The Kansas Beef Cattle Industry

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The Kansas Beef Cattle Industry

In the United States, it is impossible to ignore the impact of the beef industry on a daily basis. Across the United States and especially here in Kansas, the beef cattle industry plays a vital role in the lives of millions of Americans, even if they do not know it. The reach and influence of the cattle industry are extraordinary and can be seen from coast to coast in the US. This reach includes fast food restaurants, grocery stores and fine dining establishments. The influence of the cattle industry also stretches from small towns to large metropolises; TV advertisements and semi-trucks; and from Kansas farms to the Capitol in Washington D.C. The objective of this study is to examine the correlation and impact between the cattle industry and outside factors. Specifically we will examine outside factors such as popular concerns about the environment, animal welfare, food safety and consumer behavior. We will also examine how these factors have influenced (and still do today) the construction of legislation and programs associated with the cattle industry.

Cattle Industry Background

Workings of the Cattle Industry

There are three primary sectors of the beef cattle industry: cow-calf operations, backgrounding, and finishing. Cow-calf operations produce one calf per mature cow per year. The calves grow for 6-8 months until the reach a weaning weight of 350-750 lbs. At this time they go to market in a sale barn where they are purchased by backgrounding operations. Backgrounding operations graze cattle on pasture land in spring and summer and feed them hay, corn, silage or protein mixes during fall and winter until they reach 850-1000 lbs. At this point, backgrounders sell the cattle to finishing feedlots or finish the cattle themselves with a particular

feed mixture to ensure the cattle attain a certain grade or quality. In 90-120 days when steers reach between 1,100-1,400 lbs, packing plants purchase them for slaughter. From the slaughterhouse, the beef reaches stores, restaurants, etc (Blasi, Feb., 2010 Interview) (Porter, Feb., 2010 Interview).

An example of an average cattle ranching operation is Richard Porter of Miller Kansas. Mr. Porter purchases calves from a cow-calf operation via a sale barn in the Southeast U.S. The cattle are organized by age, sex, and breed and are shipped by tractor trailers in 50,000 lb loads holding between 120-140 calves. His operation is capable of receiving and processing up to six loads every two weeks. Upon arriving, the cattle receive tags, medical treatment, castration, and dehorning. After acclimating the cattle graze during the spring and summer months and are corralled in feedlots during the fall and winter months (Porter, 2010) (Blasi, 2010).

Once Mr. Porter's cattle reach approximately 800 lbs he sends them to finish. Fortunately for Mr. Porter, he has the capability of finishing cattle on site. From here the cattle feed on a specific diet until they reach the proper weight and grade. At this point Mr. Porter ships the cattle to a packing plant where he is compensated and the cattle are processed (Porter). After processing the beef products are sold as food across the U.S.

Macroeconomics of the Cattle Industry

As of 2008, U.S. cattle inventories total 96 million head of cattle of which 34.4 million are slaughtered annually. The total retail value of the cattle industry tops $76 billion with $34.9 billion worth of cattle being produced annually. In recent decades, the number of cattle operations has declined form 1,000,000 to 830,000 while the number of cattle going to slaughter annually remains constant (USDA, June, 2009). This trend suggests that with fewer operations

output remains steady. This is possible due to another trend: smaller operations leaving the market and larger operations holding more of the market.

Nearly 96% of all operations manage less than 1000 head of cattle (considered a small operation), but these operations only market 18% of the cattle each year. Large feedlots that handle more than 32,000 head comprise less than 1% of the 830,000 operations, yet they market 35% of the cattle sold (Commerford, *et. al.*). The reason for this is the competitive edge which larger operations hold. Economies of scale allow for greater efficiency in regards to feed costs and fixed costs as well as greater returns off of profit margins (Commerford, *et. al.*). This trend must be acknowledge, because it defines the direction the industry is headed and explains industry challenges and adaptations.

The Kansas beef cattle industry is heading in the same direction as the national scene. This is not necessarily a cause for panic, yet it is a cause for concern due to the importance of the cattle industry within the state. As of 2007, 30,000 cattle farms exist in Kansas which utilize 46.2 million acres of non-irrigable, high-quality forage grasslands. The state is currently the third leading producer of cattle with more than 6 million head in ranches and feedlots. From the cattle industry alone, the state's economy sees $6.24 billion of revenue (as of 2008) representing 45% of all agricultural revenue. Considering all relevant industries, the cattle industry generates over $10.8 billion of economic activity, however this does not adequately quantify the value of the 19,240 jobs it creates directly or the 51,210 periphery jobs it generates for the state of Kansas (KLA, 2010).

The beef cattle industry in Kansas is a real breadwinner providing revenues for the state, employing citizens, and supporting millions of people with high protein beef. The cattle industry is so vital to the state that for every $1 million expansion or decline of the industry within the

state, Kansas economic activity grows or shrinks by $1.96 million (BCI, 2010). Therefore, if the Kansas cattle industry is down 5% the state loses out on over $1 billion of economic activity. That is enough money to provide a $50,000 salary to 20,000 families.

Microeconomics of Cattle Backgrounding

Backgrounding, like any other business, is about making a profit. The principles are the same whether it's a large operation with tens of thousands of cattle or a small operation with less than a hundred head. Costs need to be minimized, efficiency needs to be maximized, and profit margins need to be above the breakeven price (DiCostanzo).

The costs associated with cattle backgrounding include calf purchasing, direct costs, overhead costs, as well as labor and management expenses. Direct costs include feed, veterinary, hauling, gas, repairs, marketing, interest, supplies, and contract expenses and overhead costs include machinery, building, farm insurance, utilities, interest, and depreciation expenses. The largest expense in this process is the purchase of calves. At prices ranging from $70-100/cwt (hundredweight) or $0.70-1.00/lb, a rancher can easily spend $40-50,000 on a truckload of calves. Therefore, it is imperative that the background rancher knows he/she can obtain healthy and productive calves. The most expensive direct cost to a rancher is feed. Since cattle require multiple pounds of feed to gain a single pound, the silage, corn, hay, and protein feed expenditures add up quickly when considering hundreds or thousands of head of cattle (DiCostanzo).

Outside of purchasing costs and feed costs, any variation in direct or overhead costs can cause nightmares for a rancher. These expenses are then divided and distributed on a per head basis; however, slight variations can have major effects on a tight profit margin. Backgrounding cattle runs a negative price margin; therefore, ranchers purchase calves at a

higher price per pound than they sell them. The only way to overcome the negative price margin is by running an efficient operation (eliminating unnecessary costs) and selling more pounds of cattle than purchased (Gow, 1999).

Due to the negative price margin, background ranchers have a tricky breakeven equation. The breakeven formula is set up to determine how much must be sold and at what price in order to cover all of a businesses' expenses (DiCostanzo). The following expression is for the breakeven point for a cattle backgrounding operation:

[(Purchasing Weight X Purchasing price)+ (Overhead + Direct + Labor Costs)] X calves purchased
=
Sale Weight X Sale Price X Calves sold

Therefore, if a rancher purchases a 50,000 lb truckload carrying 125 400lbs calves at $0.88/lb and has total costs (overhead, direct, and labor) of $160/head, his selling price can be determined to match the breakeven price (given the estimated death rate of 2% holds true and the target weight of 800lbs is met).

