DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Impact of the 2012 Drought on Field Crops and Cattle Production in Arkansas
Preliminary Report

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1. Introduction

This report summarizes the current situation in key field crops and livestock sectors and how the 2012 drought has impacted these sectors. Particular attention is given to cattle operations as these farms have been especially hard hit during the drought due to poor pasture and hay conditions and increased costs of hay and feed. The focus here is on the current situation and short-term losses experienced on Arkansas farms. The 2012 drought is widespread across the U.S. and affects other states and sectors in various ways. There are always a variety of impacts in agriculture during a drought and the long-term implications of drought go well beyond the current growing season. This report focuses on the current, short-term impacts of the 2012 drought in sectors that are the hardest hit in Arkansas. The goal of this report is to assess the current situation in Arkansas field crop and cattle sectors and examine the economic impacts of the drought in those sectors experiencing losses. The report is laid out as follows: first, an overview of the drought in Arkansas is given and a summary of the current situation is discussed. Second, summaries of the drought's impact on crop production and the cattle industry are presented including tables and figures summarizing key data. Finally, a series of "Frequently Asked Questions" are presented which address some of the broader impacts associated with drought.

2. Overview

Extended drought and rainfall deficits cause damage to crops and pasture. Crop failures and pasture losses are the two primary drivers of the direct economic impacts of drought in the agricultural sector. Production losses brought on by drought cause negative supply shocks and alter the market for agricultural products. On crop farms, a substantial portion of the costs of producing the crop have been experienced before the drought event. In the livestock sector, reduced pastureland requires farmers to use hay intended for winter feed in the summer or purchase hay from outside the drought stricken area which is more costly due to higher transportation costs and increased prices. If the cost of feed or hay becomes too high, cattle may go to feedlots or to market early which can drive down prices for cattle in the short run as well as reduce cattle breeding stocks.

Farmers across the U.S. are fighting one of the worst droughts in U.S. history. Arkansas has been one of the hardest hit states during the 2012 drought in terms of inadequate rainfall. According to data from the U.S. Drought Monitor, since the end of May the situation in Arkansas has gone from abnormally dry to extreme and exceptional drought across most of Arkansas (Figure 2.1). Over 74% of the land area in Arkansas is under extreme or exceptional drought and 97% of the state is under at least severe drought. All 75 counties in Arkansas have been declared drought disaster areas by the U.S. Department of Agriculture.

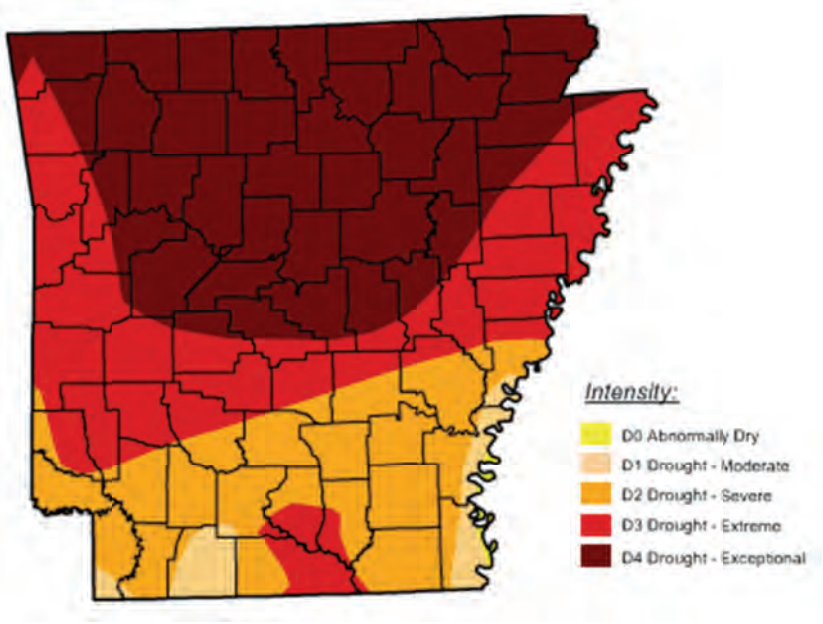
Livestock farmers are especially hard hit during this drought due to poor forage and inadequate hay production. 85% of all pasture and rangeland in Arkansas is considered to be in poor or very poor condition. The current year is forecast to be the worst for hay production since 1983 with yields the smallest since 1954. Governor Beebe has designated $2 million from the Governor's Disaster Fund to help ranchers who raise beef and dairy cattle, sheep and goats.

