



K E N T U C K Y
Small Grain
GROWERS' ASSOCIATION

2013 Annual Report & Research Summary





KENTUCKY
Small Grain
GROWERS' ASSOCIATION

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2013 Provides Record Wheat Crop

The 2013 winter wheat crop has been estimated to be 45.8 million bushels, nearly 60% greater than 2012 crop. Farmers also harvested 610,000 acres for grain. This was up 140,000 acres from 2012 and the largest acres harvested since 1982. Yield was estimated at 75 bushels per acre, up 13 bushels from 2012 and the highest yield on record. Farmers seeded 700,000 acres in the fall of 2012, up 120,000 acres from the previous year. The 90,000 acres not harvested for grain were plowed down for a cover crop prior to setting tobacco, cut as grain hay, chopped as grain silage or abandoned.
(Source: NASS-Kentucky Field Office.)



Annual Financial Report

From June 1, 2012 to May 31, 2013

Reviewed by Jones, Nale & Mattingly, PLC

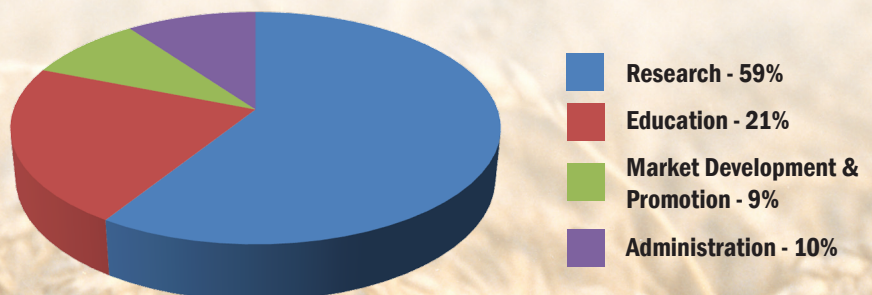
REVENUE

Checkoff Assessments	\$502,391
Producer refunds	\$22,038
Net Checkoff Income	\$480,353
Interest Income	\$832
Total Revenue	\$481,185

EXPENSES

Market development	\$21,411
Research	\$142,757
Education	\$51,690
Administration	\$24,630
Total Expenses	\$240,488

Distribution of Expenses



KySGGA Hosts Successful Irrigation Forum

More than 100 farmers and other interested people attended the August 1 Kentucky Irrigation Forum sponsored by the Kentucky Small Grain Growers Association and held at the UK Research and Education Center in Princeton. The goal was to provide farmers with information on available water sources, regulations and management. KySGGA also wanted to ease the minds of land owners and communities regarding the impact increased agricultural irrigation would have on local water supplies.

"I believe the farmers truly received the information they came to hear," said Laura Knoth, KySGGA executive director. "I am thankful our farmer leadership wanted to get in front of this issue, and the farmers in the room were encouraged to utilize the experts when making future decisions."



Panelists included Chuck Taylor from the Kentucky Geological Survey, David Jackson and Bill Caldwell from the Kentucky Division of Water, Kentucky farmers Firmon Cook and Bob Wade, Jr., and Jerry McIntosh from the Jackson-Purchase region of the Natural Resources Conservation Service. Kentucky Small Grain Promotion Council Chairman Don Halcomb and UK Extension Specialists Lloyd Murdock and Chad Lee moderated the forum.

Firmon Cook, a Caldwell Co. farmer who has been irrigating on his farm since 1980, said it is not a magic bullet for success, but it provides stability to his operation. In some years with more than adequate rainfall, he said it is a dead expense. More management and labor are required, but 2012 was a great year to have the system in place, providing a 150 bushel advantage over his non-irrigated corn. When asked how he decides to turn on the irrigation system, he said he watches the weather and subsoil moisture (tensiometer). His most important piece of advice was to never get behind with water needs.

Bob Wade, Jr., a Hardin Co. farmer, started using irrigation in 2012. He said he had a lot of questions and it was a "wild time to start something new." He said he consulted with the Cooks before setting up and started irrigating the first part of June last year. He said the public started asking questions and were worried that the creeks would dry up, but he said that never happened, and he kept water use records for security. He stressed that he has a conservation ethic, and he wants to ensure he is producing food responsibly and sustainably, and irrigation should be used correctly.



UK, JR - Farmer, Central Ky



Join Us for the 20th Annual **KENTUCKY COMMODITY CONFERENCE**

**Friday, January 17, 2014
Holiday Inn University Plaza
Bowling Green, KY**

Agenda (all times CST)

- 8:30 a.m. Registration & Trade Show Open
- 9:30 **Opening Remarks**
Kentucky Ag Commissioner James Comer
- Marketing Session**
Sponsored by Syngenta & Independence Bank
Marty Ruikka, ProExporter Network &
Dr. Cory Walters, University of Nebraska-Lincoln
- 11:30 **Lunch & Keynote***
Sponsored by Monsanto & Farm Credit Mid-America
Evelyn Browning-Garriss, The Weather Whisperer
- 1:30 p.m. Ky Soybean Association Annual Meeting
- 2:30 Ky Corn Growers Association Annual Meeting
- 3:30 Ky Small Grain Growers Association Annual Meeting
- 4:30 **Policy Roundtable Discussion**
Paul Hornback, Chairman, Senate Agriculture Committee
Tom McKee, Chairman, House Agriculture and Small
Business Committee
- 6:00 **Reception**
Sponsored by DuPont Crop Protection
- 6:30 **Awards Banquet***
Sponsored by Pioneer & Wayne Supply Co.
- 9:30 **Evening of Hospitality**
Sponsored by AgriGold

**Register today at www.kysmallgrains.org
or by calling 800-BEAN-SOY.**

***Pre-registration is required to guarantee entry into the luncheon and banquet. Tickets will be provided at registration.**

Book your rooms with the Holiday Inn University Plaza by Jan. 3. Be sure to mention Group Code C14 to get a discounted rate of \$92. Call (877) 863-4780 or register online at the link above.

1021 Wilkinson Trace, Bowling Green, KY 42103

Gifts of Grain

Kentucky Small Grain Growers Association Establishes Research Endowment Fund at University of Kentucky

The Kentucky Small Grain Growers Association (KySGGA) has established a research endowment fund at the University of Kentucky (UK) to ensure the advancement of production research crucial to Kentucky's grain farmers.

"To date we have directed more than \$2 million toward small grain research, and we expect that sum will continue to grow in the future," said Don Halcomb, chairman of the Kentucky Small Grain Promotion Council. "Establishment of this research fund, however, will guarantee that small grain research will continue to be a priority at the University of Kentucky. Our leadership has been extremely pleased with the quality of research conducted at UK, and growers have benefited greatly from the results. The fund will work only to improve our successful partnership."

Individual growers and businesses may donate to the fund, and KySGGA will match the sum of donations up to \$50,000. In addition to cash, growers and businesses may make an above the line deductible donation of grain. Donations should be made directly to the University of Kentucky College of Agriculture for the Kentucky

Small Grains Growers Association Research Endowment. Checks can be mailed to:

University of Kentucky College of Agriculture
Marci Hicks, Director of Development
E S Good Barn
1451 University Drive
Lexington, KY 40546-0097

For more information on how to make a gift of grain, contact Marci Hicks at 859.257.7200. For more information about the fund, please contact KySGGA Executive Director Laura Knoth at 800.326.0906 or by email at laura@kysmallgrains.org.



