

**Dairy Farming and Cattle Ranching; Consequences on Human and  
Environmental Health**

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## **Senior Project Research Proposal**

### **Dairy Farming and Cattle Ranching; Consequences on Human and Environmental Health**

The recent controversy shaped by author Michael Pollan's visit to Cal Poly's campus has sparked my interest in the ongoing debates surrounding both dairy farms and cattle ranching.

My time spent at Cal Poly in the Social Sciences major has made me aware of the issue of sustainability. In my senior project I plan to investigate the methods we employ in converting our natural resources into final product, specifically, when it comes to dairy and beef production. I believe that the ultimate survival of our society is greatly reliant on the way in which we manage our environmental resources.

Also, I wish to compare the uniquely American consumption of beef with the recommended amount of dietary protein and the health consequences. In addition I will investigate the correlation between what we eat and the condition of our environment.

The large demand for dairy and beef products in our country and the billion dollar market that has resulted are what continue to reinforce the mistreatment of cattle and cows. However, Americans have a fantasy idea of how these animals are treated due to campaign slogans such as "Happy Cows Come from California" which depicts cows in wide open green pastures with smiles on their faces. Investigation of the way cows are treated in this business will undoubtedly paint a much different picture. America's love for beef and money is transforming what was once a small American farmer's job into a corporate business with fewer and larger farms squeezing out many of the smaller farmers. One objective of this research is to educate the public on the effects that

tonight's dinner may have on our society as well as create possible solutions or alternatives to reduce our impact on the environment and ensure a successful future.

In order to argue my perspective on dairy farming and cattle ranches I will need to investigate many different environmental issues surrounding these agriculture businesses. Thus far I have found examples involving these issues in New Mexican dairy farms and cattle ranching causing deforestation in Brazil. I think it would also be beneficial to focus on the large Harris Ranch feedlot located along Interstate 5 because it proves that this issue exists locally and its conditions continue to shock me each time I make my commute from Sacramento to school in San Luis Obispo.

There are also many films made available concerning this problem, one specifically that would be beneficial to my topic is Food Inc. Books such as Pollan's, Omnivore's Dilemma and other documents found in both the library and databases available on campus will also be a good place to find information for my project

### **Annotated Bibliography**

Burnett, John. "New Mexico Dairy Pollution Sparks 'Manure War'". NPR. 9 Dec. 2009. 2 Jan. 2010. <<http://www.npr.org/templates/story/story.php?storyId=121173780>>.

Burnett writes about the manure from dairy farms in New Mexico polluting the air and water in the area. Nitrogen is contaminating the local drinking water. Burnett states that dealing with 'manure management' is the industry's biggest environmental challenge. This article gives a good description of the way in which waste from the dairy farms is handled in addition to a detailed description of the false image of cow treatment that is portrayed to the public. In addition, Burnett comments on the growing trend of fewer big farms rather than multiple small farms. This article provides good evidence of environmental damage as a result of dairy farming and will help support my thesis accordingly.

Butler, Robert. "Is Geography the New History?". Intelligent Life Magazine. Winter 2009. 12 Jan 2010. <<http://www.moreintelligentlife.com/content/robert-butler/going-green-rest-geography>>

Butler discusses his belief that geography is no longer a neutral subject. Many controversial topics of geography are being addressed more frequently in daily conversations including agriculture, glaciation, climate change etc. Butler further compares our society to that of the Aztecs and what can happen if we put too much strain on an ecosystem. This article is helpful to my thesis because it supports my belief that the survival of our society is dependent on the way in which we manage our environmental resources.

Duhigg, Charles. "Health Ills Abound as Farm Runoff Fouls Wells". The New York Times. 17 Sept. 2009. 16 Feb. 2010. <

<http://www.nytimes.com/2009/09/18/us/18dairy.html?pagewanted=1&r=2>>

Duhigg's article addresses the tendency of waste from farms being used as fertilizers, however an excess of waste can flow into ground water. Chemicals and bacteria leaking into the water are polluting drinking water causing rural families to become ill. The article also discusses the fact that farms are not being actively monitored so regulation of the pollution of wells is difficult. There are also examples of dairy farms that are known for pollution in addition to quotes from farm owners stating their farms are not the source of pollution. This article provides examples of bacteria and illnesses caused by the pollution from cows and what measures dairy farmers are taking to prevent this pollution.