Much of the field crop production in Arkansas is on irrigated acreage which helps to insulate the crops sector from drought. Water quantity is a concern in some areas of crop production in Arkansas but

according to production forecasts, corn grain production is up 39 percent from 2011 and is forecast to be the largest corn crop on record. Rice, sorghum and soybean production is projected to be up from 2011; however, cotton production is forecast to be down from last year given fewer acres though yield looks to be higher this year.

Outside of agriculture, losses are also experienced by firms that interact with crop and livestock farms. For example, if cattle farms were to experience income losses, they would spend less on new equipment purchases, and those firms manufacturing and selling this equipment would have decreased sales, and so on. In addition, the workers of these related industries would have less income to spend back into their respective local economies purchasing goods and services.

Figure 2.1 Arkansas Drought Conditions as of August 21, 2012



Source: U.S. Drought Monitor, 2012

3. Effects of the Drought on Arkansas Agriculture

3.1 Arkansas Field Crops

While drought conditions are plaguing crops across the U.S., field crop production in Arkansas has much more extensive usage of irrigation than other production regions. The result is that crop production in Arkansas is capable of withstanding drought conditions that are much more destructive for crop production in other states.

Warmer than normal temperatures that enabled early planting, coupled with the prevalence of supplemental water, has resulted in good plant development for Arkansas crops. Information from field reports indicates that field crops have required 1-2 additional irrigation applications due to drought conditions. Rice has required 5-10 additional acre-inches of water to maintain a desirable flood.

The most recent crop production report was released by the National Agricultural Statistics Service (NASS) on August 10 (NASS, 2012a). It indicates that the yield and production prospects for the 2012 crop are not impacted by the prevailing drought conditions. Indications are that yields for corn, cotton, rice, and soybeans are expected to be higher than the 5-year average. Expected yield for grain sorghum is approximately equal to the 5-year average (Table 3.1). Harvesting of the 2012 wheat crop was completed before the occurrence of drought conditions. Comparing the August forecast for harvested acreage to the June forecast for planted acreage indicates that abandoned acreage is not greater than normal. There is the greatest potential for continued drought conditions to impact the soybean and cotton crops, which are not as far along in development as other crops. As discussed later, applying added irrigations is stressing ground and surface water resource availability.

Table 3.1 Area Harvested, Yield, and Production, Arkansas 2011 and Forecasted August 1, 2012

Crop	Unit	Area Harvested		Yield		Production	
		2011	2012	2011	2012	2011	2012
		1,000 Acres		Per Acre		1,000 Units	
Corn for Grain	Bushels	520	640	142	160	73,840	102,400
Cotton, All	1	660	570	929	1,011	1,277	1,200
Hay, excluding Alfalfa	Tons	1,390	1,440	1.6	0.9	2,224	1,296
Rice, All	2	1,154	1,245	6,770	6,980	78,100	86,901
Sorghum for Grain	Bushels	90	110	72	80	6,480	8,800
Soybeans for Beans	Bushels	3,270	3,200	38	39	124,260	124,800
Winter Wheat	Bushels	520	460	58	55	30,160	25,300

[1] Cotton yield in pounds per acre, production in 480 pound bales.

[2] Rice yield in pounds per acre, production in hundredweight (cwt).

