heard this issue reiterated many times over the years, but it's a safe bet that you've never heard it when the price of hay is as high as current values.

For a large swath of the western U.S., drought was the dominating factor during the past growing season. Many livestock producers know they will be short on winter hay or will cut it pretty close. Accurate inventories will no doubt mean the difference between having enough hay or having hungry, low-performing cattle.

My point is that known, accurate bale weights have always been important, but they've never carried the degree of economic significance as this year. It's true whether you're selling or buying hay or feeding your own.

Reasons abound

There are a number of factors that can explain why two or more bales of equal size can have drastically different weights. These include:

- Bale density
- Bale moisture
- Time of sale
- Forage species (grass or legume)
- Forage maturity (percent leaves and stems)
- Model and age of the baler

It's fairly intuitive that the size of a bale will impact bale weight, but what may be overlooked is the degree of change that occurs when a bale is only 1 foot wider or 1 foot greater in diameter. The latter accounts for the largest change.

A bale that is 4 feet wide by 5 feet in diameter (4x5) has 80% of the volume of a 5x5 bale (see table). However, a 5x4 bale has only 64% of the volume of a 5x5 bale. Those percentages also translate to differences in weight if all other factors are equal.

Bale density, which typically ranges from 9 to 12 pounds per cubic foot, also plays a rather large role in final bale weight. In a 5x5 bale, the difference between 10 and 11 pounds of dry matter per square foot amounts to over 100 pounds per bale at both the 10% and 15% moisture levels. Missing the weight of a bale by 10% amounts to some pretty significant dollars when multiple tons are being purchased.

Forage moisture also plays a role in bale weight but to a lesser degree than bale density unless bales are extremely dry or wet. Wrapped bales, for example, can vary in moisture from 30% to over 60%. When purchasing baleage, it is always recommended to either weigh the bales or have a rock-solid moisture test.

Time of purchase impacts bale weight in two ways. First, if you're purchasing bales out of field, they are likely going to be at a higher moisture level and weight than they will be after being cured in storage. There is also a natural tendency for dry matter loss during storage that the buyer will incur if bales are purchased immediately after baling. As has been well documented by research, storage losses can range from below 5% to over 50%, depending on storage method.

Forage species can also come into play. Grass bales generally will weigh

Weight of large round bales at two moisture levels and densities

Bale size		Volume		Bale wt. @ 10% moisture Density (dm/cu. ft.)		Bale wt. @ 15% moisture Density (dm/cu. ft.)	
Width	Diameter			10 lbs.	11 lbs.	10 lbs.	11 lbs.
ft.	ft.	cu. ft	% of 5x5	lbs.	lbs.	lbs.	lbs.
4	4	50	51	559	614	591	650
4	5	79	80	873	960	924	1,016
4	6	113	115	1,257	1,382	1,331	1,464
5	4	63	64	698	768	739	813
5	5	98	100	1,091	1,200	1,155	1,270
5	6	141	144	1,571	1,728	1,663	1,830

less than legume-based bales of similar size. This is because legumes such as alfalfa will make a denser bale than a grass species. In one Wisconsin study, the average weight of a 4x5 legume bale was 986 pounds. This compared to 846 pounds for grass bales of the same size.

Plant maturity impacts bale density and ultimately bale weight. Leaves generally pack better than stems, so as plants mature and develop a higher percentage of stems to leaves, bales generally become less dense and weigh less.

Finally, there are many models of balers of differing ages. This variation, coupled with operator experience, lends further variability into the bale density and weight discussion. Newer machines are able to make a much denser bale than most older ones.

Given the number of variables that determine the actual bale weight, buying and selling large round bales based on a weight guess is likely going to result in a transaction that is either above or below the already high market values of today. This can be extremely expensive for the buyer or seller, especially when a large number of tons are purchased over a period of time.

Weighing round bales might not be as convenient as not weighing them, but there are very few situations where a bale weight isn't attainable. Take the time to weigh bales (all or a few), regardless of size or shape, whenever a transaction is made. Also, don't guess when making inventory estimates of your own hay. That, too, could be an expensive error come next spring.