Food, Inc. Pearlstein, Elise. Kenner, Robert. DVD. Magnolia Home Entertainment, 2008.

This movie focuses on how little consumers know about the food they eat. It becomes obvious that the food industry is trying to hide the truth behind the meat we eat including details on assembly lines and the abuse of the animals as well as the workers. One focus of the film is the issue of how only a few large corporations control the food industry and the way farmer's lives have been revolutionized as a result. There is also a section on feeding cows corn and how this can lead to the development of harmful pathogens such as E. Coli. A woman tells her story about her son dying from this disease, which is her reason for speaking out to encourage safe food in our country. This movie is helpful for

my thesis because it discusses the health consequences of how our meat is raised and treated as well as the power issues created by large agriculture corporations.

Knickerbocker, Brad. "Human's Beef With Livestock: A Warmer Planet". The Christian Science Monitor. 20 Feb. 2007. 17 Feb. 2010.

<<http://www.csmonitor.com/2007/0220/p03s01-ussc.html>>

This article discusses the contribution livestock is making towards global warming. According to the article, livestock contributes to 18% of greenhouse gases including methane, carbon dioxide, and nitrous oxide. The increase in the amount of meat that Americans eat poses a threat to our environment and an increase in greenhouse gas emissions. This article is useful for my thesis because it provides another aspect of environmental damage caused by livestock.

Liebman, Bonnie. "The Changing American Diet- Statistics on Food Consumption". Nutrition Action Healthletter. April 1999. 17 Feb. 2010.

<[http://findarticles.com/p/articles/mi\\_m0813/is\\_3\\_26/ai\\_54271814/](http://findarticles.com/p/articles/mi_m0813/is_3_26/ai_54271814/)>

This article discusses the unhealthy American diet. It goes through each food group and discusses how much the average American consumes. The part of this article that is relevant to my thesis is the amount of meat consumed by Americans annually (195lbs), almost double the recommended meat consumption.

“Michael Pollan: In Defense of Food”. The Commonwealth Club of California. 2 Feb. 2010. iTunes. 17 Feb. 2010.

Michael Pollan discusses his book, In Defense of Food, and what he eats. His last book, Omnivores Dilemma, left many readers wondering what is ok to eat, so he touches on this subject. Pollan explains the effects of the western diet, huge amounts of meat, including the toll it takes on the environment. Pollan states that in the US humans eat 200lbs per person per year (9oz a day). One quarter of an Americans carbon footprint comes from consuming meat; fossil fuels for corn production, methane from cows, and fertilizers emitting nitrous oxide. Reducing meat consumption by 20% is the equivalent of trading in a gas guzzling car for a Prius. This talk is helpful for my thesis because it provides many examples of how meat harms our health and contributes to our individual carbon footprint.

Raffensperger, Lisa. “Livestock Sector Drives Increasing Water Pollution”. World Resources Institute. 30 Jan. 2008. 17 Feb. 2010.

<<http://earthtrends.wri.org/updates/node/279>>

This article is about the growing ‘dead zone’ in the Gulf of Mexico as a result of runoff from cow pastures. The Mississippi River which is a drainage basin for about 41% of the US’s livestock farms drains into the Gulf of Mexico. This abundance of nutrients causes “explosive algal blooms” and when they die they decompose causing bacteria that dissolve oxygen. This forces marine life to relocate because they are unable to survive with the low oxygen levels that result. The gulf is the second biggest dead zone in the world. This article is helpful for my thesis because it provides another example of a



negative environmental consequence of livestock farms. It proves that the affects of these farms are not merely local but are effecting environments thousands of miles away.

Unknown. "Pollution from Dairy, Cattle, and Chicken Operations Can Be Corrected!". Global Perspectives. 9 Dec. 2009. 16 Feb 2010.