Source: NASS, 2012a

3.2 Arkansas Cattle, Hay and Pasture

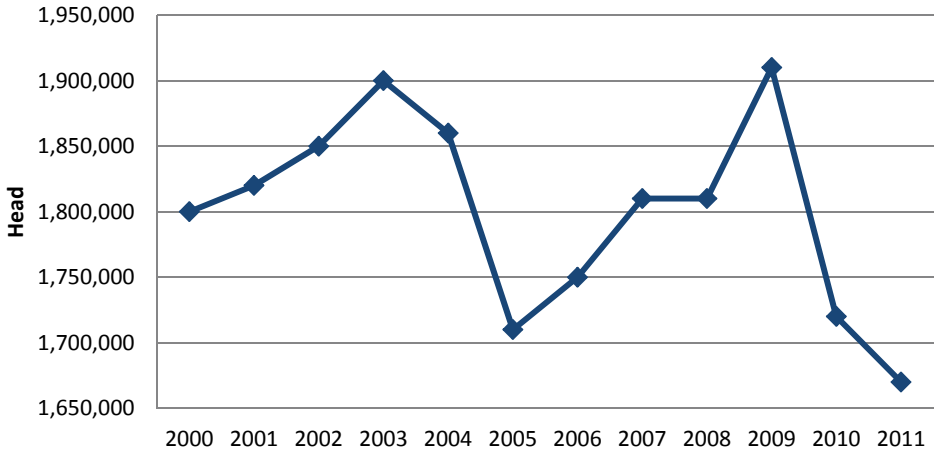
The inventory of all cattle and calves in Arkansas on January 1, 2012 was at its lowest level in the last 40 years at 1.67 million head (Figure 3.1) (NASS, 2012d). Since 2009, cattle numbers have declined 13% from 1.9 million head to the current level. Last year's hot summer and this summer's drought has had an impact that is already reflected in more cattle on feed compared to a year ago (NASS, 2012c) as farmers with dwindling water supplies and limited access to only expensive hay are choosing to sell calves early or further reduce the size of their cow herd (Figure 3.3). Along with corn prices this has led to some reductions in cattle prices. This price trend should be reversed eventually as a smaller herd size has led to fewer marketings of beef cattle (Figure 3.2) that will shrink even further beyond 2012 as more than usual heifers will be withheld to rebuild the herd size. The timing of some of these activities will be weather and commodity price dependent.

Hay and pasture conditions have deteriorated throughout the summer in Arkansas. According to data for the week ending August 19, 58% of alfalfa hay grounds, 82% of other hay grounds, and 85% of pastures were in poor or very poor condition. Hay production (excluding alfalfa) is forecast at 1.3 million tons which is 42% below 2011 production. Yield is also down 44% to 0.9 tons per acre; this represents the smallest hay yield since 1953. Pasture in these conditions indicates the need for additional feed to keep livestock on farms. Some much needed rainfall did occur across the state the week ending August 19 and pasture conditions improved slightly; however, 53% of pasture and rangeland were considered to be in very poor condition (compared to 63% the week ending August 12).

Hay prices in Arkansas have been on the rise since 2009 and prices for All Hay have increased from an average of $74.50 per ton to $99.50 per ton, an increase of 34% from 2009 to 2011 (NASS, 2012d). A recent report on hay prices in July of this year did not include data for Arkansas, but data from neighboring states and the U.S. total indicates that prices for Alfalfa Hay have risen 5% from July 2011 with the price for all Other Hay up 20%. The national average price for All Hay was $184 per ton in July. The 3-state average price for All Hay in Missouri, Oklahoma and Texas was $132 per ton, a 13% increase over July 2011 (Figure 3.4). Assuming Arkansas hay prices keep pace with the U.S. and regional average trends this would put the average All Hay price over $105 per ton in 2012. At these hay prices, farmers may consider overseeding pastures to gain extra grazing days or restore productivity on their hay meadows. The profitability of that depends on seed and weed control costs as well as likelihood of emergence when considering investing $15 – $20 per acre for a no-till drill, tractor, fuel and labor.