[(400lbs X $0.88) + $160] X 125 = 800lbs X Sale Price X 122
$64000 = 97600 X Sale price
.655= Breakeven Sale price

Thus, in order for the rancher to break even on his/ her $64,000 investment the sale price must be at least $0.65/lb. In order to turn a profit, the sale price must be above $0.65/lb. So, if the sale price is at $0.70/lb:

$0.7 X 800 lbs X 122 = $68,320
$68320-64000= $4,320 per truckload

Here the price margin is a negative $0.18 because of the purchase price subtracting from the sale price ($0.70-$0.88), and the profit margin is $0.05/lb due to subtracting the breakeven sale price from the sale price ($0.70-$0.65) (DiCostanzo).

The breakeven formula helps ranchers set selling and purchasing prices, however, it is extremely responsive to small changes in its variables. For example, assume that the $160 total

costs from the example above increase to $170 because of increases in fixed costs. Remember, that's an extra $10/head for 125 head of cattle. That is $1250 subtracted from the $4,320 profit! That can have a large impact on a small operation, and it makes it easy to see why such intense emotions surround the industry's variations.

Take the Davies family ranch in Redding, Kansas for instance; a much smaller operation than Rich Porter's operation, but still a successful ranch for over 50 years. When the Tyson meat packing plant, located less than 20 miles down the road, closed the Davies sent their cattle to a different meat packing plant several hundred miles away in Nebraska. This caused trucking/hauling costs to increase only a few dollars/head, but with a small operation the Davies struggled to overcome the cut in income (Davies Interview, 2010).

Where the Davies struggle to overcome minute changes in costs, a larger operation can spread the extra costs over more capital due to economies of scale. This means that larger operations have less risk and are less susceptible to market changes (Commerford). This also means that smaller operations must increase efficiency to stay competitive with larger operations (Gow).

By increasing efficiency, Rich Porter competes with larger operations that can afford selling at lower prices. He does so by developing good working relationships with his clients and customers, doing most of his work in-house, and expanding his operation to include finishing (Porter). It's the same method the Davies turn toward to compete with larger operations. They tighten the belt, cut costs, maximize feed efficiency, and adapt the status quo to stay competitive (Davies).

Both the Davies and Rich Porter understand that adaptations must be made to stay in business, and both agree that research from extension networks, regulations by government, and

supportive legislation are beneficial to their businesses. As long as the objectives of such actions are to help the industry minimize risks, increase efficiency, and stabilize costs; then operations of all sizes can continue to flourish in the Kansas beef cattle industry (Porter) (Davies).

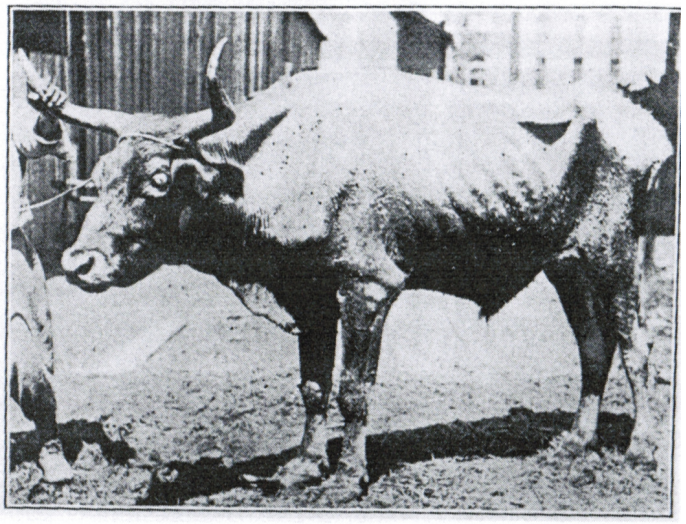
Historical Disease Threats

Hoof-and-Mouth disease, while still present today and threatening the beef industry, was also a threat in the mid-nineteenth century to the United States. In a time when the United States imported around 500,000 head of cattle annually from Mexico, Mexico and Argentina were experiencing extensive outbreaks of hoof-and-mouth disease. This extremely virulent disease posed a major threat to the U.S. cattle industry. The Department of Agriculture issued a quarantine "to protect this country's livestock industry from the disease. Already barred from this country [U.S.] are similar livestock and meats produced in Europe, Asia, Africa and South America" ("Mexican Livestock," 1947). The United States felt the only way to protect their own beef industry was to restrict all travel and imports of meat from areas exposed to hoof-and-mouth disease. This quarantine lasted six years, until 1952 when on the eve of the Mexico, United States border reopening after the hoof-and-mouth disease quarantine was placed on Mexican cattle; the Mexican livestock industry was once again plagued with disease.

Vampire bats are widespread throughout northern Mexico and central Argentina. Cattle located within this region experienced nightly attacks by the Vampire bats through the mid-nineteenth century. These attacks spread bovine paralytic rabies and also resulted in economic losses from malnutrition, lowered milk production, and secondary infections as results from the bites (Gonzalez & Mitchell, 1976, p.4). Cattle paralysis amounted to $3,500,000 in economic damages to cattle herds in the year 1952 alone ("Cattle in Mexico," 1952).

Finally, the disease credited with helping bring an end to the long cattle drives of Texas cattle to the northern slaughter markets is "Texas fever". Although this tick-borne pathogen was essentially eradicated in the United States by the late 1940's, in order for it to become so, a National Cattle Fever Tick Eradication Program was developed in 1906. Before its eradication, "Texas fever" was arguably one of the worst infectious disease pathogens to ever hit the cattle industry. According to Dr. Bahnsen, "This little insect [tick] causes every man, woman, and child in the country to pay tribute to it in dollars and cents. It [tick] directly increases the cost of all kinds of meat by the great damage it does cattle" (as cited in "Ticks Cost," 1912). It is hard to estimate how much toll the tick took on the cattle industry. By 1906, an estimated 387,500 animals were lost to Texas fever annually, causing the development and prosperity of the cattle industry in the United States to be greatly threatened during the reign of the Texas fever tick ("Texas Fever's Ravages, 1906).

Figure 1 below is an image of a cow infected with the tick, *Boophilus annulatus* that led to the disease "Texas fever." As Figure 1 below shows, "Texas fever" led to extreme weight loss, but also infertility, reduced milk production, and finally death (Hope, 2005).



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Disease Control Methods

The lack of technology available in the late nineteenth century during cattle drives from Texas to the Midwest facilitated creative methods for bovine disease control. Vaccines were developed for the prevention of some diseases, usually there was not enough created, nor was the vaccine very effective. A popular method of disease control, still used frequently today, is to quarantine cattle for a certain length of time. This means to place all cattle coming to or from a location under strict isolation in order to prevent the spread of disease. A great example of this method being used is under the National Cattle Fever Tick Eradication Program that was developed in 1906 to try and contain the spread of "Texas fever." This program led to all or part of fourteen southern states being placed under quarantine with specific intensive fever-tick surveillance and control activities (Pelzel, 2005). Figure 2 below shows the boundary line drawn across the country dividing the Southern states, where the carrier cattle of the disease originated, from the Northern states.