PEMBROKE

Certified Seed, No Strings Attached

Pembroke Varieties are developed by UK Wheat Science Group and released by KySGGA. Farmers, not KySGGA, profit from the release. Royalties go to UK to improve wheat technology. Buyers fully own the technology. Once you buy the certified seed, you own it - ALL OF IT. No strings attached.



www.kysmallgrains.org - 800.326.0906



SAVE IT

RESELL IT

REPRODUCE IT

Research REPORT

The Kentucky Small Grain Growers Association dedicates the largest portion of its budget to small grain research that may help increase grower success and profitability. The following report lists projects that are complete or continuing. More in-depth results can be found at www.kysmallgrains.org.

Kentucky Small Grain Variety Test Results Include Straw Yield Evaluation

By Bill Bruening, Research Specialist, University of Kentucky

Kentucky Small Grain Variety Performance Test Results are available at <http://www.uky.edu/Ag/wheatvarietytest/>.

During the 2012-13 growing season, ninety-nine wheat entries from seed companies/breeders were evaluated across Kentucky at 7 test locations. In addition to evaluating wheat varieties for differences in grain yield potential, the UK wheat variety trials also evaluate characteristics, such as test weight, heading date, plant height, winter hardiness, lodging and disease reaction. Additional specialized single location tests were conducted to measure wheat and oat varietal differences in forage biomass yields and post-grain harvest straw yields. Barley & oat variety grain production performance was also tested.

The University of Kentucky straw variety test was the first large scale test of its type. Straw research has generally been considered a labor intense process, due to the time required to manually cut, collect and weigh straw samples. By teaming up with UK forage variety testing, a protocol was developed to efficiently collect and measure straw yields from plots using a forage research combine, which followed a grain combine at harvest. This multi-disciplinary research approach combines expertise from two different research areas and has been a model for other universities. UK straw data has been an important component of the Sun Grant Initiative, a national research project evaluating wheat straw yields and its potential for cellulosic bioethanol production.

Straw is highly valued in many diverse industries and is an important secondary commodity for many small grain growers. Marketing both grain and straw provides



growers additional income from a single crop. Harvesting straw reduces field residue and facilitates good double-crop soybean stand growth and development. The time and labor requirements of harvesting straw may however, delay double-crop soybean planting.

When making wheat variety selections, growers who are harvesting both grain and straw should select varieties with both high grain and straw yield potential. Growers producing grain exclusively may consider selecting varieties with high grain and low straw yield potential to minimize post harvest field residue & aid soybean stand establishment. Secondary characteristics such as maturity and disease resistance are also important in variety selection. Plant height is often correlated with straw yield, but this is not always the case. A tall spindly variety may, for example may have lower straw yield than a shorter, thick stemmed variety with heavy tillering potential.

When managing wheat for grain and straw production, a fungicide application is it is recommended along with the standard management practices for grain production. A fungicide application near bloom stage will improve the brightness and quality of straw produced. It is also important to note that wheat harvested for straw removes organic matter and nutrients, such as potassium from the soil (approx. 50 lb K₂O per acre). Growers need to factor soil nutrient loss into their economic decision to harvest straw.

Straw yields vary widely among wheat varieties. In the 2013 UK wheat straw test, dry matter yields ranged from 0.9 to 2.0 tons per acre. Straw yields and production profitability can be dramatically affected by simple variety selection decisions. Multi-year data on varietal differences in straw yield potential are presented and recommended for variety selection decisions.

Soft Red Winter Wheat Breeding and Variety Development

The goal of the University of Kentucky wheat breeding program is to increase profitability of Kentucky's wheat production by developing and releasing improved wheat varieties with high yields and test weights, enhanced scab resistance and overall disease resistance, increased lodging resistance and increased profitability. Significant progress towards these goals requires long term, sustained effort and commitment. To date, nearly \$800,000 has been directed to Van Sanford's wheat breeding research. This is an ongoing project.

2013 Results

By David Van Sanford, University of Kentucky

Crossing: In greenhouse crossing this year we made a total of 386 successful 3-parent crosses in which at least one parent had scab resistance. In the spring crossing cycle, we made 290 successful single cross F1's in which both parents had high yield and test weight with some level of scab resistance.

Field plots and headrows: Our plot total was close to 15,000 in 2013. Plots and headrows were grown at four locations as shown on the map to the right. Almost all of our headrows were grown at Princeton. Due to late planting and emergence, flowering was delayed and the lines were exposed to head scab. This allowed us to screen for resistance without having to inoculate.

Line development: Close to 1800 F5 headrows were selected at Princeton, far more than in any other year. Selection was based on head scab resistance, height, maturity, and leaf disease symptoms. Seed from these rows will be grown in unreplicated Preliminary Trials in 2014 at Lexington, Schochoh and Princeton.

Yield testing: In 2013 10 breeding lines were entered in the state variety trial. KY03C-1002-02 performed extremely well in the test, ranking third of 100 entries. Several other KY lines performed quite well in the test; three of these lines are being put on the fast track of seed increase in Yuma, AZ this winter.

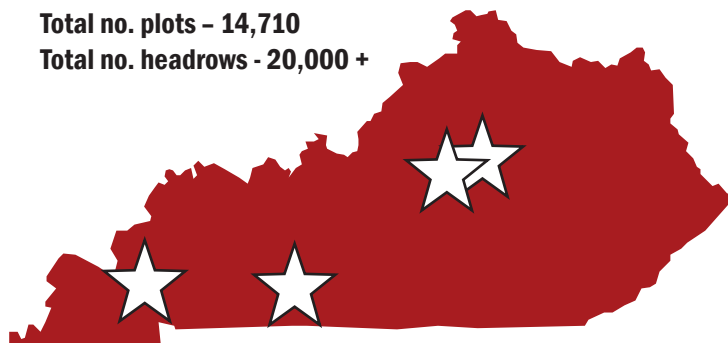
Purification and Increase: Seed increases of two KY lines were grown in 2013. About 8000 bu of seed of KY03C-1237-32 was produced by 4 growers at several locations around the state. KY03C-1237-39 was increased near Springfield and approximately 600 bushels were produced.