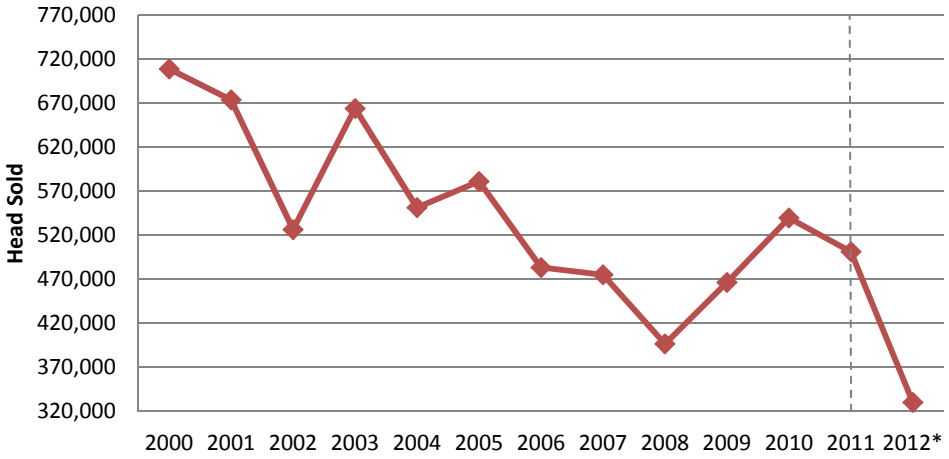
To better understand the full economic impact the drought is having on cattle producers in Arkansas, we have developed a short 15-20 minute survey that has been distributed to beef producers in Arkansas. We are collecting responses through the end of August. The results will be used in combination with the impact analysis software IMPLAN (MIG, 2012) to assess the statewide economic impact that the drought has had on cattle production. We expect to have the impact analysis completed by mid-September.