Adding Value to Feeder Calves

Justin Benavidez—Southern Ag Today 2 (43.3)

Medium & Large #1 and #2 Steer Values for the *week* of 10/3/2022 – 10/7/2022 ($/CWT)

	Combined Texas Panhandle Auctions		Oklahoma National Stockyards		Joplin Regional Stockyards		
CWT	Weaned	Un-weaned	Weaned	Un-weaned	Weaned	Un-weaned	Avg. Difference
3-4	213	205	174.82	177	181.42	173	4.80
4-5	197.5	176.54	175.11	165.5	179.87	172	12.80
5-6	176.80	168.52	165.38	161.01	168.905	162	6.50
6-7	170.28	154.71	165.885	162	--	--	9.70

As spring-born calves across the country reach the end of their stay at their farm or ranch of origin, it is important to consider management options like implanting, weaning, castrating bull calves, and dehorning that add value on sale day. Each choice requires an investment of time, facilities, and some education, but when used appropriately, each option tends to yield a positive return on investment, ROI.

Whether you have weaned or are in the post-weaning phase, implanting calves has one of, if not the highest ROI of any production tool in the business. Implants contain growth stimulants that increase muscle growth and result in higher weaning weights and sale weights. Consider a popular implant priced at $40.78 for 24 doses or $1.70 per dose. The product is marketed to increase weaning weight by 20-35 lbs. That means each additional pound costs roughly $0.06 to produce, and today those additional pounds are worth anywhere from $1.70 to $2.15/lb. Some producers will reach out to us and suggest they are missing the premium for NHTC calves if they implant; if you are not in a verified, likely audited program that produces calves bound for either the EU or Whole Foods, those calves are unlikely to see any premiums at sale, and they are implanted the minute they set foot in the feed lot. Remember, even if you've already weaned calves, implants can be utilized post-weaning.

On that note, weaning is another management choice that adds significant value to calves at sale. However, the investment in weaning is certainly greater than that required when implanting. The table below reports sale values for weaned steer calves and their un-weaned peers in different weight ranges. With only one exception, the value of weaned calves exceeds that of un-weaned calves. In one case, the premium for weaned calves was 20 cents per pound or roughly $94 per head. The average difference in weaned and un-weaned calf prices varies by weight class but averages $8.33 per hundredweight across the report. This sample suggests that weaning increases the value of each calf by roughly 4.6%.

Dehorning and castrating bull calves both add value as well. Data on each management decision is reported less frequently through AMS, but expect both management choices to yield a positive ROI. A few data points from Texas collected over the last month suggest a $0.19 per pound discount for bulls compared to steers and a $0.03 per pound discount for horned calves.

Consider the aggregate difference in a few management decisions presented here. Last week at the Oklahoma National Stockyards, a weaned steer calf that was implanted and sold at a weight of 450 lbs. brought roughly $787.50. A similar quality un-weaned bull calf that was un-implanted and therefore weighed only 420 lbs. may have brought only $627.80; a total discount of $159 per head compared to the calf from the producer that applied some management tools.

We want to keep animal welfare at the forefront of our decision-making, even before financial gains, so always read and follow the product label. It is also true that the misapplication of these tools can result in a financial loss. If implanting calves, castrating bulls, dehorning, or weaning is new to your business, be sure to reach out to your county Extension agent, Extension Animal Science Specialists, or at least experienced producers you trust. The experience and knowledge these groups will bring to your operation will help prevent a financial misstep and will help you maintain the well-being of your cattle.

More with Less.... Really?

Steve Isaacs | Extension Professor

We've all heard it. Budgets are tight. Profits are down. Vacancies are not filled. People are laid off. So… those who are left have to do their own jobs… and the jobs of those who aren't here… and we're going to do MORE? REALLY?

It's well-intentioned and probably said in an attempt to motivate those who are still around. Most bosses, managers, and administrators have probably said it at one time or another, "We have to do more with less." The idea is to buckle down and do even better (and more) than we have before. REALLY?

Perhaps it's a compliment to those who are left, an endorsement of the confidence of their managers. Perhaps it's an insult to those who have left, that not only are we not going to miss you, but we're going to do more than we did while you were here. REALLY?

If indeed we expect to accomplish "more with less," then perhaps we weren't operating very efficiently before. Economists would say we had slack resources, and maybe we really did need to reduce staffing. If we're going to actually accomplish "more with less," then we probably weren't doing very well before.

If, however, an organization was operating efficiently, we should expect that the loss of valuable personnel will inevitably lead to a drop in productivity. An attempt to wring more out of fewer people is at best what Susan Fowler would refer to as an IMPOSED motivational outlook. Fowler describes an Imposed outlook as being driven by pressure, guilt, obligation, or expectations; and it is not an optimal outlook. It is not a motivational outlook that is sustainable.