<<http://bootheglobalperspectives.com/article.asp?id=317>>

This article discusses the trend of dairy operations moving out of populated areas because of development and complaints of odor and potential disease caused by these facilities. A typical milk cow produces three times more manure than milk. Families living near these farms are exposed to contaminated water causing illness such as diarrhea and ear inflections. Communities are dependent on these industries because they need the money. When farms were more spread out they didn't propose such health risks but now companies are mass producing milk, chicken and cattle, and the pollution is huge. This article is beneficial to my thesis because it explains the changes among the industry in terms of size of farms and the health risks and problems that are arising with this change. It also provides information on farms that are beginning to develop renewable sources of energy in hopes of showing their concern for the environment and removing some of the criticisms of the industry.

Unknown. "Facts about Pollution from Livestock Farms". Natural Resources Defense Council. 7 Jul. 2005. 17 Feb 2010. <<http://www.nrdc.org/water/pollution/ffarms.asp>>

This article gives multiple statistics and facts regarding the pollution that livestock produces and its effect on public health and water. Particularly, nitrate pollution

polluting ground water causing spontaneous abortions, methemoglobinemia, and pathogens (Salmonella, E. coli, Cryptosporidium). Also, antibiotics are added to animal feed to speed up growth resulting in resistant bacteria. Waste spills from livestock farms have also caused the death of millions of fish. One example of this is a spill in North Carolina. This article helps support my thesis and gives examples of where waste spills have had detrimental effects on the humans and organisms.

Unknown. "Get the Facts: The Destructive Dairy Industry". Born Free USA. 16 Feb. 2010. <<http://www.bornfreeusa.org/facts.php?p=373&more=1>>

This article describes the true conditions that milk cows in our country live in. It discusses the differences in milk production today compared to 60 years ago and explains in detail health issues milk cows face due to the unnatural amount of milk they produce and hormone injections. It explains how antibiotics used to treat the cows are passed on to the consumer and lists human diseases that are related to meat consumption. This article is beneficial for my thesis because it disproves the ideal life most Americans believe milk cows lead and describes in detail how milk cows are truly treated.

## Outline

### **Dairy Farming and Cattle Ranching; Consequences on Human and Environmental Health**

- I. Introduction
- II. Transformation of livestock farming business
  - a. Small to large compact feedlots: Americas obsession with meat has led to this change in industry in order to meet demands and make money
  - b. Controlled by a small group
  - c. Social theory behind transformation of the industry
- III. Treatment of cows
  - a. Abuse
  - b. Diseases cows suffer from due to treatment and conditions on dairy farms/feedlots
  - c. Use of antibiotics and hormones
  - d. Disprove image of happy cows in pastures
- IV. Environmental consequences of dairy farms and feedlots
  - a. Ground water pollution and its effect on rural families; New Mexico
  - b. Gulf of Mexico becoming a dead zone
  - c. Global Warming; contribution livestock makes to producing greenhouse gases
  - d. Deforestation
- V. Health consequences of beef consumption
  - a. American consumption vs. recommended daily requirements
  - b. Diseases that result; Heart Disease, Cancer
  - c. Illness that result; *E. coli*: Method of corn feeding cows leading to the development of resilient pathogens
- VI. Conclusion

- a. Discuss our society's dependency on the condition of our environment
- b. What can be done?
- c. What are farmers doing to change?
- d. What can consumers do to demand change?
- e. Possible renewable energy sources for farms

## **Introduction**

The recent controversy centered on author Michael Pollan's visit to Cal Poly's campus has sparked my interest in the ongoing debates surrounding both dairy farms and cattle ranching.

My time spent at Cal Poly in the Social Sciences major has made me aware of the issue of sustainability. In my senior project I plan to investigate the methods we employ in converting our natural resources into final product, specifically, when it comes to dairy and beef production. I believe that the ultimate survival of our society is greatly reliant on the way in which we manage our environmental resources. America's love for beef and money is transforming what was once a small American farmer's job into a corporate business with fewer and larger farms squeezing out many of the smaller farmers resulting in a negative effect on our environment as well as farming communities. The mass production of beef and dairy has led to the development of substantial compact farms controlled by a few large corporations. The extremely crowded conditions of such feedlots as well as dairy farms have created new environmental threats due to the massive amounts of waste produced as a result of this business.