Figure 2. Tick Eradication Quarantine Line (Hope, 2005)

Another method that gained widespread attention among ranchers desperate to eradicate the infamous tick that caused "Texas fever" involved dipping cattle in arsenic vats. Hope (2005) also reports that other techniques included, "[…] picking or brushing with a knife or currycomb,

coating the cows with a disinfection solution like crude petroleum to block the path of ticks, immunization with infected blood and dipping cattle in a cat filled with a solution poisonous to the tick." Although, arsenic dipping was the preferred and most successful method of eradication the basic procedure involved prodding the cattle, usually with sticks, to wade into a vat of arsenic where they were fully submerged and unable to breath (see Figure 3). It was common for cattle to be injured and occasionally die during this tick treatment.

Figure 3. Arsenic Vats for Dipping Cows (Hope, 2005)

By 1915, arsenic dipping was the preferred and most widely promoted method of tick eradication. Annually cattle dipping became a community-wide event. While the arsenic vats were very effective at eliminating ticks, as well as any other insects such as flies and lice that may have been on the cattle, they had some unforeseen consequences (aside from the death of the cow). Many local farmers from the mid-nineteenth century were not aware of the danger involved in using the arsenic solution. Consequently, vats filled with arsenic were drained into nearby water sources or leached into the ground. Abandoned vats were also remade into swimming pools or bathtubs exposing those who used them to the dangerous solution (Hope,

2005). Arsenic is a poison and exposure to arsenic can result in varying levels of skin irritations and internal organ damage. Breathing arsenic can give people sore throats or irritated longs. Ingestion of arsenic, like from arsenic leached to water sources from overturned dipping vats can cause nausea, vomiting, decrease red and white blood cells, damage to blood vessels and the nervous system, and death depending on amount ingested. Finally, by swimming or bathing in abandoned arsenic vats, varying skin diseases can result. Even low levels can result in dark corns or warts, redness, swelling, and cancer ("Agency for Toxic Substances", 2007, p. 4-5).

A more creative method for disease control was implemented during the reign of Cattle paralysis, a disease transmitted by Vampire bats. This disease required quick thinking on the part of Mexican Ministry of Agriculture employees when an outbreak occurred in 1952. While Ministry scientists worked to develop a vaccine, the serum was not available in sufficient quantity to have an effect on cattle infections by the bats. Instead, Dr. Ortega, an Assistant Secretary of Livestock took it upon himself to personally lead a surprise attack on the very home of the Vampire bats, nearly twenty feet underground. This brave group of officials killed 10,000 bats by infiltrating their lair and using flame-throwing torches ("Cattle in Mexico," 1952). Other control methods besides smoking the bats out of caves included gassing, poisoning and dynamiting; however these methods were essentially ineffective and usually very expensive (Gonzales & Mitchell, 1976, p. 2).

Government Disease Regulation

Unlike environmental regulation, which is met with mixed feelings by livestock operation managers, government intervention into disease regulation is relatively welcome. Because loss to disease can be the most costly production expense, and disease control is difficult at the level of individual producers, government agencies and research facilities have developed to regulate and

restrict the transport of ill livestock as well as advance the science of animal medicine. In 1881, a Cattle Commission was set up to control pleuropneumonia in transient cattle and in 1883 the Secretary of Agriculture established a Veterinary Division to research animal disease. In 1884, the Bureau of Animal Industry was established, absorbed these two organizations, and commissioned to protect the public from diseased meat, eradicate livestock diseases, improve livestock quality, and conduct scientific investigations. This bureau was eventually succeeded by the Agricultural Research Service in 1953 (Records of the Bureau of Animal Industry, 1995).

Kansas has special significance in the history of livestock health science. Kansas State Agricultural College—now Kansas State University—was the developer of the blackleg vaccine (Wood, 1980). Blackleg was the cause of an estimated 5-25% calf loss. It was also estimated that losses to blackleg exceeded losses to all other diseases combined in some states (Scott, 1923). In response to increasing amounts of Texas fever and scabies in the 1880s and pressure from cattlemen, Kansas also established a State Livestock Sanitary Commission in 1884. This commission was responsible for setting up quarantines and evaluating and certifying the health of cattle crossing state boundaries. In 1914, the commission was put to the test as an epidemic of foot and mouth disease reached the United States. State quarantines successfully delayed the entrance of the disease into KS for a year, but circumvention of the quarantine lead to the infection of certain regions of Kansas. Upon this revelation, the state legislature appropriated $10,000 to eradicate the disease, halted the movement of cattle temporarily, and along with the federal government, paid out $76,000 to cattlemen for stock that was destroyed. In 1919, Kansas cattlemen were again awarded reparations when federal inspectors in Texas certified a few carloads of cattle free of ticks and those cattle went on to infect Kansas cattle with Texas tick

fever (Wood, 1980). It is the general policy of the federal government to offer aid to cattle producers experiencing losses due to weather, disease, and natural disasters (Mathews, 2009).

The Livestock Industry and Human Health

When Upton Sinclair published "The Jungle" in 1906, in which he revealed the unsanitary conditions in the meatpacking industry, meat sales dropped dramatically. This prompted President Theodore Roosevelt to pass the Pure Food and Drug Act of 1906 and First Federal Meat Inspection Act in 1907. The Meat Inspection Act made the United States Department of Agriculture responsible for the inspection of slaughtered animals (Celender, 2009). The Pure Food and Drug Act of 1906 would go on to establish the Food and Drug Administration (FDA) (Sanger, 2003). This type of event sequence is not uncommon. In 1996, in response to salmonella poisonings, President Bill Clinton sought to improve the lax rules regarding checking meat for contamination. In 2003, prompted by the mad-cow infections, President George W. Bush banned cattle that appeared sick on the way to the slaughterhouse from being sold (Sanger, 2003).

In addition to ensuring sanitary slaughter conditions and cattle health, in 1938, the FDA was awarded the responsibility of insuring the safety of food, pharmaceuticals, and cosmetics. Enabled by the Food, Drugs, and Cosmetics Act, the government prosecuted farmers moving livestock containing illegal drug residues like the growth hormone Di-ethylstilbestrol, which is known to cause cancer in mice (New York Times, 1971). Additionally, the FDA's Center for Veterinary Medicine (CVM) has regulatory standards for what can be used in animal feed (Mathews, 2009).