So, now what? What's the goal? Is it really to increase productivity? Or, is it to keep the train on the tracks till things improve? Or, is it an opportunity to prioritize, or to look for efficiencies beyond expecting people to work harder?

Prioritize. What's the most important thing we have to do? What's the least important, or the least productive? It is usually easier to identify and focus on the most important or most valuable components. Deciding what should go is harder. We have to ask, "why are we doing this?" Does it fulfill our mission or are we doing it because we always have? Which, if that's the only reason, is a terrible reason. Prioritize.

Look for efficiencies. While this should have always been a responsibility, never waste a crisis. Look for things that can be done cheaper, quicker, with fewer resources. Be careful. Don't make a cut that leads to a loss in productivity that's greater than the cost savings. Make sure a cut makes economic sense.

A pet peeve, "We're going to cut all but essential travel." Does that mean we were doing non-essential travel? Why? If it wasn't essential, we shouldn't have been doing it in the first place. Make sure a cut makes economic sense.

All this should be part of the organization's predetermined strategy. While we should not plan for failure, we should plan for adversity. Know the mission. Know the goals. Prioritize the goals and the tactics. Run a contingency planning exercise occasionally. Start with, "What'll we do if…."

We anticipate growth. We probably should anticipate contractions. Don't wait till the opportunity arises to develop a plan to grow. Don't wait till budgetary disaster strikes to figure out what to do.

Know what absolutely HAS to happen, what can be delayed, what can be cut. A good time to examine whether it should've been cut is before adversity strikes. But for sure when it does.

If you're running a good organization, don't expect "more with less." Change "more with less" to "more of our best with less, and less of some of the other stuff."

Doc, how do I use a modified live vaccine in my cows?

Dr. Lee Jones, DVM
Associate Professor Department of Population Health, Food Animal Health and Management Tifton Diagnostic and Investigational Laboratory-October 2022

I've gotten several calls this fall asking about using modified live virus (MLV) vaccines in beef herds. Though modified live virus vaccines have been around for years and have been approved for use in adult cows for about 20 years there's still a lot of confusion about using them.

First, I need to explain what is meant by MLV vaccines. The vaccines that contain Bovine viral diarrhea virus (BVD types 1 and 2), infectious bovine rhinotracheitis or also bovine herpesvirus type 1 (IBR), Bovine respiratory syncytial virus (BRSV) and parainfluenza 3 (PI3) come in 3 types – modified live, killed or combination (chemically altered). When we refer to 'modified' live or killed we are referring to virus vaccines. Not 7 way Clostridia (also called 'blackleg') or pinkeye vaccines or other bacterin or toxoid type vaccines. While there is a live bacteria vaccine for respiratory protection, it's the virus part of the vaccine that causes the controversy. All MLV require mixing and they are clearly labeled on the front of the box MODIFIED LIVE VIRUS. The virus in these vaccines is alive and replicates in vaccinated animals causing a mild version of the disease. That's how MLV vaccines work.

Why the controversy?

MLV vaccines can cause abortions if used in pregnant cows or heifers and can delay breeding if given less than 30 days before breeding if the cows or heifers have never been vaccinated with the MLV vaccine before.

If they have serious risks why use them?

MLV can stimulate a quicker, stronger and longer immunity in one dose than even 2 doses of killed virus (KV) vaccines.

If they can stimulate immunity in one dose why is it recommended to revaccinate?

We recommend revaccination because not all cattle respond to the first dose but hopefully do respond to a second or even third dose.

If they're so much better why don't more people use them?

There isn't an easy answer to that one. There is a lot of confusion about how to effectively use a MLV in beef cow herds. When they first came out and were used in pregnant cows some cows aborted so MLV vaccines got a bad reputation even though there have been millions of doses given safely to cows and heifers. Plus, I think most farmers at least in Georgia enjoy the safety and flexibility of using KV. The problem with KV, though, is that the immunity isn't as good and it takes 2 doses 4 weeks apart to start and many farmers don't set their cows up that way. But, you also have to be careful how you mix and handle MLV vaccine. KV vaccine is much simpler to use.