Scab screening: Scab screening is carried out in the irrigated, inoculated Lexington nursery where our goal is to create a scab epidemic that will allow us to find the resistant lines. Data from this nursery is used in combination with the data from our greenhouse screen to identify a

2013 Test Plots:

Total no. plots – 14,710

Total no. headrows - 20,000 +



Princeton UKREC
1790 plots: MX, AT,
Variety/Fungicide test
F1, F2,F3,F4, F5 headrows

UK Spindletop
8488 plots: MX, Scab studies
AT, AE, PT, F2, F3, F4, Barley,
Variety/Fungicide test, Scab nursery,
F5 and other headrows; Increases

Schochoh
2992 plots: SMX, MX, AT, AE, PT
Coop tests

Woodford County
1440 plots: MX, AT, AE, SMX

Fungicide-Treated Variety Trial Inoculated with Scabby Corn. Average of LEX and PRN Tests, 2013

Name	Yield Fungicide Treated	% Increase from Fungicide	Test Wt	Scabby Kernels (%) Fungicide Treated
KAS S1200	101.2	62.2	55.9	1.6
Pembroke 2008	100.1	53.1	57.4	0.9
KY03C-1237-32	99.2	52.3	57.9	0.5
AgriMAXX 413	98.3	47.7	47.8	2.0
KY03C-1002-02	95.1	15.3	57.0	1.2
KY03C-1237-10	94.6	31.3	57.3	0.7
KY03C-1237-12	93.3	31.6	57.3	1.4
Dyna-Gro 9042	92.3	60.2	53.9	1.8
KY03C-1237-07	92.2	16.0	57.1	0.2
KY03C-1237-05	90.4	23.2	57.6	0.8
Dyna-Gro Dinah	88.2	26.0	57.9	0.9
Pioneer 26R22	86.0	85.9	55.3	1.5
KY03C-1237-39	79.4	15.6	54.0	2.1
Pioneer 25R56	70.1	12.0	55.3	2.7
Pioneer 25R32	69.7	8.7	59.0	0.6
Truman	63.1	28.3	58.0	0.6

LSD (0.05) 12.6

number of resistant lines with good yield and test weight potential. The non-irrigated fungicide x variety trials at both Princeton and Lexington provided good data in 2013 due to the frequent rains around flowering and during grain fill.

Genotype Specific Wheat Management

By Kathleen Russell, Dave Van Sanford and Chad Lee, University of Kentucky

The complex interaction of genotype x environment x management (GxE x M) that defines crop yield is often only explored with research on a single genotype or a select few genotypes. Improvements in crop management and understanding local adaptation to climate variability will require a broader understanding of specific genotype interactions with management systems across multiple environments. A multi-year study investigating the potential for variety specific management systems based on phenotypic characters in Kentucky soft red winter wheat (*Triticum aestivum*) was initiated in the 2012-2013 growing season.

A randomized split plot design was replicated 3 times at the University of Kentucky Spindletop Research Farm in Lexington, KY. The field study evaluated 10 genotypes under 3 management systems across 4 nitrogen rates. (Tables 1 & 2) Field sampling included: kernel growth rate, soil nitrate analysis, vegetative tissue and grain nitrogen analysis, relative water content, developmental staging, lodging and disease observations. Data collection was determined as input for DSSAT crop model for use with implementing climate scenarios on specific wheat genotypes. Data was analyzed using SAS Proc GLM ($p=0.05$).

Table 1. Genotypes

1	Truman	6	25R32
2	Pembroke	7	Dinah
3	1237-32	8	SS 8700
4	Shirley	9	SS MPV57
5	1238-17-1	10	Branson

Due to the poor corn crop from the 2012 drought conditions, nitrogen carryover caused high yields even in the 0 lb/A nitrogen treatments. This also caused few significant differences among nitrogen rates at all 3 management systems. (Figure 1)

With all nitrogen rates combined the high management system consistently resulted in higher yields across genotypes compared to the control and low management systems but

Table 2. Management Systems

	High	Recommended	Low
Seeding Rate	45 seeds/ft ²	35 seeds/ft ²	35 seeds/ft ²
Seed Treatment	Cruiser	Cruiser	Cruiser
Fungicides	Headline @ Feekes 6.0, Prosaro @ Feekes 10.5	Prosaro @ Feekes 10.5	No
Growth Regulator	Palisade	No	No
Insecticide	Warrior	Warrior	Warrior
Nitrogen	0 lb/A	0 lb/A	0 lb/A
	60 lb/A	60 lb/A	60 lb/A
	100 lb/A	100 lb/A	100 lb/A
	150 lb/A	150 lb/A	150 lb/A

many genotypes performed similarly to one another at each management system. Greater variability of yields among genotypes occurred at the high and low management compared to the control management system. (Figure 2)

We will extend this research project to

two locations in 2013-2014: UK Spindletop Research Station located in Lexington, KY and UK Research and Education Center located in Princeton, KY. We do not expect the same issues experienced due to nitrogen carryover in 2013-2014.

Figure 1. Management x Nitrogen Rate Yield Results, Lexington, KY-2012-2013.

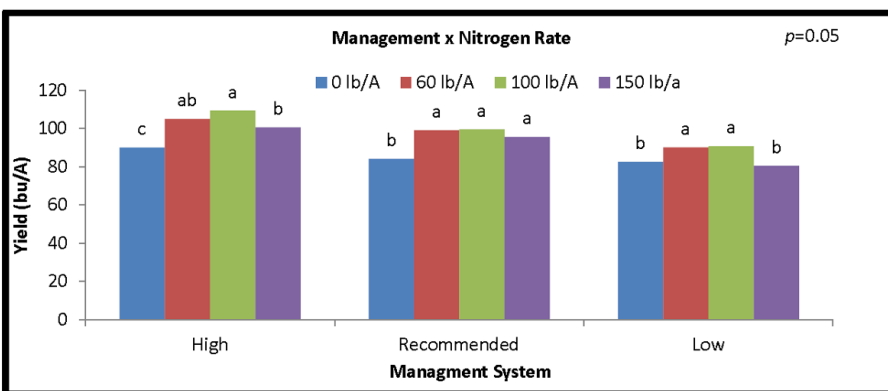
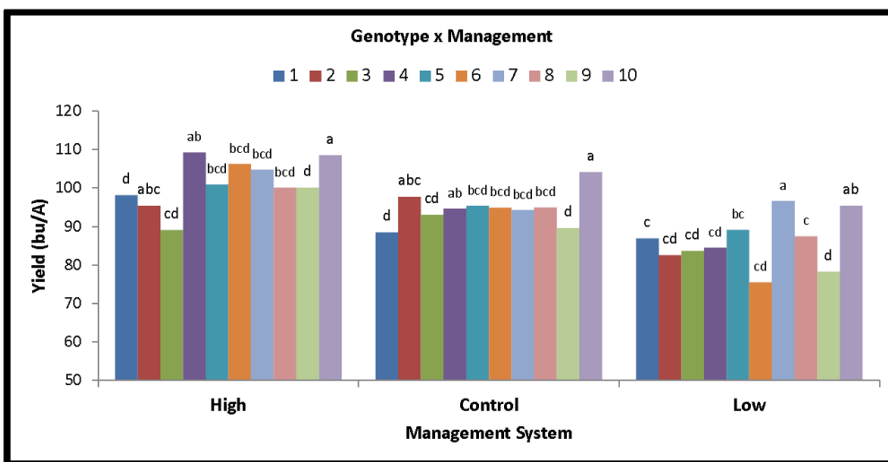


Figure 2. Genotype x Management Yield Results, Lexington, KY-2012-2013.





Fragipan remediation work in the UK Research & Education Center greenhouse at Princeton.

FRAGIPAN REMEDIATION

*Lloyd Murdock, A.D. Karathanasis, Chris Matocha and John Grove
University of Kentucky, Plant and Soil Science Dept.*

The fragipan reduces the crop yields by 20-25%. The fragipan is a naturally occurring soil horizon that virtually stops water movement and root growth through the soil. Its' depth averages about 20-24 inches in the soil types in which it occurs. The impervious nature of the layer is due to the cementation of the soil particles with a silicate rich amorphous aluminosilicate binding agent. This binding seals all the pores. Therefore this layer acts as a barrier similar to bedrock with similar effects on plant growth.