Animal Welfare Groups

The animal rights movement has experienced many shifts of focus and intensity throughout its expansive existence, often mirroring the majority public opinion at the time. Throughout history the movement has focused on issues ranging from animal testing, wildlife protection, and most recently, livestock welfare. However, while it may seem like a majority of the general public feels one way, there is often large variations on not only what kinds of animals should receive protection but to what degree as well. Current animal welfare groups are lobbying for all-natural, pasture raised livestock. However, this is not the first time livestock protection has been brought to the public eye. It was as early as 1822 when Richard Martin helped to pass the Act to Prevent the Cruel and Improper Treatment of Cattle (Raithby, 1822, p.403) when it was first recognized that the general public does not like the unkind treatment of livestock. Since then, concern has ebbed and has only recently once again been brought to the forefront of animal right issues. Foremost is the concern involving growth hormones and antibiotics in livestock and how this affects public health down the road. However, according to Bussing and Self, (1981) the cattle industry's fundamental goal "[…] remains the same—to transform feed and cattle into finished beef in the most profitable manner possible […]" and with a growing amount of livestock production being converted from small-scale farms into large, industrial farms in order to feed the growing world population, there is a need for supplementing normal food to increase livestock production as well as keep cattle from getting sick. There are always two sides to every story, and while it is great that Americans are trying to more actively participate in the production of their food, it is imperative that more knowledge is acquired about the industry before judgments are made.

Consumerism and the Beef Cattle Industry

Welfare Groups and the Consumer

Animal welfare groups try to have some impact on the thoughts about the cattle industry. These groups stretch across the nation and have a local presence in each state and have a much more significant impact on the cattle industry than one would expect. When groups such as People for the Ethical Treatment of Animals (PETA) or the Humane Society of the United States (HSUS) have rallies and protests against the beef industry, consumers see activity and as a result it stirs emotions. Subsequently, the next time the consumer sees a cow, they may think about how the animal is being treated. Animal welfare groups try to regulate how cattle are handled and treated. This provokes legal battles between producers and the welfare groups. Once consumers see movies, commercials, advertisements and other marketing materials created by the welfare groups, the thoughts and emotions return and may persuade the consumer to not eat a beef product. Usually these messages are negative towards the agriculture and beef industry that in turn decreases demand for certain products. Individual companies may also be targeted for their methods used in production. Consumers could see true or untrue accounts of how the companies operate and would not buy products from those specific companies.

Recently, welfare groups have witnessed a drastic increase in membership and volunteers. The HSUS membership has increased from 6.8 million in 2001 to 11 million in 2008 (HSUS Annual Report). PETA has recently reached the 2 million-member mark and continues to rise (PETA). As these groups continue to battle the agriculture industry, the way animals are handled and cared for is starting to change. For example, recently, all natural or organic beef has moved to the forefront of popular debates regarding what consumers really want. Welfare groups have helped pushed this idea by using their publicity and advertisements to demand beef from

cattle that are not given any scientific boosts (additives, enhancements) while they are raised. Such boosts are growth hormones, feed supplements and antibiotics. In the Organic Foods Production Act of 1990 the term organic was given the definition: "Organically grown" food is food grown and processed using no synthetic fertilizers or pesticides. Pesticides derived from natural sources, such as biological pesticides, may be used in producing organically grown food (EPA). Although this definition exists, there is still some discrepancy surrounding the organic market. The term “all natural” is usually given to animals that are raised for consumption purposes. These animals are not given antibiotics, feedstuffs or growth hormones to aid in growth and production. The term “organic” is given to fruits, vegetables and other edible plants. These plants are grown without the use of synthetic herbicides, pesticides and fertilizers that might aid in its growth or protection. This current idea is starting to evolve from a trend in the market to a part of the industry. Organic farming has rapidly increased and become a popular technique. Organic is still considered to be a niche market for those who can afford it, but this could soon change to a more broad market (Organic Farming).

The Studied Consumer

Although the relationship between consumers and the cattle industry has only been studied recently, consumers are thought to have a very unique impact on the industry. In 1986 the National Consumer Retail Beef Study was started and is known as the first time consumer affect was studied by the beef industry (Goodson, et al.). Ranchers and producers decide which breed of cattle to raise, but consumers ultimately determine the fate of the industry. Consumers impact the demand of beef, how it is prepped and even how cattle are raised.

There are many factors that influence beef demand and how consumers react to the industry. Family income, race, gender and geography all play a role in the amount of beef consumed

(Davis, Lin, et al.). Recent studies have shown that lower income homes eat more beef than higher income homes. The explanation for this is that ground beef is less expensive and lower income homes are more likely to eat many meals with hamburger rather than have a variety of other products. Race also has an affect on consumers and beef products eaten . Multiple studies show that blacks eat the majority of beef products at 77 pounds per year. They are followed by Hispanics who consume 69 pounds per year, Whites consume 65 pounds per year and other races consume 62 pounds per year. Males on average eat 37 more pounds of beef per year than females and people in the US Midwest eat seven more pounds per year than in other parts of the country (Davis, Lin, et al.). This last fact is important to the Kansas cattle industry because of its location in the Midwest. As you can see in areas throughout this paper, Kansas is in the top five nationally in beef production and the state is impacted greatly by the cattle industry.

A Consumer Driven Industry

Consumer demand creates different changes in the beef industry. Restaurants, grocery stores and markets change menus, prices and specific cuts available due to consumer demand. T-bone, Rib-Eye, New York Strip and Porterhouse steaks are all popular cuts of meat ordered at restaurants and purchased at stores. These types of cuts affect how slaughterhouses and packing plants cut the meat from the animal. These demands and breed type also shift beef prices. At many restaurants throughout the US, a popular trend is to serve 100 percent Angus beef. Angus is a breed known for its high quality meat and tenderness (American Angus Association). It is also one of the most recognizable breeds of cattle in the world. Within the past decade, this trend has greatly boosted the Angus market but this trend has also had a negative impact on other cattle breeds. Commercials and advertisements claim they serve or provide 100 percent Angus beef and consumers see Angus beef is popular and a . The idea of preferring specific breeds of

cattle could just be a trend or it could be popular for a long time. Marketing professionals may try to introduce other ideas regarding the purchasing of beef, but only consumer habits will change the trends in the beef market.

Beef, no longer, "what's for dinner"

Throughout history, beef demand and consumption has fluctuated. However, in the past two decades consumption has remained relatively stable between 65 and 67 pounds per person per year (The Beef Cattle Institute. Outside factors have played a significant role in determining the amount of beef consumed. Recently, convenience has been the dominant reason people eat certain foods. Beef has always been the core meat and source of protein consumed in the United States. However, in 1992, poultry changed everything, by-passing beef on consumption per person. Poultry, particularly meat from broiler chickens, was on the rise in popularity since 1975. Since 1975, consumption has gone from 39 pounds per person per year to 90.6 pounds per person per year in 2006 (Ehler). Convenience has made this possible due to processed meats and microwaves. Chicken can easily be processed and turned into quick meals such as chicken nuggets or chicken patties, while beef is not as easily processed or microwavable. Usually, beef is cooked as ground beef and hamburger or cut into steaks and cooked on the grill. Beef also has to be cooked to a higher temperature than chicken, therefore taking a longer amount of time to be cooked fully. Diet and health related issues also had an impact on chicken surpassing beef in consumption. Although beef is a major source of protein and nutrients, it has been cast in a negative light because of E.coli[1] and other viruses that cause illnesses when ground beef is consumed undercooked. Someone could become ill by consuming raw chicken but it is less often

[1] E. coli: *Escherichia coli* are members of a large group of bacterial germs that inhabit the intestinal tract of humans and other warm-blooded animals (mammals, birds). The foodborne pathogen causes diarrhea, hemorrhages, abdominal pain, and in rare occasions cause organ injuries or fatal illnesses.

the case than with beef. However, both industries still tend to face pressure from various sources and other industries.