The large demand for dairy and beef products in our country and the billion dollar market that has resulted are what continue to reinforce the mistreatment of cattle and cows. However, Americans believe in a fantasy of how these animals are treated due to campaign slogans such as "Happy Cows Come from California" which depicts cows in wide open green pastures with smiles on their faces. Investigation of the way cows are

treated in this business will undoubtedly paint a much different picture. Crowded and restricting living conditions coupled with the treatment of these animals leads them to develop horrible diseases and deformations. The use of antibiotics and hormones to maximize milk and beef production is harmful to the animal as well as to those who consume the final product. One objective of this research is to educate the public on the effects that tonight's dinner may have on our society and health as well as address possible solutions or alternatives to reduce our impact on the environment and ensure a successful future.

The mass production of cattle and its byproducts has already done notable damage to our environment. The large amount of excess waste from large dairy farms and feedlots is linked to groundwater pollution in many rural areas such as New Mexico. Furthermore, runoff from cow pastures into the Mississippi has transformed the Gulf of Mexico into the second biggest dead zone in the world. In addition to waste management issues, dairy farms and feedlots play an increasingly big role in Global Warming. The emissions of greenhouse gases from animals as well as production methods such as deforesting areas to create farms and the use of fossil fuels for corn production contribute to Global Warming and Climate Change.

The uniquely American consumption of beef compared with the recommended amount of dietary protein has a variety of health consequences. The average American diet consists of an over consumption of beef products which heightens the risk of many diseases including heart disease, and cancer. Life threatening bacteria such as E. coli can also be found in the meat itself and passed on to consumers. The development of such resilient pathogens is linked to the method of corn feeding cows to maximize profits

instead of allowing the animals to graze in pastures. Eating meat and dairy products produced by cows can expose the consumer to many hormones and antibiotics used to lengthen the life of sick cows. The health effects of contaminated meat are increasingly being linked to our diet and to the condition of our environment and society.

America's love for meat and dairy, in addition to the money brought in by these businesses, is not sustainable. Practices that have been developed to maximize this wealthy industry are placing an immense strain on our environment. Rural illness due to ground water pollution and dead zones in our oceans are only a sampling of the visible damage we have done to our environment. Increasing damage is inevitable if we don't reevaluate our nation's agriculture practices and strive to achieve more sustainable methods such as proper waste disposal and the usage of renewable energy sources on farms. Solutions may only be found in completely revamping the workings of this large industry and, fortunately, consumers hold the power to demand change. If our survival as a society ultimately depends on the way in which we treat our natural resources, any efforts to improve the practices of cattle ranching and dairy farming will be well worth it in the end.

### **History of the American Cattle Industry**

The early American cattle industry originated in Europe and was brought to the United States by various routes. Cattle entered the US through multiple states including Texas, Florida, California, Virginia, and New England. Columbus introduced cattle to the New World during his second voyage in 1493. Upon completing his 3400 mile expedition he landed cattle on Hispaniola where they quickly thrived. Twenty six years later in 1519 Spanish explorer Hernando Cortez took offspring of Columbus' cattle to

Mexico where he formed the first cattle ranches in North America. As these ranches grew, many of the cattle were able to roam wild migrating to the US through both Texas and California thus marking the start of a soon to be extremely successful industry (Ball, 1998).

Historically, cattle provided three main services; labor, meat, and milk. As time progressed horses and machinery replaced the need for cattle labor, therefore milk and meat production became the sole purpose for cattle. Multiple different breeds of cattle were brought to North America, but not all proved to have the characteristics necessary for survival in the US. In 1623 the first purebreds were brought to North America, two Devon heifers and one bull all of which were imported to Plymouth Colony from Britain. Later in 1783, shorthorns were introduced followed by longhorn cattle. The longhorn breed stems from ancestors brought to America by the explorers. After the near complete destruction of the buffalo herds, longhorns were able to occupy the Great Plains. However, the era of longhorn cattle was short lived when the open range was fenced in and cattle with earlier maturing characteristics were imported. In 1873 a man named George Grant brought four Angus bulls from Scotland to Victoria, Kansas. He crossed the bulls with the native Texas Longhorn and created calves that weathered better on the plains and weighed more in the spring. Grant unknowingly creating what would soon be the largest beef registry association in the world, the American Angus association (Cybersapceag.com). A new century was approaching that would change the lives for cattlemen worldwide.