There's a lot of research that shows that calves that receive 2 doses of MLV before they enter the feed yard have less respiratory problems than calves that get vaccinated on arrival. But farmers don't use the MLV in calves nursing cows because the label clearly states "do not use in calves nursing pregnant cows that haven't been previously vaccinated within the last 12 months'. So if cows don't get the MLV vaccine neither do their calves. In fact, only about 3 in 10 small herd operations (<50 head of cattle) vaccinate calves against respiratory disease. So most calves leave the farm at a high risk for bovine respiratory disease (BRD).

For farms that don't use the MLV vaccine in their cows they need to use the vaccine after weaning – when they separate them from the cows. But most farmers wean the calves 'on the truck'. That means calves are sold and don't go through a weaning or preconditioning program on the farm where they were born.

How can I get started using a MLV in my calves?

It's best to work through the specific details with your veterinarian. However, there are some general recommendations. The MOST IMPORTANT principle is that

vaccines work best in healthy cows in good body condition. The second most important is to follow all label recommendations.

If you are giving it for the first time to open cows then it shouldn't be given less than 30 days before breeding or bull exposure. Ideally, 45 days would be better. Since the virus infects the cow's ovaries it will cause a very short infertility that lasts less than 60 days in most healthy cows. If the bulls are separated then that's a good time to vaccinate the calves too. If you don't have a controlled breeding season this recommendation won't work. MLV vaccine should not be given for the first time to cows with unknown breeding status. It's too risky.

If you separate the heifers for replacements then that's a great time to start with a MLV vaccine program. They can get 2 doses before returning to the breeding herd. After a few years all the cows will have a foundation of a MLV which provides superior protection and flexibility for vaccinating calves.

There is no such thing as a one-size-fits-all vaccination program so it is advised to work through a plan to integrate a MLV into your herd health program with your veterinarian. Since the MLV does provide superior protection, it is definitely worth the effort. However, no vaccination program can overcome poor biosecurity or poor nutrition programs. Those 2 things need to be in place before a vaccination plan can work.

Not all MLV are the same either. Some have adjuvants (improves response) and some are combined with other components. Make sure you get good advice from a knowledgeable source before vaccinating your cows. Read and follow ALL label recommendations before using vaccines in pregnant cows or calves nursing pregnant cows.

College of Agriculture, Food and Environment

Venison Chili

PLAN. EAT. MOVE.

Servings: 10 **Serving Size: 1 cup**

Ingredients:

- 1 pound ground venison
- 1 large onion, chopped
- ½ green pepper, chopped
- 2 tablespoons vegetable oil
- 1 (16 ounces) can diced tomatoes
- 2 (16 ounces) cans chili beans, undrained
- 1 (8 ounces) can tomato sauce
- 1 bay leaf
- ½ teaspoon salt
- ½ teaspoon cumin
- ½ teaspoon garlic powder
- 1 tablespoon chili powder
- Black pepper to taste

Directions:

In a Dutch oven or large skillet, brown meat, onion, and green pepper in vegetable oil. Add remaining ingredients. Simmer 1 hour on low heat, stirring frequently. Remove bay leaf before serving.

Nutrition facts per serving:
190 calories; 4.5g total fat; 1g saturated fat; 0g trans fat; 40mg cholesterol; 640mg sodium; 20g carbohydrate; 2g fiber; 4g sugars; 16g protein; 0% Daily Value of Vitamin D; 6% Daily Value of Calcium; 15% Daily Value of Iron; 10% Daily value of Potassium

Source: *Adapted from Wild Game: From Field to Table, Sandra Bastin, PhD, RD, Extension Food and Nutrition Specialist. Revised July 2007*

Planning For Winter Hay Supply and Storage

– By Heather Smith Thomas, Feed-Lot Contributor Questions or comments about this article can be emailed to editorial@feedlotmagazine.com

In climates where feeding hay is necessary, producers must plan ahead regarding quality and quantity for each class and age group of cattle. Forage testing allows you to more readily meet their needs. Mature cows eat approximately 1.1% of their body weight in neutral detergent fiber (NDF) but this will vary based on fiber digestibility. Some forages can fill a cow's stomach without meeting her nutrient requirements, while others will more than meet those needs if cows are allowed to fill up—resulting in too-fat cows.

It pays to invest in tarps, canvas cover or black plastic to protect hay.