The Current Industry

Recently many challenges to the cattle industry have facilitated change from within the industry. A rapid increase in the amount of consumer concern regarding the origin and substance of their dietary beef needs has led to a rise in public interest regarding the cattle industry. With animal welfare groups promoting more organic and all natural meat or not eating meat at all, the actual health of the cattle and safety of the meat can sometimes by lost in translation. The goal of this section is to identify similarities between historical and recent disease threats and control methods of the cattle industry.

Disease Prevalence and Risks

Disease ridden cattle can harm the consumer as well as the producer at various stages in the beef production process. The first place a producer can begin to see an economic downturn is if disease-ridden cattle are part of his initial purchase. Table 1 below illustrates the probability a producer has of purchasing already infected cattle.

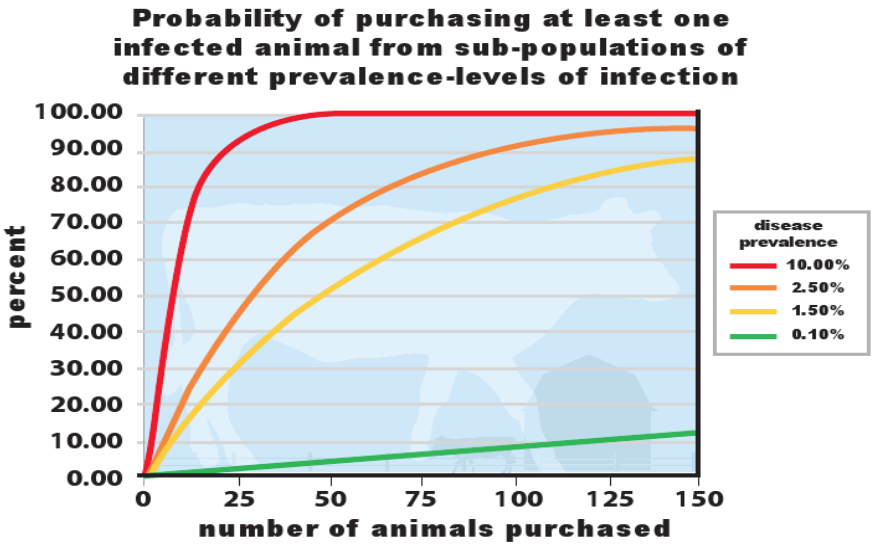

Table 1. The Probability of Purchasing Infected Animal (Produced by The Center for Food Security and Public Health, 2005)

The disease prevalence lines represent diseases that have persistently infected cattle in those ranges for a given population of animals. Research conducted by The Center for Food Security and Public Health (2005) has shown the yellow line (1.50 percent) can represent Bovine Viral Diarrhea Virus Persistent Infection, BVD PI. With this knowledge, a producer who has recently purchased a population of 100 cattle, can expect, as the yellow line indicates, that there is a 75 percent chance he will obtain at least one animal infected with BVD PI.

As shown in the above chart, there is a high level of risk associated with purchasing cattle and the probability of bringing a new disease into the herd. In order to limit the spread of infection and for numerous other reasons producers must actively manage for disease prevention. Not only is it economically beneficial because of lower mortality and morbidity rates among a herd, but also treatment costs will be less and consistently produce healthier cattle, which will increase the reputation of a producer beyond his own farm. However, there are also numerous ethical and legal incentives to maintain healthy cattle. For example, producers should actively work at reducing the risk of human exposure and thus the spread of zoonotic diseases that can pass between cattle and humans. Reducing the risk and spread of these diseases is important. Besides protecting the consumer and other humans exposed to cattle, practicing good disease risk management has the added benefit of preventing the spread of disease to surrounding farmers and local wildlife. (Taylor, 2005, p.3). In turn wildlife can mobilize a malady and expand the realm of exponentially.

Current Disease Threats

While the United States can boast a great track record at keeping recent epidemic disease outbreaks at bay in the cattle industry, this is not the time to rest on past success as today's highly mobile world is leaving the United States more exposed to disease threats. Indeed it has

been decades since the cattle industry has had to employ massive euthanasia as a method of disease containment, yet the introduction of foreign animal diseases into the cattle market has had producers and veterinarians worried for the future of the cattle industry. According to Mel Pence, a veterinary field investigator and associate professor of large animal medicine at University of Georgia, "When you look at reproductive efficiency in the industry, when you look at disease in the nation's feedlots and the horrendous amount of money we pay for it, certainly diseases are severely impacting economic returns to the beef industry." (Ishmael, 2005).

The most infamous of foreign animal diseases that the United States has so far managed to avoid is foot-and-mouth disease. Pence warns that "FMD [foot-and-mouth disease] is the one we worry about the most. It's a devastating economic disease we can't afford to get." (Ishmael, 2005). The reason FMD is such a threat economically is that although mortality rates are low for the actual disease, morbidity is extremely high and all exposed animals are euthanized as the only form of effective containment. Conversely, Heartwater, a foreign animal disease spread by ticks would require all ticks, rather than cattle, to be eradicated a nearly impossible achievement. Heartwater has extremely high morbidity and mortality rates while also posing a high threat to U.S. producers. If not detected, Heartwater results in fever, severe respiratory distress, convulsions, severed diarrhea, and death (Olugasa, 2006). The one bright side to these potentially catastrophic diseases, they are not zoonotic and pose little threat to humans (Ishmael, 2005).

However there are many zoonotic diseases that remain a threat to cattle and consumers of beef products. Trevino's (2006) study found the following:

> Zoonotic diseases of cattle that are present in the U.S. include anthrax, brucellosis, cryptosporidiosis, dermatophilosis, *E. coli*, *Giardia*, leptospirosis,

> listeriosis, pseudocowpox, Q Fever, ringworm, *Salmonella*, tuberculosis and vesicular stomatitis. Zoonotic diseases of cattle that are not found in the U.S. are called foreign animal diseases. Examples include bovine spongiform encephalopathy (BSE) or "mad cow disease", melioidosis and Rift Valley Fever (RVF). (slides 5-6)

In order to lessen the risk of spreading contagion, it is up to producers to adopt good risk management practices on their farms. While zoonotic diseases pose a huge threat and cover a large portion of the disease risks facing the cattle industry, currently there is an unparalleled disease wreaking havoc on beef producers and that is bovine respiratory disease (BRD) also known as shipping fever. BRD is caused by multiple factors, some environment, which makes it very hard to immunize against because the disease only occurs when stimulated by certain outside factors such as climate, parasites, stress that when all occurring trigger the disease. Cattle can undergo significant stress and exposure to the elements when they are moved from one location to the next. This exposure to new animals and environmental pathogens often compromise their already weakened immune systems. These factors, along with infections pathogens that invade the lower respiratory system lead to BRD. According to the National Institute for Animal Agriculture (NIAA), "beef producers nationwide annually lose an estimated $1 billion to shipping fever" (Barto, 2002) and this can come in various forms: cattle deaths, lower feed efficiency and subsequent weight gain, treatment needs, and poor quality meat.