While many east coast and central American cattle ranchers proved successful, it didn't take long for the industry to be focused almost entirely in the west. The



disappearance of the buffalo, newly barbed wire farms, and the replacement of trail drives with railroads in the 1890s made way for a large industry based on the production of cattle. Cattle became a business owned by both small and large producers. However, it was an industry that is much different than the one that exists today specifically in terms of how the animals were reared and delivered to the market. The 1898 industry was organized to produce steers that were 4-5 years of age; heifers, young cows that have not yet given birth to a calf, were never killed. Grass fattened steers were shipped by train to central markets and stockyards served as temporary holding places for cattle until sorted and distributed to packers. The only corn fed cows were those that belonged to Midwestern farmers who kept cows to use up excess corn in addition to their corn and hog economy. Packers commonly killed a wide range of livestock and customers were small butcher shops interested in an assortment of meat. High freight rates were a drawback to the business, but it was simply a one way haul to the markets in the eastern parts of the country. Ethics of railroad, packers, and buyers operating outside of ranchers' control quickly became a concern to industrial cattlemen nationwide (Ball 1998).

Internationally, the United States along with Brazil are the top beef producing countries. All 50 American states have beef cattle and 30 states alone each have at least 10,000 cattle farms and ranches. The US produces about 25% of the world's beef even though it contains less than 10% of the world's cattle population. While it is reported that over 900 different breeds of cattle exists worldwide, many in the United States are crossbred to produce economically productive cows (Cyberspaceag.com). What once

began as a small industry has been transformed into a commercial business controlled by a small group of large corporations operating unsustainably.

### **Capitalism and the US Food Industry**

“The capitalist system works against a rational agriculture...a rational agriculture is incompatible with the capitalist system.” –Karl Marx

Since the development of agriculture millennia's ago, it has been a continually changing industry. Today we are faced with many people on our planet suffering from hunger, when in actuality there is no food shortage. Enough food is produced to provide at least 2800 calories per day for each person on Earth. This amount is more than what is required to meet minimum health standards. It is ironic that most proposed solutions for ending world hunger revolve around developing new technologies when there is no shortage in the current food supply. The current food industry is not organized to feed the hungry or in concern of human consumption, but rather to generate maximum profits.

Capitalism and the consequential extreme drive for profit have transformed the food industry and cattle industry from commerce that benefited communities and families to businesses controlled by large corporations. This is evident in the fact that only three companies control 85% of the world's trade in grain, three different companies control 80% of banana trade, and merely three companies control the world's corn supply. What was once traditional farming has become a monopolized industry. It has driven people off their land and into unemployment and poverty. Those small farmers that have hung

on to their land have fallen to the mercy of large corporations and have little to no say in the manner in which their product is produced (Angus 2008).

While the problem of capital influence on our food system is detrimental at a global level, it has also greatly transformed the United State's food industry as well. Today, four companies control 80% of the American meat market (Center for Sustainable Systems). Seemingly this downfall began with the development of McDonalds, a fast food chain devoted to producing quick good food. The development of this assembly line strategy used to make quick hamburgers has now been applied to many aspects of our food production including the meat market. Profit hungry corporations use this strategy in addition to many others to produce more meat in less time in order to compete in our capitalist society. As a result both the health of our people and environment are at stake. One example of such detrimental tactics includes feeding cow's corn rather than their natural diet of grass because it is cheaper. Another example includes feeding chickens hormones and antibiotics in order to produce plump chickens in less time. Both of these examples have proven negative side effects on both our environment and health (Food Inc. 2008). The capitalistic society has driven the cattle industry into unhealthy unsustainable industries that if left unattended will self destruct.