Figure 3.1 Inventory of All Cattle and Calves in Arkansas, 2000-2011



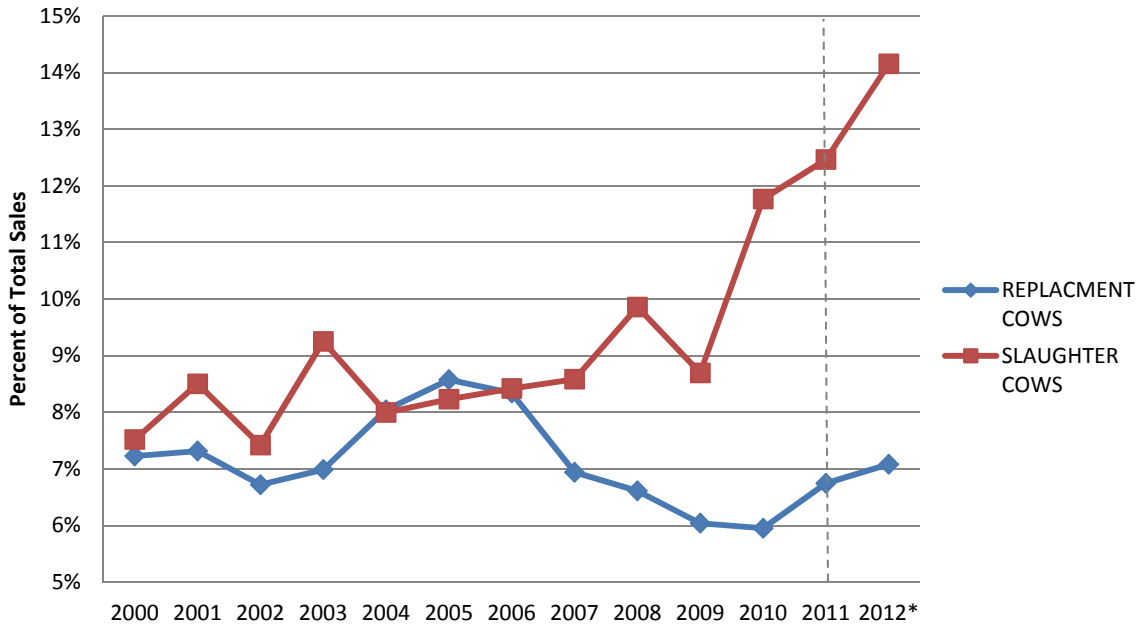
Source: NASS, 2012d

Figure 3.2 Total Head of Cattle Marketed in Arkansas, 2000 - Aug 9, 2012



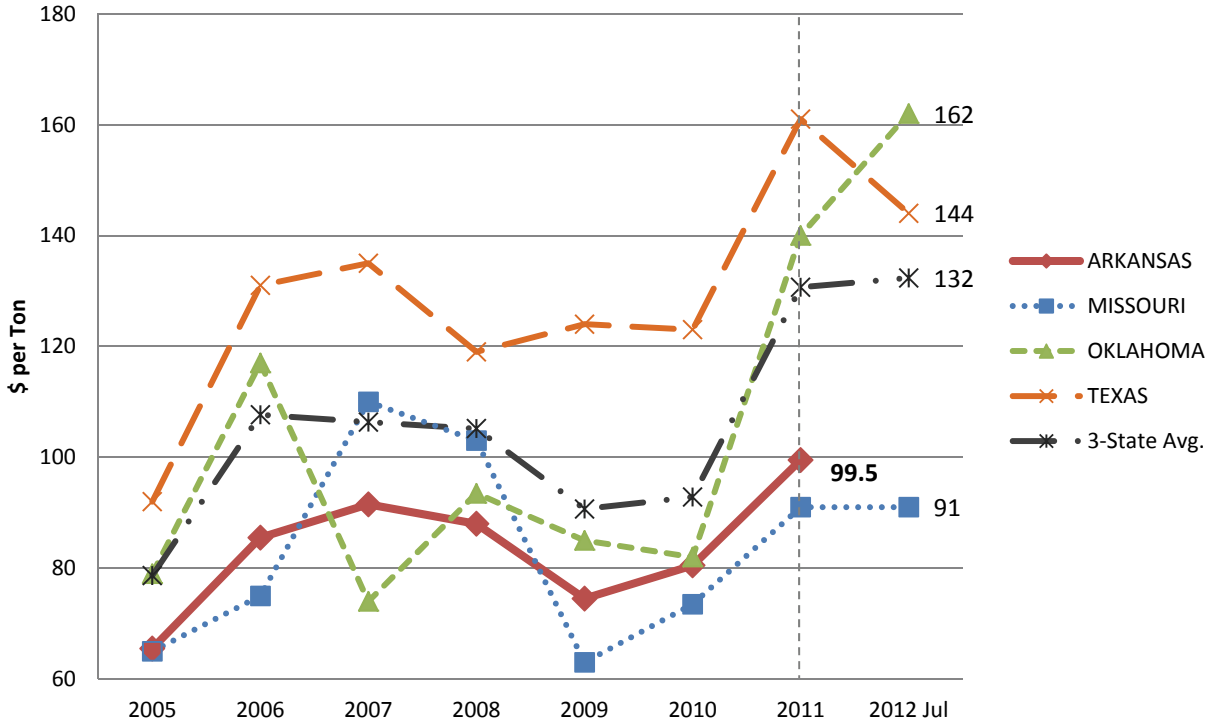
Source: AMS, 2012

Figure 3.3 Replacement and Slaughter Cows Marketed in Arkansas, 2000 - Aug 9, 2012



Source: AMS, 2012

Figure 3.4 Hay Prices Received (All Hay) in Arkansas and Neighboring States 2005 - July 2012*



*July 2012 data not available for Arkansas
Source: NASS, 2012d

3.3 Effects of the Drought on Non-Agricultural Sectors

Outside of the agricultural sector, drought-induced losses are also experienced by firms that interact with crop and livestock farms. For example, agribusinesses that specialize in handling, processing and transportation of agricultural commodities are affected by decreases in agricultural production. If cotton farms experience crop losses and do not harvest cotton, the cotton gin does not operate, and the transportation sector suffers due to the loss of bales to transport, and so on. These are indirect impacts of drought – losses generated when purchases of farm products and services from other Arkansas businesses decrease due to the loss of crop and livestock production. In addition, those workers at the cotton gin and the truck drivers also lose income due to the crop failure. This is income that would have otherwise been spent by the workers in their local economies purchasing goods and services. These are the induced impacts of drought – the reduced amount of income that would have been spent by the owners and employees of the farms, agribusinesses, and suppliers. The drought losses are also partially passed on to consumers through increased prices.

Because the direct agricultural production losses due to the drought have been concentrated in the cattle sector, the economic impact analysis will focus on this sector. Once the survey data are collected and analyzed the responses will be used to build impact scenarios and estimate the total economic impacts of the production losses. The results of the impact analysis will include the direct farm sector losses as well as the losses experienced outside of the farm sector.