Current Technology for Disease Control Methods

Several disease control methods have stood the test of time. These include enforcing quarantines to isolate animals in order to determine if they are infected and to euthanize infected animals in order to contain the spread of the disease. However, much time and money has been dedicated to the development of less extreme and more effective methods of controlling diseases.

Disease is most common in cows within the first 30-40 days they arrive at a production farm. The new cattle are exposed to many new diseases and these new cattle also have weakened immune systems and are under high levels of stress. Many of the calves were usually just weaned from their mothers and have traveled on large trucks exposed to the elements. All of these factors require quick action once the cattle arrive at their final location. At R. Porter's farm outside Miller, Kansas, cattle are immediately vaccinated, using high-tech dart guns, tagged, and if needed castrated. Because close quarters cause diseases and illness to spread quickly, Porter makes sure to vaccinate within the first couple of days, if he does not many cattle are likely to fall ill. The most common illnesses Porter deals with on his ranch are respiratory related, especially during bad weather. However, pink eye, which is a bacterial irritation that is caused by the stems of hay or rye irritating the eyes of cattle when they feed, allows bacteria to enter the cow's eye and cause an infection. Pink eye is a common problem among cattle ranches. Finally, the tags affixed to the cattle are a final disease control method that allow Porter to track where each cow came from, how productive it is, and whether or not it was ill when it arrived. If one cow/calf operation is sells calves in poor health, the tag will help identify which sale barn the cow/calf came from and if there is a trend toward contraction of particular diseases. Through these mechanisims Porter can link the origination point of the sale calf/cow to the epicenter for a particular malady. (personal communication, February 23, 2010).

Effect on Public Health and Safety

The three main areas that have consumers worried about their beef quality are biosecurity, antimicrobial resistance, and finally high levels of hormones present in some livestock production. All three of these issues are related by the producers need to compensate for the rising demand in beef in order to feed the growing population.

Biosecurity

Biosecurity is unique from the other pressing consumer issues such as antimicrobial resistance and high level of hormonal use in livestock in that this poses more of an indirect threat to consumers. Globalization is leading to borders that are more porous between regions. No longer can distance alone between countries be enough protection from the spread of disease. International trade in animals and animal products from areas of the world where differing pathogens are present as well as the increase in global industrial livestock production are the main reasons behind the development of new zoonotic diseases. This has the potential for global proliferation and infection. Another factor nurturing the emergence of powerful new zoonotic pathogens relates to the rise in human population. As human demographics increase, closer contact between livestock and humans means habitable space becomes limited, leading to increased risk for mortality among humans animal (Dudley, 2004).

While the threats presented by the emergence of new zoonotic diseases are critical according to Dudley (2004), an additional threat posed by technological advances in laboratory cultures of deadly pathogens could have an even more detrimental effect. These pathogens are developed as biological weapons that target humans as well as agricultural crops and livestock. Even just the accidental release of these pathogens could result in widespread devastation of biodiversity and agricultural production. The potential threat of disease pathogens compromises public health as well as the security of the American economy and food source infrastructure as the threat of disease pathogens target the very backbone of the American economy and food source.

Antimicrobial resistance

Antimicrobial resistance is most likely a topic more relatable to the average consumer. In the public health sector, the increase in antimicrobial resistance has become a major concern. However, there is a large deficit of knowledge relating the increase in antimicrobial resistance to the beef production industry. A study produced by Silbergeld, Graham, and Price (2008) attributed the largest use of antimicrobials worldwide to the antimicrobials used in animal food production for human consumption, principally as feed supplement for the animals. With livestock production growing more into industrial corporations, animals are kept in smaller spaces, in closer contact to each other, and usually not very far from their own waste. This is a breeding ground for disease pathogens and is why antimicrobials are used in animal food.

For the most part, antimicrobial use in agriculture is largely unregulated. According to Silbergeld et al., (2008), "A wide range of antimicrobial drugs are permitted for use in food animal production in the United States […] these drugs represent all the major classes of clinically important antimicrobials, from penicillin to third-generation cephalosporin compounds" the use of these drugs in food animal production can significantly lessen their lifespan as effective antimicrobials for fighting human disease.

Antimicrobial resistance can affect humans besides consuming beef products through several other vectors. Rodents, insects, and birds as well as farm workers can, if exposed to antimicrobial-resistant bacteria, threaten outside communities and local wildlife by transferring the pathogens.

Regulations to Protect Human Health

The increased use of antibiotics in livestock has raised concern that the antibiotics which are either also used in humans or are very similar to antibiotics used in humans will exacerbate the issue of antibiotic resistance. Drugs like penicillin, erythromycin, and tetracycline have

become increasingly ineffective overtime. Tuberculosis, which was formerly considered almost eradicated, is now resistant to more than 100 drugs. Part of this is due to overuse, over-prescription, and incorrect use of antibiotics by humans, but part of it is also due to widespread use in the animal industry (Schmidt, 2002). An estimated 70% of all antibiotics used in the United States are used on livestock, often in a manner aimed at preventing infection and promoting growth. Most of these antibiotics are similar or identical to those used for humans (Multinational Monitor, 2005).

In another case where consumer demand lead to industry change and governmental regulation, fast food chains like McDonald's, responding to public pressure, announced that they would stop using chicken treated with enroploxacin because of its similarity to the human antibiotic ciprofloxacin and chicken producers like Tyson Foods an Perdue Farms declared they would no longer use antibiotics non-therapeutically. While the term "non-therapeutically" is defined differently by different organizations, it generally means that the animal is not treated with the antibiotic unless it is sick. Non-therapeutic use is often considered to include the use of antibiotics broadly for disease prevention and growth promotion (Schmidt, 2002). In 2005, for the first time, the Food and Drug Administration banned an agricultural drug—enroploxacin, industry name "Baytril"—on the grounds that it may be contributing to antibiotic resistance in humans, setting up a precedent for future antibiotic bans (Multinational Monitor, 2005).

The argument made by the pharmaceutical companies against this kind of regulation is that there is no cost-effective and scalable alternative for the animal industry which will allow consumers to buy meat at current low prices. However, Europe tightened regulation on the use animal antibiotics in 1999 and Denmark, which has been particularly strict on the non-therapeutic use of antibiotics, has in addition to seeing a decrease in antibiotic resistance, has not

seen an increase in the price of meat. More feed is necessary to compensate for the loss of enhanced growth from the antibiotics, but this cost is balanced out by the savings in drug costs. It should be noted that the use of therapeutic usage of antibiotics increased by 30% as preventative usage was eliminated (Schmidt, 2002).