The fragipan is present in about 2.7 million acres of Kentucky soils and about 50 million acres in the U.S. Fragipan soils reduce yields of crops for 2 reasons: 1) limited water holding capacity due to limited soil depth 2) water saturated soil conditions during wet periods. If the yields on these soils can be improved by 10% on ½ of the 2.7 million acres, the economic returns to Kentucky producers would be about \$2.2 billion over a 10 year period.

The approach to investigation for a remedy to the fragipan has two phases. A laboratory and evaluation phase and a field research and evaluation phase.

The laboratory phase is looking at many different chemistry compounds and readily available materials and their effect on the fragipan. At this point, the two things that have given the most promise are sodium fluoride and ryegrass.

The field phase is looking at many different materials applied to the soil as well as ryegrass. The results from the field trials are much slower to be realized and any findings will take time. The one thing that can be said with certainty is that chicken litter has no effect on remediating the fragipan.

Evaluating Marestalk Control with Wheat Herbicides

2-Year Summary By James Martin & Jesse Gray, University of Kentucky

The University of Kentucky conducted trials during the past two years to evaluate several herbicides for managing marestalk in wheat. The results of these studies indicated there are a number of wheat herbicides that have activity on marestalk that emerged in the spring, although none of them provided 100% control. The following are some summary points concerning these trials:

Huskie (a premix of pyrasulfotole + bromoxynil) appeared to be most consistent in managing marestalk, however, it would not be suitable for spring applications since its label requires a minimum of 4 months after application to plant soybean.

Valor (flumioxazin) at 2 oz/A applied 7 days before planting no-till wheat seemed to do better this season compared to last season

when winter temperatures were warm and more favorable for herbicide dissipation.

Harmony Extra (a premix of thifensulfuron + tribenuron) alone provided about 50 to 75% control of marestalk seedlings in the spring. Including 2,4-D and dicamba with Harmony Extra in the spring provided 84 to 95% control of marestalk seedlings. Note that 2,4-D should NOT be used in fall applications; whereas, dicamba is labeled for use in wheat before, during or after planting.

Metribuzin 75 DF (formerly known as Sencor) applied in the spring at 6 oz/A appeared to be effective in controlling marestalk. The lack of information on susceptibility of wheat to metribuzin is a limitation on using this herbicide, especially at the 6 oz/A rate.

Pyoxasulfone products, such as **Anthem**, **Fierce**, and **Zidua**, are not registered for use in wheat; yet they were included in this year's research to determine their potential for controlling marestalk. The fact Fierce contains flumioxazin (Valor) was a benefit over the other two pyoxasulfone products in managing marestalk.

Finesse (a premix of chlorsulfurin + metsulfuron) and **Peak** (prosulfuron) did not provide acceptable marestalk control. Finesse is not labeled to control marestalk. The 0.5 oz/A rate of Peak that is used in wheat is labeled only for partial control of marestalk.

It is important to recognize these data are based on marestalk populations that emerged in the spring and do not reflect what may occur in populations that emerge in the fall.

Managing Winter-Wheat Variability in a Farmer's Field

Ole Wendroth, Department of Plant & Soil Sciences, University of Kentucky

Farmers' fields usually show a considerable spatial variability in their soil properties. This variability is expressed in crop yields varying across the field. Farmers who use a yield monitoring system on their combine know that in some areas of their fields, yields are very high, in other areas they are rather low, and in several areas yields behave similar to the average yield in the field. It is not possible to predict in a particular year how the variability will turn out, because a lot of the variability depends on the development of the weather during the growing season. If yields turn out high in one part of the field and low in another part where the same management effort was spent, i.e., same planting density, fertilizer rate, pesticides etc., some fine-tuning of the effort could have turned out in economically more efficient wheat production.

For example, the nitrogen fertilizer rate could have been optimized by paying attention to the local wheat crop nitrogen needs. How can that be done? Farmers can very well tell by looking at their wheat field whether the crop needs more nitrogen fertilizer. A wheat crop that suffers nitrogen deficiency, for example, at the end of winter or in early spring has a light green color, unlike a crop whose demand is fulfilled by sufficient nitrogen fertilizer application showing dark green leaf color, and in case of excess nitrogen, the green turns into a very dark to almost bluish green. Since several years, there exist optical sensors that can be mounted on a sprayer and connected to a GPS. What our human eye tells us including our own personal bias, these optical sensors can do in an unbiased way: When such a sensor moves across the field, it scans the crop on its go, and records scanner readings. See a photo of the scanner in action, mounted

to the sprayer's boom in Figure 1. Several thousand readings are taken per second and averaged over a second or a short time step. The information is saved to a computer. This information can be directly transferred into a nitrogen application rate, computed for the local condition wherever the sprayer's and the sensor's current position in the field is.

In the past years, Dr. Lloyd Murdock has already successfully demonstrated the development of an algorithm and on-the-go nitrogen fertilizer application based on sensor measurements. In the current project, Dr. Murdock was part of the team with Drs. Chad Lee, Dennis Egli, and Ole Wendroth from the UK Plant & Soil Sciences Department, and Adam Hendricks from Wheat Tec that worked on a procedure during this year to scan a wheat field a week before the second nitrogen split. This can technically be accomplished without any extra time and machine cost when farmers apply a herbicide at this time of the season a few days prior to the second nitrogen split. The time window of several days between scanning and the second nitrogen application can be used for data processing. The data processing becomes necessary with this procedure for the following reason: It is known that field soils do vary spatially. It is also known that there is a general response of crop yield to nitrogen application rate but experiments in Trevor Gilkey's farm in past years have shown that this response is not unique across the field but can change. In other words, if the sensor indicates the same reading of the wheat color (called NDVI) in two different locations in the field, this reading would translate into a nitrogen rate at the one location that may differ from the other location despite the same NDVI was observed there. Hence, depending

on where we are in the field, the application algorithm is flexible and takes into account the local soil conditions.

The farmer Trevor Gilkey, Hillview Farms, Princeton KY, allowed our group to conduct a strip experiment in one of his fields under real-world conditions. Every other strip was fertilized at a uniform rate, and the nitrogen application at strips in between was based on sensor readings. Moreover, in this approach, the local change of NDVI response to zero-nitrogen was accounted for. For this purpose, four 120 by 120 ft. plots distributed across the field received zero nitrogen during the first split in early March. These zero-N plots showed different NDVI values as they were responding to zero nitrogen application.

In the time between the crop scanning and the second nitrogen split, an application map was computed taking into account the different behavior of the zero-N plots. Adam Hendricks converted the computed map into a format that can be installed in the computer on the sprayer. The rate of N applied in the uniform strips at the second split was 71 lb N/acre whereas the variable rate nitrogen was on the average 80 lb N/acre. The higher amount in the variable N strips included the full nitrogen rate in the four zero-N plots now applied at the second split.

Wheat yields were obtained from the farmer's yield maps that he downloaded from the computer on his combine. Data were analyzed based on the center pass in each strip. Assuming a price of \$7 per bushel of wheat and \$0.70 per pound of N, the net economic gain from using the sensor and variable rate application is \$19/acre. Not only would farmers benefit economically from basing the N rate on sensor measurements but there is also an ecologic advantage through avoiding high N rates where the crop NDVI indicates a low N demand.