Knowing the amount of hay your cattle require is also important. A cow can eat roughly 2% of her body weight per day in dry matter (DM) so you need to determine the average number of winter feeding days for your region—and your ranch. This may depend on how much fall/winter pasture you'll have, and when it might snow under and necessitate feeding hay. Also figure storage and feeding loss. There will be some spoilage during storage unless you can protect hay from weather damage, and some feeding loss—the amount depending on how hay is fed. There will be more waste/loss when using ring feeders (hay pulled out and trampled) than when strung over sod or clean snow in a different area each day.

A University of Wisconsin Extension article gives an example regarding what you might need for a herd of 20 cows that average 1200 pounds when fed from October 1 through April 15 in a ring feeder, using hay that was stored tarped on a rock pad. In that example, cows should eat an average of 28 pounds of hay as-fed, but with this storage method expect a 7% loss, and this feeding method a 6% loss in feed waste. This means you need to feed 32 pounds per head per day. Each cow would require 3.3 tons of feed for winter or 64 tons for the group.

This will vary depending on age of cows, stage of pregnancy, quality of hay, winter temperatures (cows require more feed in colder weather) and whether the cows are feed-efficient. Some cows eat more than others just to maintain themselves. The amount of hay to plan for will also depend on how much extra you might want in case of unusual weather (colder than normal, winter storms coming early or late, covering fall pastures or delaying spring turnout on grass).

Hay Storage

Warren Rusche with South Dakota State University Extension says the ideal way to store hay is under cover in a shed, but this works best for square bales. It's impractical for most cattle producers, especially for round bales that take up more space.

"If hay is stored outdoors, we need a well-drained site, to avoid spoilage on the bottom. Gravel or some kind of base that will drain keeps bales from soaking up water," he said. In snow country, avoid low areas that become wet with snow melt, and trees—to allow more air movement to keep things dry, and avoid catching more snow.

"My preference, if there's room, is to store round bales in long single-bale

rows with flat sides touching each other and round side up—with rows running north to south with sun exposure on both sides. You want wide gaps between rows, for air movement." Snow slides off between rows with enough room to not pile so deeply between them and won't stay against the sides of the bales so long.

"With single rows, we can pull bales off and only open up a small area—rather than trying to get into stacks. If there's limited space, however, we must stack them," says Rusche.

People often put round bales in rows with a sideways bale on top of each upright bale, or make a pyramid stack. "Kansas State University looked at putting a bale on end and other bale on top of it. Shrink loss was similar to what they saw in single rows. A study in South Dakota looked at storage losses in pyramid stacks (base of three with a layer of two and a third bale on top) and found 10% loss in one year. A single bale with air around it had storage loss of 4% and when placed end-to-end in long rows the loss was under 1%," he says.

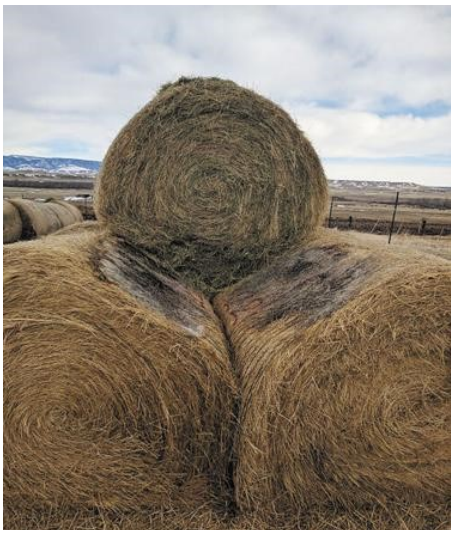
"The longer you need to keep hay, the more protected it should be. If you have covered storage, put the highest-quality feed under roof if it needs to hold quality until spring," he explains. Rained-on grass hay that's not worth as much can be stored outside.

It pays to invest in a few tarps, canvas cover, or rolls of black plastic that can be reused several years. Black plastic lasts longer than most tarps, is cheaper than a good tarp, and can be cut to fit the stacks. Plastic is slicker—and warmer from absorbing sunshine—and snow sheds off better in winter.

Tarping hay is easy with long single rows or even rows of single bales placed on top of single bales—compared with tarping a pyramid stack. A tarp or plastic comes off single rows easily, whereas the pyramid stack or any rows placed tightly together has dips and valleys where water or snow melt collects and creates heavy chunks of ice—more difficult to take the tarp off in winter.

"Pyramid stacks have more problems in general; there are more places for water to collect and sink into the hay. If we place bales flat side to flat side in long rows of single bales, water sheds off," says Rusche.

Hay stored outside should be on high, well-drained ground or on pallets, old tires, bricks, railroad ties, or old fence posts—anything to keep it off the ground.