Controversial Hormone Levels

Hormones, also known as growth promoters, were recently introduced into animal feeds to try to maximize the production output and feed efficiency of cattle while minimizing feed costs and time. With increased technology available and directed toward the research of increasing animal efficiency, a growing population of producers is using growth hormones in increasing rates. A study produced by the American Heath Institute of America estimated "without growth promoting antibiotics, the United States would require an additional 452 million chickens, 23 million more cattle and 12 million more pigs to reach the levels of production attained by the current practices" (Al-Dobaib & Mousa, 2009). However, there is a downside to the economical miracle of growth promoters used in bovines and the risk they pose to consumers. The Scientific Committee for Veterinary Measures relating to Public Health unanimously ruled that the hormone residues in meat and meat products could cause adverse developmental, neurobiological, genotoxic, and carcinogenic effects (as cited in Al-Dobaib & Mousa, 2009).

Possible Impacts of Synthetic Hormone residue

One other concern about feedlots is the impact that synthetic hormones have on human development and reproductive systems in young people. Synthetic hormones have been used in the cattle industry for rapid growth and large weight gains in cattle. The hormones are one other form of being cost effective and have large gains without having to invest too much in the

animal. The use of synthetic hormones on cattle has been widely used in the past by CFOs in the United States and Canada. Studies done by the World Health Organization (WHO) back in 1988 found that the level of residue from synthetic hormones was marginal and would not impede human consumption of such beef. Later a revaluation was done on this study again and had a different conclusion (Andersson, Skakkebaek, 1999). The revaluation found that young children were very sensitive to small levels of estradiols found in the meat. Since levels of residue were high enough to affect you girls that ate the meat, some of the problems that arose were cases of gonadal dysfunction (sterile ovaries) or Turner syndrome. Hormones are not the only things that are used in large cattle operations, antibiotics are also used to ward off any diseases that may quickly spread in small location with so many animals. The antibiotics were found to have some effect on bacteria by allowing the harmful bacteria to be more resistant and evolve to a more harmful level (Davies, Khan, Peters, Roser, Stuetz, Tucker)

Eutrophication

Nitrogen (N) is another nutrient that is either leached through the soil into water systems or can simply be transported by runoff from agricultural fields. Nitrogen is usually the limiting nutrient in saltwater ecosystems, so eutrophication can also eventually reach the oceans and cause large algal blooms. Contamination of ground water can lead to Nitrate poisoning of infants, this is called methemoglobinemia or Blue Baby Syndrome. Infants near six months of age are more vulnerable of contracting this syndrome. Once the contaminated water is ingested the bacteria in the digestive system reduces nitrate (NO_3^-) to nitrate (NO_2^-). The nitrate then oxidizes iron (Fe) in the hemoglobin molecule from (Fe^{+2}) to (Fe^{+3}), forming methemoglobin that cannot transport oxygen (O_2) in the blood, causing the infant to have or appear blue in color due to the lack of (O_2) in the blood (Beateon, Havlin, Nelson, Tisdale, 1975).

Some factors that are affecting manure management practices is the fact that there are very large quantities of it and it is viewed as waste, or disposal. The nutrient concentrations are hard to predict due to not having a balanced N and P concentration, which is not always available to the crop demand. Solid manure is also bulky and difficult to transport over long distances when gas prices are increasing all the time. This leads to over applications of plots in close proximity of feedlots, and timing of application is not always administered at proper times, which leads to nutrient build up. There is also the Vertical integration of the livestock industry which means a company will own cattle from the time that they are birthed to the time they are slaughtered. But ranchers are contracted by these large companies to care for the cattle during this period and by default own the manure produce and the environmental issues that come along with it. Economics also at times encourage poor management of livestock manure, because there is no incentive to practice proper management. Manure is viewed as waste rather than a resource. (CFOs) are also under harsh scrutiny and regulation because of the environmental issues that have risen over the years.

Feedlots and the Environment

Modern feedlot operations consist of two types; Animal Feeding Operations (AFO) and Concentrated Animal Feeding Operations (CAFO). A concentrated animal feeding operation has over 1000 head of cattle were a (AFO) will have less than 1000 head of cattle.(De Rouchey, 2010) Large-scale CAFOs have been localized in areas like western Kansas since around the 1950's. The cause of this was due to the technological advances in Agriculture. More feed such as corn or alfalfa could be mass produced and the ability to feed more cattle in a shorter period of time became possible (Bussing, Self, 1981). Because these operations house at least one

thousand or more head of cattle each, as opposed to AFOs which house less than one thousand animal units, waste disposal is one of their highest priorities. Some practices of disposing of the waste is to have cattle manure and urine funnel into massive holding lagoons. After a period the lagoons are emptied and applied to neighboring agricultural fields to irrigate agriculture fields. This rich organic matter (OM) is essential for providing valuable nutrients to crops(De Rouchey, 2010). Although this is a great practice for land management, it also presents some problems. For instance, over applications of (OM) in the fields within a close proximity to the (CFOs) increases the risk of runoff or pollution into public drinking water systems. Organic matter from bovines (cattle) is rich in phosphorus (P) and during application of CFOs, mainly during the months of April and May in the mid-west, rain is unavoidable. Rainfall then contributes to non-point sources of pollution that can contaminate fresh water systems by means of rapid eutrophication, (Carpenter 1998, Gibson 2000, Sharpley and Rekolainen 1997). Eutrophication is the process by which a body of fresh or salt water becomes enriched with nutrients such as phosphorus. These nutrients are dissolved and then quickly stimulate the growth of aquatic plant life. When aquatic plant life dies and settles to the bottom of lakes, streams or river systems, microorganisms become anaerobic and deplete dissolved oxygen. Dissolved oxygen is responsible for large fish kills. The water quality impacts of eutrophication can be numerous and include increased water treatment cost, foul odor, poor taste, shift in aquatic communities, loss of biodiversity, impairment of navigable waters, and the loss of recreational value of lakes or streams.

Environment Land Management

When used properly animal waste can be seen as a resource and not a refuse. Manure is a very valuable nutrient source for the development of crops all over the world. Some of the beneficial effects of this valuable resource are: an increased buffer capacity for soils, increased OM in soils, and an improvement to the soil structure. So regardless of the type of manure that is applied or how it is applied, its sole purpose it to maximize the productivity of the crop, maximize profitability and to minimize any deleterious effects on ground water quality and air quality. A good management plan can assist in efficient nutrient use help protect the environment. Some good examples of practicing good land management are: Up to date soil tests for quality nutrient recommendations, Application timing is essential for specific nutrient and crop growth patterns, Proximity to nutrient sensitive areas such as the unwanted transport of nutrients into ponds or streams, ground water or wells. The use of riparian buffers is in integral part of good land management because of the buffer that riparian areas create for soil erosion and catchments for pollutants. And last but not least, a land owner should do and assessment and revision after each crop season to determine whether or not to apply more nutrients (Beateon, Havlin, Nelson, Tisdale, 1975).