Acknowledgement

We thank the Kentucky Small Grain Growers' Association for supporting this experiment and several studies in previous years that allowed us to collect the information necessary for conducting this project. Special thanks to the farmer Trevor Gilkey who over the years has let us conduct experiments in his fields and who supported this experiment by allowing us to carry it out as close as possible to real-world conditions.



Impact of Wheat as a Rotational Grain Crop on Palmer Amaranth

By Jim Martin and Jesse Gray, University of Kentucky

The use of cereal rye as a cover crop is being used in some states as a non-chemical control strategy for helping manage herbicide – resistant Palmer amaranth. With the support of the Kentucky Small Grain Growers Association, University of Kentucky conducted trials at Doug Voorhees farm in Fulton County and Chad Elkins farm in Warren County to determine impact of wheat as a rotational grain crop on early emerging populations on Palmer amaranth.

Double-crop soybeans had an advantage over full-season soybeans in limiting early season emergence of Palmer amaranth due to the shading effect of wheat (See photo 1). However, Palmer plants emerged in the tramlines and skip areas before harvest (See photo2). Once wheat was harvested, double-crop fields needed to be treated with an effective burndown program that included a soil-residual herbicide.



Photo 1 above - No Palmer in wheat.
Photo 2 below - Palmer in tramline.



Winter Barley Breeding and Research at Virginia Tech

By W.S. Brooks, C.A. Griffey, M.E. Vaughn and W.E Thomason, VA Polytechnic Institute

The overall aim of the Virginia Tech Barley breeding program is to develop new and improved barley varieties with high yield potential, improved disease resistance, and acceptable quality for use in multiple end-use markets. Specific breeding goals include high yield, resistance to diseases (leaf rust, powdery mildew, net blotch and Fusarium head blight), and favorable feed, malting and brewing characteristics. To meet these objectives, we are conducting comprehensive breeding and genetics research activities (making crosses, population development, trait evaluation, breeding line selection) directed toward the development of new winter barley varieties adapted to the mid-Atlantic and south eastern United States regions. Specific expected outputs on a yearly basis are: 1) development of breeding populations segregating for useful genes; 2) barley germplasm with specific desirable traits; 3) a steady flow of variety candidates into state and regional trials.

Significant Accomplishments

We are pleased to report release of the winter hulless barley line VA07H-31WS from the Virginia Tech breeding program in March 2013. VA07H-31WS is a six-row, full season winter hulless barley having white seed (WS) color with high grain yield and good straw strength. Head emergence of VA07H-31WS is more similar to that of the hulless cultivar Dan, and 3 to 5 days later than Eve and Doyce. In addition, our program is participating in a national winter malt barley research effort that includes tests conducted at a total of 16 locations in 13 states (Washington, Oregon, Idaho, Utah, Nebraska, North Dakota, Minnesota, Wisconsin, New York, and Virginia) targeted at local brewing industries in the mid-Atlantic and south eastern United States regions. In the past two years, we have initiated population development and series of field testing trials to develop winter malting barley for Virginia and the eastern United States. Our strategy is to use germplasm from the Uniform winter barley trials in crosses with elite two and six-row material from our program. We will also be using marked assisted breeding to accelerate population development.



Virginia State Variety Trials

In 2012-13 the hulless state test contained 26 entries (5 released cultivars and 21 experimental lines) planted at six locations in Virginia. The highest yielding hulless entry was the white seeded experimental line VA07H-31WS with an over location average of 88.4 bushels per acre. The highest yielding cultivar was Dan which had an over locations average of 79.3 bushels per acre. Dan also had the highest test weight over locations with average of 58.7 bushels per acre. The hulled state test contained 54 entries (8 released cultivars and 46 experimental lines) planted at six locations. The highest yielding entry was the experimental line VA11B-143 with an over locations average of 118.7 bushels per. Thoroughbred was the highest yielding cultivar with an over locations average of 106.4 bushels per acre.

Diseases

In the spring of 2013, the most prevalent diseases observed in the Virginia state barley tests were leaf rust (*Puccinia hordei*), net blotch (*Pyrenophora teres*), and powdery mildew (*Blumeria graminis* f. sp. *hordei*). Severity ratings were taken on a 0-9 scale with 0 being no symptoms present and 9 being near total leaf coverage. In the hulless state test, average leaf rust ratings ranged from 0.9 to 7.8 with an average rating of 4.0. Net blotch ranged from 0.44 to 7.5 with an average rating of 3.0. Powdery mildew ratings ranged from 0.4 to 8.2 with an average rating of 2.0. In the hulled state test, leaf rust ratings ranged from 0.6 to 6.8 with an average of 2.0. Net blotch ratings ranged from 0.1 to 5.9 with an average of 2.0. Powdery mildew ratings ranged from 0.3 to 8.0 with an average rating of 1.0.

Establishment of Chia as a Sustainable Grain Crop for Kentucky

By David Hildebrand, University of Kentucky

Chia, *Salvia hispanica*, continues to show promise as a new Kentucky crop. The objectives of this research were to: 1.) Further evaluate the top lines from the 2009 – 2012 field trials for yield and other agronomic performance characteristics and optimum production practices in 2013. 2.) New promising lines will be further evaluated for yield potential and yield by nitrogen level interaction. 3.) The genotype and environmental effects on oil and protein contents and fatty acid composition including $\omega 3$ levels will be analyzed of the materials produced on both the farm and greenhouse in 2013. 4.) NIR calibrations for rapid, non-destructive chia seed protein and oil analyses will be established. 5.) A stable market potential for a nutrigen soluble fiber product stream from chia seeds will be extensively analyzed.

The goal of this research was the development of chia as a sustainable oil source for edible and renewable chemical applications as well as fiber for food and medicinal applications and high protein meal. This in turn will provide a major new market for farmers.

Yield and other agronomic data was obtained in multiple locations on the University of Kentucky Lexington farm and with farmer cooperators led by Chris Kummer. The most promising lines from the 2012 harvest were used in replicated agronomic performance trials at the UK research farms in Lexington. Data on total plant biomass and seed yield was collected, as well as flowering date, harvest date, lodging score, and any pest problems. Large increase blocks of four of the most promising lines were planted and harvested but due to the severe drought in 2012 no yields were > 500 lbs/acre. 50% or greater shattering was experienced indicating much higher yields with better harvesting equipment/settings and selection for lower shattering. In 2012 the highest yields were obtained with later maturing lines apparently due to the cooler weather during seed development and less shattering. Chris Kummer reported better yield of ~ 700 lbs/acre in 2012 in small plots on his farm in Simpson Co. apparently due to a little more favorable rainfall and better seed recovery. Few pest problems were observed

but we need to continue to find good herbicides for weed control.