Help and Hope Are Right Here

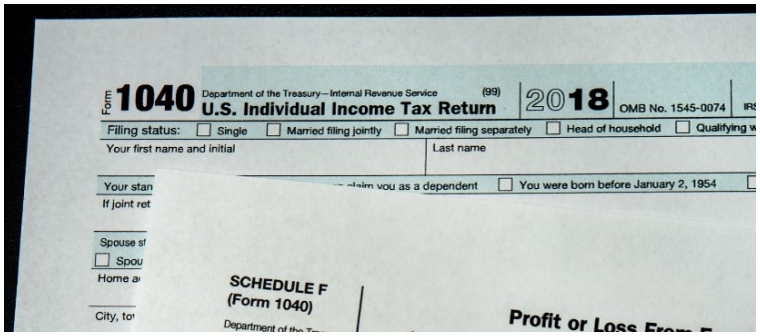
Debt, extreme weather, unstable prices, and isolation have created a storm of stress for the people who feed the rest of us. We see you, we appreciate you, and we are here to help.

If you or someone you know is feeling depressed or overwhelmed or is struggling with their mental well-being, please don't hesitate to reach out.

Call 988 or text "KY" to 988 or chat at 988lifeline.org

Tax Management is Still Important – Even in a Down Year

Jennifer Rogers | KFBM Area Extension Specialist



With farm production being down, compared to recent years, it may come as a surprise to many that tax management is still vitally important. Kentucky producers were blessed in 2021 with record yields and good prices, resulting in high revenues. While some of the 2021 revenue may have been recognized last year, many bushels of crops were held over to sell in early 2022. Most farms are cash-based taxpayers, meaning that any crop sales held over to the following year will be taxed in the year they were received. This means that even this drought year, with reduced production, could still come with a big tax bill. The steps to tax management include knowing where your income currently stands, managing tax brackets, and adjusting your income.

Good, up-to-date records are the key to management. If you don't know what is going on financially, there is no way to know that you are making sound decisions. At this point in the year, you should be able to calculate your revenue and expenditures to date. Using this information, you should also be able to make some projections about what additional income and expenses will take place before the end of the year. Being able to compare net income this year to last year or other previous years is also a good tool. This will provide some insight into how things are different and give you some inclination as to whether you expect your tax liability to be up or down. When considering expenses, don't forget about the non-cash expense of depreciation. An operation may or may not have depreciation available from the previous year's purchases to use in the current year. It will depend on the expense elections and purchase history. An operation may also have capital purchases in the current year that may be available to depreciate.

While almost everyone wants to pay as few dollars in tax as possible, managing tax brackets, to take advantage of an entire lower bracket, may result in less tax paid over time. Tax liability is calculated based on the total taxable income and is calculated on the percentage rate of the tax bracket that income falls into. Everyone gets to take advantage of the lower brackets and only pays that lower rate on the income amounts that fill those brackets. As taxable income increases so does the tax rate for those additional dollars. Managing tax brackets may result in additional tax dollars paid this year as you fill up a lower bracket, but then save tax dollars in future years because you don't have income flow over to the higher bracket. This year, with lower revenues expected from crop sales, may provide opportunities for the opposite. Producers may expect lower taxable income next year, so they may try to manage tax into a lower bracket this year, knowing that they can move some taxable income forward to next year and stay in the same bracket or at the same rate.

Adjusting taxable income sounds like it might be an issue of tax manipulation, however, cash-based taxpayers are allowed a lot of flexibility about when they recognize both income and expenses. Adjusting income can be as easy as delaying sales to the next year or prepaying expenses in the current year that won't be used until the next year. If additional income is needed, a producer can sell more crop in this year, or take out a CCC loan and claim it as income. Accelerating depreciation or foregoing accelerated depreciation is another option. There are lots of ways to adjust income legally. If you have questions about what you can and cannot do, you should consult your tax professional. The flexibility of being able to adjust income is what allows producers to be able to manage tax brackets.

Tax management is one piece of total farm management. The key to almost all farm management issues starts with good records. Without complete, up-to-date, financial records, you can't manage tax brackets or know which way to adjust taxable income. In a down year like this, stay aware and don't get surprised by a sleeping tax liability that you have pushed forward. It may also be a year to "catch up" or slow the deferral of moving income forward. Review your records and have a discussion with your tax professional before the end of the year, while you can still adjust your taxable income.