Environmental Legislation

Throughout the United States there has been a trend toward fewer and larger agricultural operations. Livestock is no exception. There is public concern that these larger and often more concentrated operations present a threat to environmental quality. Additionally, the occurrence of certain environmental incidents—like the over 1,000 manure spills between 1995 and 1998 that killed cumulatively over 13 million fish (National Resource Defense Council, 2005)—elevates these concerns and leads the public to demand environmental regulation (Morse, 1996).

Subsequently, the environment is at the forefront of policy discussion regarding the livestock industry (Mathews, 2009).

The conventional concerns about livestock and the environment are regarding air and water quality and waste management. With concentrated amounts of animal wastes, there is an increased potential for nutrient runoff and leaching into water resources as well as bacterial runoff into surface waters (Morse, 1996). The Environmental Protection Agency (EPA) began regulating large cattle operations in the early 1970s beginning with the Clean Water Act (CWA), which required operations of a certain size—operations of over 1,000 head of beef where there was no waterway or of over 300 head of beef in the presence of a waterway—to contain waters with manure. These operations, dubbed concentrated animal feeding operations (CAFOs), were required to have a National Pollutant Discharge Elimination System (NPDES) permit. In order to get a permit the EPA requires operations to demonstrate the use of best management practices. For example, an operation may have to determine nutrient content of soil and manure in order to determine manure land application rates. An operation is also restricted in how close it can apply manure to surface waters and wells (Morris 1996). Individual states can elaborate on the requirements, making the stricter (Celender, 2009). Kansas has steadily been increasing the stringency of state regulations. Some of the state manure-management legislation includes facility and waste system design requirements, public notice when an operation is proposed, setbacks from property lines, nutrient management plans, and financial responsibility for manure leaks and spills (Metcalfe, 2000).

The government may be furthering its regulatory arm through the Supreme Court's 2007 ruling that greenhouse gases are pollutants by Clean Air Act definitions and the EPA's 2009 follow-up proclamation given after a period of research and open public comment. This ruling

obligates the EPA respond to the issue of greenhouse gas pollution in order to protect public welfare. Due to the difficulty in passing climate legislation, this inclusion of greenhouse gases in the definition of pollutant makes it quite possible for the EPA to regulate greenhouse gas emissions sans new legislation. Methane is one of the greenhouse gases listed in the EPA's endangerment finding and animal agriculture is one of the main sources of anthropogenic methane. Methane is considered twenty three times as potent as carbon dioxide and is produced by enteric fermentation characteristic of cattle digestion (IPCC, 2001).Currently this ruling is being used to raise emission standards for vehicles, but could conceivably be used in the future to regulate the livestock industry (EPA, 2009). The EPA put out a rough draft regulatory proposal in which agricultural operations emitting over 100 tons per year would need a permit. Roughly, this would mean cattle operations with 50 or more cattle (USDA, 2008).

Within the government, there is discord regarding this proposal. The United States Department of Agriculture (USDA) responded to the EPA's proposal to regulate greenhouse gases with extreme negativity, stating that it threatened to undermine the United States' landscape of abundant, productive agriculture. The USDA stated that the costs associated with meeting regulations would drive up food prices—decreasing domestic supply—and push out the smaller operations unequipped for compliance. Additionally, because of the diffuse nature of the emissions, it would be unfeasible to measure progress in reducing emissions, emissions, which for agriculture the USDA cites as coming mostly from biological processes and only contributing to 6.4% of total US emissions in 2006 (USDA, 2008).

The National Cattle Beef Association (NCBA) has also taken a strong stance on this potential expansion of government regulation. The NCBA—the nation's largest cattle organization—along with other opponents of greenhouse gas emission regulation have filed

lawsuits. In light of the "climategate" scandal where private emails sent between leading climate change scientists raised questions about validity of some of the science, the NCBA is petitioning the EPA to re-evaluate their findings regarding greenhouse gases (Burgdorfer, 2010). It should be noted however that in climate change scenarios, animal agriculture is almost always negatively impacted. Increased weather extremes, heat, and drought would impair livestock productivity while increased carbon dioxide in the air would decrease forage quality (Karl, 2009).

Sensitive to the issues greenhouse gas regulation could have on the state's economy, Kansas Legislature is also making an effort to halt such governmental intervention. Senators Pat Roberts and Sam Brownback, Congressmen Jerry Moran and Todd Tiahrt, and Congresswoman Lynn Jenkins are all sponsoring legislation to get the EPA ruling blocked or overturned in the Senate and the House of Representatives (Kansas Livestock Association, 2010). Greenhouse gas regulation and other climate change legislation will also have indirect effects on the livestock industry. For example, by requiring a minimum amount of ethanol in gasoline, or subsidizing the production of corn for ethanol, corn prices are driven up, which increases feed costs for livestock producers, decreasing profit margins. Currently the EPA is proposing raising the current gasoline blend with 10% ethanol to 15% ethanol—a change that cattlemen fear will cause corn prices to go even higher (Burgdorfer, 2010). Thus, legislation geared at protecting the environment has profound economic implications for cattlemen.

Environmental issues are not easily made distinct from human health issues. In a broad sense, climate change has the potential to stress the health and welfare of several populations. In a more localized sense, issues like that of manures contaminating water resources is both an ecological problem and a health issue. Feedlot wastes that get into water elevate nitrate levels.

Infants drinking water or breast milk with elevated nitrate levels have impaired oxygen transport in the blood, a condition called methemoglobinemia, which can lead to asphyxiation. Additionally, animal wastes contain high concentrations of pathogens. Humans can get over forty diseases from these pathogens (National Resource Defense Council, 2005). Highly publicized disease outbreaks in humans from water contaminated with animal manure cause the public to pressure the government for more regulation (Metcalfe, 2000).

Opinions of Livestock Operators on Agricultural Policy

There is a shortage of data available for policy makers on the opinions of agricultural producers on agricultural policy. However, one study surveyed 1221 Kansas producers, 208 of which were livestock producers, about their satisfaction regarding various agricultural policies. While generally satisfied, the main concerns of the producers were about environmental regulation and equity issues arising from the government favoring one sector over another. When asked what they viewed as the best mechanisms to protect the environment, 58% were in favor of cost-sharing programs for the institution of certain conservation practices. In contrast, 12% saw direct government regulation as a desirable method. Most of the surveyed operators opposed government intervention into their operation. Another general finding was that economic self-interest was the most significant determinant in how a producer felt about a certain policy. Livestock producers mostly were opposed to policies that raised the price of feed grain prices and subsequently the cost of livestock production (Barkley, 1990).

Conclusion

The cattle industry is subject to a variety of forces and constantly faces threats from other industries. Public perceptions and pressures drive consumer demand as well as influence governmental policy. Using those ideas, we have studied the effects and the correlation between

the cattle industry and outlying factors. It is important to remember the significance of the cattle industry to Kansas. Kansas produces the second largest quantity of cattle of any state, and with every million dollars that the industry expands or shrinks, the whole economy of Kansas follows by a factor of two (The Beef Cattle Institute, 2007). Few individuals have evaluated and documented the complex economic and resource management impacts on livestock operators from the more recent regulations and regulatory proposals (Morris 1996).

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