Breeding for high-yielding chia lines that can set seed in Kentucky is continuing. Uniform white and charcoal seeds are being selected. The oil and protein contents of the harvested seeds as well as fatty acid composition has also been determined. Most of the trials were being conducted in 2 ft. row spacings as the prior data indicated this to be optimum. This was investigated further in 2012 with narrower spacings yielding more apparently due to better weed control. The ideal spacing appears to be about 12 – 20 inches with a seeding rate of 4-5 lbs/acre. For the fertility response trial, nitrogen was again applied at 0, 30 and 60 kg/ha two weeks after planting, with P and K being applied according to soil test results. An erratic response was found to N rates with greater lodging at higher rates. Chris Kummer reports a better N response on his farm in Simpson Co.

The 2013 yield trials appear more promising.

Chris Kummer is also establishing optimum planting rates, planting depth, row spacing fertility. Chris can be contacted for information for other farmers interested in producing chia.

For commercialization of these lines as an $\omega 3$ oil in addition to whole seeds we are further screening and selecting lines for higher oil and $\omega 3$ levels. We have established a very efficient screen for higher oil chia lines and have found considerable variability for oil content. Thus we should be able to readily develop new higher oil lines.

For one of our top oil chia lines, G8 the oil was found to range from 32.7 to 34.2 % from different plots analyzed in bulk. When brown seeds were isolated and analyzed separately the oil was only 20.4% for brown seeds. The 100 seed weight ranged from 91 – 117 mg with brown seed only weighing 55 mg/100 seeds. All G8 seeds were ~ 60% $\omega 3$ fatty acids. We put together a comprehensive chia germplasm collection and analyzed 120 lines for seed composition. The protein ranges from 18.2 to 28.2%, $\omega 3$ content ranged from 33.9 to 66.7% and phosphorus ranged from 0.55 to 1.1%.

Further work is being done on processing and marketing chia for new commercialization



Tim Philips and Ph.D. student Maythem Al-Mery observing plots in early August.



Some lines showed severe lodging with 6 - 7 inches of rain in a few hours.



Chia seed.

opportunities for Kentucky growers for food, health and renewable chemical markets. For expanding market opportunities for chia growers we are continuing to work with experts in nutrition and medicine and high chia content product development. It has become apparent that chia may be the best source of soluble fiber in addition to $\omega 3$ fatty acids. We will further study the formation, isolation, health properties, processing and marketing opportunity of chia soluble fiber in addition to the oil and high protein meal especially the viscosity as this is a very important parameter for the marketing of such products for food, health, cosmetic and industrial applications.

Financial Impacts from Farmland Value Declines by Various Farm Ownership Levels

(AEC 2013-05) By Cory Walters and John Barnhart, University of Kentucky

Long-term farm financial strength stemming from investment decisions is a primary concern of all producers, bankers, and the entire agricultural industry. Farmland in Kentucky represents the primary resource for producers to accumulate wealth and represents, on average, 75% of producers' assets (KFBM, 2012). There are large differences in farmland as a percent of assets across Kentucky producers, with a minimum of 13% and maximum of 99% (KFBM, 2012). Declines in farmland values have the potential to reduce long-term farm financial strength (causing liquidation in the extreme case) as well as producing negative indirect impacts throughout the entire agricultural industry. In this article, we examine farm financial impacts from farmland value declines by various farmland ownership levels through key financial ratios.

Producers rely on banks for access to credit. In order for banks to grant access to credit they require key financial ratios to be below predetermined thresholds. Certain key financial ratios that help gauge producer

solvency, such as debt to total asset and debt to equity ratios, depend heavily on farm assets and therefore, farmland values. For example, the debt to total asset ratio depends heavily on the denominator, which includes farmland values, Box 1. A decline in asset values while holding debt constant results in a higher debt to total asset ratio. The resulting higher debt to total asset ratio is that much closer to banks predetermined thresholds where credit access could be declined. Impacts on producers from declines in farmland values will not be symmetric across producers and will depend on two factors. The first factor is the percent of total wealth invested in farmland. For example, producers who own no farmland will face no change in their financial ratios from farmland value declines whereas producers who own almost all their farmland will observe a direct adverse effect on their financial solvency ratios. The second factor is the starting level of the main financial ratios. Increases in key financial ratios will not cause any adverse impacts if the financial ratios started well below

predetermined thresholds.

Starting with strong financial ratios increases the chances of success versus starting with poor financial ratios, which are already closer to bank thresholds.

Financial Ratios

Two leading financial ratios that demonstrate financial health are the debt to total assets ratio (Box 1) and the debt to equity ratio (Box 2). The debt to asset ratio is calculated by dividing total outstanding debt by total assets and multiplying it by 100 to turn it into a percentage. In the denominator of the debt to asset ratio is total assets, representing available resources to pay off debt and farmland. Farmland value declines raise the debt to total assets ratio resulting in additional long-term financial risk. As a general rule of thumb, a debt to asset ratio of 30% or less is strong because the debt financing is managed substantially through producer equity. A debt to asset ratios greater than 70% is considered weak, indicating financing of assets primarily through debt.

The debt to equity ratio indicates a business's ability to pay debts. The debt to equity ratio is calculated by dividing total outstanding debt by total equity then multiplying it by 100 to turn into a percentage. Farmland value declines decrease equity, increasing long-term financial risk. The difference between strong and weak debt to equity ratios depend upon industry factors such as; industry scale, capitalization make up and market volatility. In agriculture, a debt to equity ratio is strong when below 42%, indicates financing of growth through debt and weak with a value greater than 230%, indicating growth with debt (Kohl 2009).

Data

We use Kentucky Farm Business management Program (KFBM) farm financial data to analyze farm financial impacts from farmland value declines. The KFBM data

BOX 1

Debt to Total Assets Ratio:

$$\frac{\text{Total Debt}}{\text{Total Assets}} \times 100 = \%$$

- Calculated by taking the amount of total debt outstanding and dividing it by the amount of total assets multiplied by 100 to put it into percentage terms.
- Debt to total assets is strong with a value less than 30% and weak with a value greater than 70%.
- For example, a debt to total assets ratio of 30% can be interpreted by stating that a producer has \$0.30 of debt for every \$1.00 in assets.

BOX 2

Debt to Total Equity Ratio:

$$\frac{\text{Total Debt}}{\text{Total Equity}} \times 100 = \%$$

- Estimated by dividing total debt by total equity multiplied by 100 to put into percentage terms.
- Debt to Total Equity is strong with a value less than 42% and weak with a value greater than 230%.
- For example, a debt to equity ratio of 13.20% can be interpreted by stating that a producer has \$0.13 of debt for every \$1.00 in equity.

provide over two thousand observations from 1998 to 2009 of producer-level balance sheet data and farm demographic information (i.e., Owned acres, farm acres, crops grown). We supplement KFBM data with Kentucky farmland value per acre data from the National Agricultural Statistics Service (NASS).

KFBM farm business summary statistics indicate that farmland represents on average 75% of producers' assets (Table 1). Debt to total assets ratio averaged 8.7%, indicating that there is \$0.09 worth of debt for every dollar of assets. Variation in debt to asset ratio ranged from zero or no debt to 75%, indicating the financing of assets through debt. The debt to equity ratio averaged 10.6%, implying about \$0.11 debt for every dollar worth of assets. The debt to equity ratio varied from a low of zero or no debt to a high value of 316%, indicating, in this case, the financing of growth substantially with debt.