4. Frequently Asked Questions

This section of the report discusses some frequently asked questions regarding the current drought and its implications for food prices, commodity prices and agricultural production.

4.1 With widespread drought across the U.S., what impact is the drought having on commodity prices?

Shrinking crop inventories worldwide in 2010 drove 2011 commodity prices upward, particularly prices for cereals and oils crops. The rise in commodity prices was due to resurgence in global demand resulting from a strengthening global economy and reduced agricultural production resulting from adverse weather conditions (drought and floods) across the globe (Henderson, 2011). Spring plantings of corn and soybeans in the U.S. were at record levels in 2012 and all indications pointed to an abundant fall harvest. Commodity prices in 2012 were expected to plateau and possible begin a downward decline. However, widespread drought throughout most of the corn, soybean, and livestock producing areas of the U.S. has led to a surge in commodity prices. From the beginning of June to the end of July, cash corn and soybean prices surged upward by 40 and 30 percent respectively. Since May, fed cattle prices have fallen by 15 percent due to cattle liquidations, but the price drop is expected to be a short term phenomenon as future beef supplies contract (Henderson and Kauffman, 2012).

Commodity prices will continue to be high if grain inventories remain low worldwide. However, several factors can affect commodity prices in the coming year. For example, high commodity prices this year could encourage a strong supply response from foreign crop producers next year, particularly if worldwide growing conditions become more favorable worldwide. Low ethanol demand could weaken the corn price, particularly if the Renewable Fuel Standards (RFS) mandate is waived. Export demand could also be reduced by high commodity prices, and demand for feed grains will also likely be smaller in the near future due to cow herd liquidations. All of these factors could collectively lower commodity prices in 2013 (Henderson and Kauffman, 2012).

4.2 What are the impacts of the 2012 drought on food prices?

Drought in major producing states is leading to damage or destruction in much of the crops for field corn, soybeans, sorghum, and hay. Production of corn and soybeans, as well as other crops, is particularly critical for supply, demand, and price conditions during the 2012/13 marketing year because of relatively tight U.S. and global supply conditions and low stocks at the end of the 2011/12 marketing year. Season average corn prices for the 2012/13 marketing year are forecast to fall within a range of $7.50-$8.90 per bushel, up from $6.20-$6.30 for 2011/12. Projected carryover stocks for soybeans would be the lowest since 2003/04. The result would be higher prices for soybeans in 2012/13, projected at $15-$17 per bushel, up from an average of $12.45 per bushel for 2011/12. Wheat is widely produced across much of the drought-affected area of the Midwest, but most of the wheat in this region is harvested in the spring and early summer, so it reached maturity before the dry conditions could significantly affect yields. Nevertheless, wheat prices are projected at $7.60-$9.00 per bushel in 2012/13, up from $7.24 in 2011/12, due to higher corn prices and stronger export demand resulting from reduced foreign wheat production.

However, commodity prices are just one of many factors affecting retail food prices and make up less than 15 percent of the average retail food purchase. The majority of costs are expenses for food processing, packaging, retail trade, energy, and transportation. Historically, if the farm price of corn increases 50 percent, then retail food prices as measured by the Consumer Price Index (CPI) increases by 0.5 to 1 percent. Retail food price inflation has averaged 2.5-3.0 percent each year on average for the past 20 years. Next year, there will likely be a slight increase above historical averages when overall food price inflation is expected to be between 3 percent and 4 percent, with increases concentrated in eggs, meat, and dairy (ERS, 2012).

4.3 What are the effects of the drought on cropland that depends on irrigation?

Crop production in Arkansas is heavily dependent on irrigation water. Because of this dependence on irrigation water, crop producers in Arkansas have largely been insulated from the effects of the 2012 drought. However, drought does affect Arkansas irrigated agriculture in both the short term and in the long term.

In the short term, more irrigation water is required in a drought year than in a normal weather year, and this translates into higher pumping costs during the growing season. Pumping expenses for rice are estimated to be $20 to $41 per acre higher in 2012 than in a normal growing season, while pumping expenses for furrow irrigated soybeans and corn are estimated to be $4 to $8 per acre higher in 2012 than in a normal growing season based on irrigation information from field reports and irrigation cost data from 2012 Arkansas crop enterprise budgets.