FORFS 22-05

Cooperative Extension Service

Forestry and Natural Resources Extension
College of Agriculture, Food and Environment

Selling Black Walnuts in Kentucky - 2022

Jacob Muller and Renee' Williams, UK Forestry and Natural Resources - Extension

Black walnuts can be sold to commercial hullers in Kentucky (see Table 1). Bring the whole seed to the huller locations and they will run them through a machine to remove the hulls. They will weigh the walnuts after the hulls have been removed and pay you a specific amount per 100 lbs. Normally, they accept walnuts throughout the fall. However, it is recommended that you contact your local huller prior to gathering nuts.

Table 1. Commercial Huller Operations in Kentucky – 2022

Huller Operator	*City (County)*	*Phone #*	*Address*
Graber, David	Carlisle (Nicholas)	*	4600 Burris Rd., Carlisle, KY 40311
Yoder, Uria	Cynthiana (Harrison)	859-588-0001	2126 Salem Pike, Cynthiana, KY 41031
Leid, Henry	Elkton (Todd)	270-265-3970	161 Majors Lane, Elkton, KY 42220
Coblentz, Tim	Flemingsburg (Fleming)	606-748-2219	1591 Maddox Pike, Flemingsburg, KY 41041
Troyer, Ammon	Glasgow (Barren)	*	7675 Oil Well Rd. Glasgow, KY 42141
Yoder, Paul	Hardyville (Hart)	270-303-0350	2440 Whickerville Rd., Hardyville, KY 42746
Zaharie, William	Jeffersonville (Montgomery)	859-498-6525	2115 KY Hwy 213, Jeffersonville, KY 40337
Grayson County Implement- Paul Young	Leitchfield (Grayson)	270-259-0075	3363 Owensboro Rd., Leitchfield, KY 42754
Yoder, Andrew	Lewisburg (Logan)	270-755-5670	797 Coon Ridge Lake Road, Lewisburg, KY 42256
Burkholder, Paul	Liberty (Casey)	606-787-7996	9431 KY 501 South, Liberty, KY 42539
Sumrell, Eric	Manchester (Clay)	606-847-2980	7856 Beech Creek Rd., Manchester, KY 40962
Blyer, Roy	Marion (Crittenden)	270-969-8266	2865 Mt Zion Church Rd., Marion, KY 42064
Farmwald, Delbert	Monticello (Wayne)	606-348-6281	3521 State Hwy 1009, Monticello, KY 42633
Thomas, William	Mount Olivet (Robertson)	859-588-3032	731 Blue Lick Pike, Mt Olivet, KY 41064
Hertzler, Henry	Bethel (Bath)	606-336-8810	State Route 11 North, Bethel, KY 40360
Midwest Herb Co. KY	Pineville (Bell)	606-337-7668**	3930 HWY 221, Pineville, KY 40977
Raber, Roman	Pleasureville (Henry)	502-878-4211	10712 Castle Hwy., Pleasureville, KY 40057
Ottenheim Country Store- Matthew Yoder	Crab Orchard (Lincoln)	606-355-7464	5920 KY Hwy 643, Crab Orchard, KY 40489
Derstines, Aquila	West Liberty (Morgan)	606-495-8280	207 Crockett Loop, West Liberty, KY 41472

If you need directions, please go to Hammons Products Company's website (http://www.black-walnuts.com/) and click on the Locate a Buying Station where you will find the Hulling locations. *A phone number was not listed for this huller, please visit Hammons website for directions. **Call for directions.

Issued 10-2022

Off-Grid Solar

University of Kentucky
College of Agriculture, Food and Environment
Cooperative Extension Service

Small Systems for Farm & Home Applications

This program will help you understand the components that make up a solar panel system (batteries, fuses, controllers, and inverters).

Off-grid solar systems are often considered on farms and small acreages locations where power is difficult or expensive to run.

- Light a Barn
- Power a Fence Charger
- Run a Small Motor or Pump

Presenters: Daniel Carpenter, *Larue County Agriculture Agent* **Morgan Hayes**, *Biosystems and Agricultural Engineering*

Thursday, December 8, 2022 — 6:00 p.m.

Environmental Education Center
1261 Race Track Road, Alexandria, KY 41001

Call the Extension Office to register 859-572-2600
or online at: https://campbell.ca.uky.edu/

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Disabilities accommodated with prior notification.