Analysis

To assess farm financial health caused from declines in farmland values we look at five different categories of percent farmland ownership to total acres farmed. The five categories are the largest 10% farmland ownership group, largest 3rd, middle 3rd (median), smallest 3rd, and smallest 10 percent. The middle 3rd farmland ownership group has 75% of their assets invested farmland, where the largest 10% farmland ownership group has 84% (Table 2). Finally, the smallest farmland ownership group has 53% of their assets invested in farmland.

To identify farm financial impacts from farmland value declines we reduce farmland values by 15% and 30% and re-calculate both financial ratios. The 15% decline represents one the largest historical year-to-year farmland value changes. The 30% decline is double the 15% decline to represent a rare event twice as large ever witnessed. Producers with a larger share of total assets invested in farmland represent the ownership group with the greatest amount of money to lose from declines in farmland values. For the largest ownership group a farmland value decline of 15% results in over a 12% capital loss, while the smallest farmland ownership group loses

Table 1. Summary of Kentucky Farm Business Management Data, 1998 to 2009, in percent.

	Mean	Standard Deviation	Min	Max
Farmland as a % of total assets	75.0	13.0	19.2	99.5
Debt to Total Assets	8.7	8.5	0.0	75.1
Debt to Equity	10.6	12.9	0.0	316.5
Notes: 1003 observations, years 2005-2009				

Table 2. Farmland as a Percentage of Total Assets with Simulated Farmland Value Declines*

		Farmland Value Decline			
		15% Decline		30% Decline	
Farmland Ownership Group	Farmland Value	New Farmland Value	Difference	New Farmland Value	Difference
Smallest 10%	53.0	45.0	-7.9	37.1	-15.9
Smallest 1/3	60.6	51.5	-9.1	42.4	-18.2
Middle 1/3	74.8	63.5	-11.2	52.3	-22.4
Largest 1/3	80.2	68.2	-12.0	56.2	-24.1
Largest 10%	83.6	71.1	-12.5	58.5	-25.1
* Average value. Years 2005-2009. Values are in percent.					

Table 3. Debt to Asset Ratio from Declines in Farmland Values*

		Farmland Value Decline			
		15% Decline		30% Decline	
Farmland Ownership Group	Debt to Asset	New Debt to Asset	% Change	New Debt to Asset	% Change
Smallest 10%	18.3	19.7	7.9	21.2	15.9
Smallest 1/3	14.5	15.8	9.1	17.1	18.2
Middle 1/3	10.7	11.9	11.2	13.1	22.4
Largest 1/3	7.2	8.0	12.0	8.9	24.1
Largest 10%	2.5	5.8	12.5	6.4	25.1
* Values are in percent.					

nearly 8% worth of capital (Table 2).

While both losses are high, impacts on the farm are quite different. Diversified farms or those who have assets in other investments see a smaller impact than farms with assets primarily found in farmland.

Results indicate that debt to asset ratios across all farmland ownership sizes is currently displaying strong long-term financial solvency (Table 3). In the extremes of farmland ownership categories, debt to asset ratios ranged from a high of just over 18% in the smallest ownership group to 5% for the largest ownership group. Financially, the group with the highest debt to asset ratio, the smallest

ownership group would be the most concerned about increases in debt to asset ratio above acceptable bank levels.

A 15% decline in farmland values increases the smallest farmland ownership group's debt to asset ratio by almost 8% to just less than 20% (Table 3). A 30% farmland value decline increases their debt to asset ratio to over 21%. For the largest farmland ownership group, the 15% farmland value decreases result in their debt to asset ratio increasing by over 12% for a new ratio of just less than 6%.

The smallest farmland ownership group has the highest debt to asset ratio but also has the lowest percent assets invested in farmland. As

Table 4. Debt to Total Equity Ratio from Declines in Land Value*

		Farmland Value Decline			
		15% Decline		30% Decline	
Farmland Ownership Group	Debt to Equity	New Debt to Equity	Difference	New Debt to Equity	Difference
Smallest 10%	26.1	28.2	7.9	30.3	15.9
Smallest 1/3	21.0	22.9	9.1	24.8	18.2
Middle 1/3	12.5	13.9	11.2	15.4	22.4
Largest 1/3	8.2	9.2	12.0	10.2	24.1
Largest 10%	5.5	6.2	12.5	6.9	25.1
* Values are in percent.					

Table 5. Capital Levels from Declines in Farmland Values

Farmland Ownership Group	2009 Level	Farmland Value Decline	
		15% Value Loss	30% Value Loss
Smallest 1/3	\$119,349,450	\$17,902,417	\$35,804,835
Middle 1/3	\$334,949,100	\$50,242,365	\$100,484,730
Largest 1/3	\$804,870,500	\$120,730,575	\$241,461,150
TOTAL	\$1,259,169,050	\$188,875,357	\$377,750,715

a result, changes in farmland values will not affect them as strongly as producers with a higher percentage of assets in farmland. The smallest farmland ownership group realizes 53% of each dollar of farmland value decline on their financial ratios. The largest farmland ownership group realizes 82.6% of each dollar of farmland value decline. The debt to asset ratio for the largest ownership group was so low to begin with that it does not raise enough to be near any financial concern levels. Farmland value declines of up to 30% do not leave any farm ownership groups with weak debt to asset ratios, indicating strong solvency.

Across all farmland ownership groups, the debt to equity ratios displays strong long-term financial condition (Table 4). For the smallest farmland ownership group, the debt to equity ratio comes in over 26%, and for the largest farmland ownership group the debt to equity ratio comes in at over 5%. As we found in debt to asset ratio analysis, the group with the highest debt to equity ratio is the smallest farmland ownership group. A 15% farmland value decline increases the debt to equity ratio by just fewer than 8% to just over 28%. A 30% farmland value decline increases the debt to equity ratio by just fewer than 16% to

slightly over 30%. For the largest farmland ownership group, the average debt to equity ratio is surprisingly low, coming in at less than 6%. With more assets invested in farmland, a 15% decline in farmland values impacts them by just over 12% to a new debt to equity ratio of just over 6%. For a 30% decline, the debt to equity ratio increases to just fewer than 7%. Large declines in farmland values do not put any ownership group in a weak debt to equity ratio condition.

Using these two financial ratios we found no evidence that producers would find credit inaccessible due to farmland values declines up to 30%. This result comes with a few caveats. First, results assume all other assets remain equal in value. Declines in farmland could also be positively correlated with equipment values. Second, banks also depend on other financial measures such as current ratio and past repayment history to evaluate credit worthiness. Third, declines in farmland values could continue for a long time, resulting in multiple double digit farmland value declines that could lead financial ratios to levels where producers may find it difficult to obtain credit.

While financial ratios are quite prominent in accessing credit, producers are still concerned

about capital losses associated with farmland value declines. KFBM producers as a group carry about \$1.2 billion worth of assets in farmland (Table 5). Capital losses of nearly 200 million dollars results from a 15% farmland value decline for KFBM producers. This amount varies among producer ownership with producers in the largest farmland ownership group losing around 120 million dollars. Producers in the smallest farmland ownership group lose around 17 million dollars. Farmland as a higher percentage of assets results in larger capital losses due to declines in farmland values.