Limited surface water is another short-term consequence of the drought. Several crop producers in Arkansas depend on surface water for irrigation. This water comes from a variety of sources including rivers, bayous, and constructed on-farm reservoirs. Some crop producers in the state have seen their surface water dry up because of the drought. These producers have been forced to either use a less reliable and more expensive well or sacrifice their crop due to lack of a viable alternative water source.

A long run consequence of the drought is greater pressure placed on groundwater, which is an important but exhaustible input for the state. Most groundwater is supplied by wells tapping into the Mississippi River Valley alluvial aquifer, which underlies nearly all of eastern Arkansas (Schrader 2010). Extensive pumping has caused a steady depletion of the alluvial aquifer in many areas of eastern Arkansas (Czarnecki 2010; Gillip and Czarnecki 2009; Schrader 2010), and several counties have been either partially or totally designated as critical ground water areas because of significant groundwater declines resulting from intensive irrigation (Czarnecki 2010; Gillip and Czarnecki 2009). Drought puts even more downward pressure on this exhaustible resource, because more irrigation water is applied in a dry growing season than in a normal growing season.

4.4 What are the implications for cattle farms and feeding operations now and over the next few years?

U.S. ranchers are hard hit by the drought due to the poor pasture conditions and rising hay costs across the U.S. Over 70% of pasture land nationally is in poor enough condition to require some additional feedstuff purchases to keep livestock on-farm. The natural substitute for grazing is hay; however, over two-thirds of the nation's hay land is also under drought conditions. U.S. hay prices are up 5% for alfalfa and 20% for all other hay even with abandoned corn used for silage where possible. Placement of feeder cattle into feedlots increased through July as ranchers attempted to limit losses. Feedlots also have imported more feeder cattle from Mexico and the combination led to a sharp decline in feeder cattle prices this summer. The Livestock Marketing Information Center (LMIC, 2012) estimates that cow-calf returns have dropped by more than $100 per cow since May.

Cattle and calves inventory numbers have been declining over the last few years. Rebuilding the national cow herd will take time. As heifer calves are withheld from the market to rebuild the herd, less beef is in the feedlot causing prices to rise. This creates even further pressure to withhold female calves for herd building and those calves, bred in 2013 won't produce extra marketings until 2016 or 2017. So look for higher prices in the meats department. Depressed cattle prices as a result of early weaning of calves and culling of cow herds are masking this trend at the moment.

Cattle feedlot operations are expected to also experience high financial losses from high feed costs. Prices for common feeds purchased by feedlots (soybean meal, corn gluten and dried distillers grains)

have increased over 25% since May while fed cattle prices declined over 15% (Henderson and Kauffman, 2012). The USDA expects feedlot operations to lose over $200 per head this fall (Johnson 2012).

The outlook for beef cattle prices is positive given current supply and demand (Drovers, 2012). The number of calves produced this year is low and projected to remain low over the next couple of years. This means that feedlots will be competing for a reduced number of feeder calves while at the same time grappling with higher prices for corn and hay. The Food and Agricultural Research Policy Institute projects beef cattle prices to increase to nearly $170 per hundredweight by 2014. Even with concerns over the drought impacted 2012 corn crop, with the U.S. herd at its smallest size since the 1950s, high prices could be in store for cattle over the next 2-3 years.

5. Conclusion

Farmers across the U.S. are fighting one of the most severe droughts in U.S. history this summer. Arkansas has been one of the hardest hit states during the 2012 drought with unusually high temperatures and low rainfall totals. Eventually, drought conditions over the long-term will subside and agricultural lands will recover; however, much physical and financial damage has been experienced on U.S. farms during the 2012 drought. One risk mitigating factor for field crops in Arkansas is the use of irrigation and with a high percentage of crops in Arkansas grown on irrigated acreage, this production year is shaping up to be a good one for irrigated farms. For livestock producers in the state, it remains to be seen whether some cattle farmers can overcome the short-term losses from the drought. Regardless of the magnitude of the estimated economic impact of the drought of 2012, it will certainly be remembered in Arkansas as one of the most historical in the state's recorded history.

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