Conclusion

We analyze producer ability to withstand farmland value declines at different farmland ownership levels. Data indicates a strong financial position currently exists in both the debt to asset ratio and debt to equity ratio for all farmland ownership sizes. Results indicate that after shocking both financial ratios with a 15% and 30% farmland value decline all farmland ownership levels remain in a strong financial position.

Declines in farmland values still result in loss of capital. A 15% decline in farmland values results in nearly a \$200 million capital loss for Kentucky KFBM participants. A 30% decline results in nearly a \$400 million capital loss. The financial impact on the farm depends on the percentage of assets in farmland. We found that for the smallest farmland ownership group the debt to asset ratio increases by 8.6% from a 15% farmland value decline. For the largest farmland ownership group, the debt to asset ratio increases by 14.3%. Diversification of assets into other investments provides protection against declines in one asset; farmland in this example. Furthermore, diversification of assets into an asset classes that grow as farmland values declines provides a farmland value hedge.

Currently, no hedging mechanism of this type exists. Financial innovation through the creation of Exchange Traded Funds (ETFs) could provide an approach in which producers could invest in assets that grow as farmland values decline. Future articles will discuss how ETFs can help achieve this.

References

Kentucky Farm Business Management Data. 2012. <http://www.uky.edu/Ag/KFBM/about.html> ,

Kohl, David. 2009. "Farm Financial Ratios and Benchmarks" <http://cdp.wisc.edu/pdf/FarmFinancialRatiosandBenchmarks3192009.pdf>

Additional studies from this project, Hedging Opportunities against Declines in Land Values, can be found at www.kysmallgrains.org. The project was also funded by the Kentucky Corn Growers Association.

KySGGA Supports New Mobile Science/Ag Teaching Centers

Thanks to support from a number of Kentucky farm organizations, including the Kentucky Small Grain Growers Association, students are now using a dazzling array of high-tech instruments to learn about agriculture in the Kentucky Department of Agriculture's new Mobile Science Activity Centers (MSAC).

The new units were launched in a ceremony during the Kentucky State Fair in August.

The MSACs travel to schools throughout the commonwealth to give students the opportunity to conduct scientific experiments related to agriculture using current educational standards and core content. The new MSACs are 44-foot trailers that each contain 11 iPads, a 70-inch LED monitor, and an all-in-one touchscreen desktop computer. Students interact with the teacher using the iPads through special software. The mobile units contain internal generators; heating, ventilation, and air conditioning (HVAC) systems, and handicapped-accessible ramps.

"This is a great example of a successful public-private sector partnership," Kentucky Ag Commissioner James Comer said. "With the help of our private partners, we will teach Kentucky's kids why agriculture matters to all of us."

The MSACs are booked through the 2013-2014 school year. School administrators and teachers who want to find out more about the mobile units may contact Elizabeth McNulty at (502) 564-4983 or elizabeth.mculty@ky.gov.

Walnut Grove Farms Honored as Leopold Conservation Award Finalist During Ky Ag Summit

Stewardship of natural resources was the theme of the 2013 Kentucky Ag Summit, and the Kentucky Agricultural Council partnered with the Sand County Foundation to present the Leopold Conservation Award (LCA) in Kentucky for the first time.

The LCA recognizes farmers, ranchers, and other private landowners actively committed to living the legacy of renowned conservationist Aldo Leopold. Recognizing extraordinary achievement in voluntary conservation, the LCA inspires other landowners through award winners' examples, and helps the general public understand the vital role private landowners can and do play in conservation success. Kentucky is the first state east of the Mississippi to participate in this prestigious national conservation award.

Sherwood Acres Farms, owned and managed by Jon and Sylvia Bednarski, was the inaugural recipient for the Kentucky Leopold Conservation Award. They received \$10,000 and a Leopold crystal award, presented at the Kentucky Ag Summit on Thursday, November 14, 2013.

Kentucky Small Grain Promotion Council Chairman Don Halcomb and his wife Meredith, owners of Walnut Grove Farms in Schochoh, Ky., were also honored as a top three award finalist.

Halcomb had the following to say about their conservation efforts:

Farming and caring for the land has been the vocation and passion of the Halcomb Family for many generations. From settling of the Home Farm in the 1830's to the present day, each generation has embraced this opportunity/responsibility.

As the farm has progressed through the generations, it has transformed from being a self-sufficient pioneering farm into a commercial farm, producing food that moves into global trade. But even as the generations have changed, our commitment to preserving the land has increased. Science has given us a better understanding of the interaction of all the parts involved in a business focused on living organisms.

Our planning periods are not quarterly or annual, but generational. The changes we make in tillage, crop rotations, and wildlife habitat today may take decades to reach their goals. It is the complexity of this concept that has held our family and many other families together in this business of agriculture.

With backgrounds in agribusiness management, economics, equipment technology, manufacturing, and human resources, our family is committed to this generational goal for our farm moving into the 21st century.

KySGGA was a proud sponsor of this year's Kentucky Ag Summit and is a member of the Kentucky Agricultural Council.

For more information about the Leopold Conservation Award, visit <http://leopoldconservationaward.org/>



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2013
ANNUAL REPORT
& Research Summary

Kentucky Wheat Yield Contest Winners Announced

Congratulations to the winners of this year's UKCES Kentucky Wheat Production Contest. State and Area winners will be recognized at the Kentucky Commodity Conference on January 17, 2014 in Bowling Green, Kentucky. Each will receive a trophy and monetary prize from the Kentucky Small Grain Growers Association.

Full results of the contest including herbicide, fungicide, and insecticide information can be found at www.kysmallgrains.org.

	State Winners		Area Winners			
	Champion Tillage	Champion No-Tillage	Area 1 Purchase & Pennyrile	Area 2 Green River	Area 3 Mammoth Cave	Area 4 Rest of State
Producer	Jeff Coke	Duncan Gillam	Paul Yoder	Goetz Bros. Farms	Gary Summers	Fresh Start Farms
Yield, Bu/A	121.80	119.59	119.19	112.24	120.50	116.76
County	Daviess	Todd	Todd	Daviess	Simpson	LaRue
Area	2	1	1	2	3	4
Variety	Pioneer 26R10	Branson	Becks 113	Becks 126	SS 8404	Pioner 25R56
Division	Tillage	No-Tillage	No-Tillage	Tillage	Tillage	No-Tillage
Planting Date	10/6	10/11	10/12	10/8	10/17	10/11
Row Width, in.	7.5	7.5	7.5	7.5	7.5	7.5
Fall P ₂ O ₅ , lbs/A	69	69	0	64	60	69
Fall K ₂ O, lbs/A	90	90	0	90	100	90
Fall N, lbs/A	27	27	0	27	23.4	30
Winter N, lbs/A	40	40	50	100		40
Spring N, lbs/A	75	40	40		77	70
Total N, lbs/A	142	107	90	127	100.4	140
Other	10 lb S					
Manure Type			Chicken			
Manure Rate			2 tons/A			
Herbicide	Harmony	Harmony	Harmony Extra	Harmony	Harmony Ex. XP	Harmony
Herbicide		Sencor				Roundup
Fungicide	Headline	Headline	Headline	Caramba	Stratego YLD	Priaxor
Fungicide	Prosaro	Prosaro	Prosaro		Prosaro	Prosaro
Insecticide	Warrior x2	Warrior II	Warrior II	Warrior		Declare