Capitalism resulted from new technological advances in transportation, communication, and manufacturing. These advances sparked an expansion in commercial markets for goods. Work and domestic life were reorganized as this industry expanded agriculture work declined. Families were forced to move from rural areas to city centers in search of work. It may have seemed as though agriculture would remain untouched by the revolution, but today's agriculture in the United States is directly

dictated by capitalism. The basis for this economic system is on individual competition for markets where producers and consumers ultimately control all aspects of commerce. According to Marx, “wage labourers, capitalists and landowners constitute [the] three big classes of modern society based upon the capitalist mode of production...” (Edles and Appelrouth 20). This resulted in a concentration of wealth among the production owners producing a system based on subordination and domination. Marx believed that exploitation, alienation, and dehumanization shape the capitalistic society and they are observable in today’s food industry (Edles and Appelrouth 2010).

Worker exploitation, alienation, and dehumanization can be seen in the relationship between small farmers and the large agriculture companies that employ them. Many small farmers have been coerced into turning their farm into a factory farm to avoid loosing their farm as a result of the agricultural monopolies created by corporations. A factory farm is one in which animals are mass produced to maximize supply of meat. As a result, these farm’s animals live in inhumane conditions that threaten the lives of the animals themselves as well as the workers and residents in surrounding areas (Food Inc., 2008). According to Marx, capitalism is inherently exploitive because the owners of the businesses collect the profit from the labor of the workers and the sale of goods. Business owners are constantly looking to cut costs in order to compete in a capitalistic market and as a result, farmer wages are limited to what their corporate owner allots, putting them at the mercy of their employer (Edles and Appelrouth 2010). Small farmers in today’s market are unable to change any aspect of their livestock production because they are expected to maintain a production rate that does not coincide with humane living conditions (Food Inc. 2008). Marx interprets this

as removing individual humane potential and explains that when human activities are no different than a machine the individual becomes dehumanized (Edles and Appelrouth 2010). Not only does the quality of life for farmers suffer in this business, but the quality of the treatment of animals and the quality of meat produced is sacrificed as well.

The capitalist nature in which this industry is currently become subjective to has created an industry infiltrated with risks. Some of the most obvious risks of the food industry pertain to the development of resistant pathogens as a result of meat production. An example of this is the occurrence of human exposure to the potentially deadly bacteria *E.coli* from consuming beef. Naturally, cows should be grass fed throughout their lives, but recently a new trend has developed in feeding cows corn 60 to 120 days before slaughter. Corn fattens cows up tremendously producing more meat and allowing them to survive all year long in cold regions. Consequently, corn is not part of a natural diet for cows and acts to acidify the cow's digestive track disabling the killing of *E.coli* within the cow (Arsenault 2009). *E.coli* may be passed on to the consumer through meat consumption or contaminated water. The detrimental effects may include possible death.

Exacerbation of *E.coli* is one example of how capitalism has turned our society into a 'risk society'. According to Ulrich Beck, both the development of the means of production and industrialization has developed a set of risks and hazards, which have never previously faced. He writes that these dangers can no longer be limited and with technology they will be able affect future generations and cross national boundaries. With modernization, it becomes impossible to determine who is held accountable for hazards or to compensate those whose lives have been affected by such hazards (Beck). Beck's theory is clearly observable in the case of food safety advocate Barbara Kowalczyk

who lost her 2 year old son to E.coli. His death reflects how hazards created from the transforming agriculture industry can affect future generations. Furthermore, little compensation can be offered to a mother who has lost a child, and as a result Kowalczyk has dedicated her life to fighting the USDA in efforts to shut down plants that produce contaminated meat (Food Inc.2008). Corn feeding cows to increase production rates in order to maintain a competitive edge in a “dog eat dog” industry is just one example of the life threatening hazards our capitalistic society has created.

Both Karl Marx and Ulrich Beck provide theoretical insight that helps one understand the detrimental causes and effects of today’s food industry. Perspectives offered by Marx and Beck bring attention to the damage that is being done to workers within in industry as well as consumers. Competition that guides this commercial market is slowly killing our environment as well as our loved ones. The unsustainable practices of factory farms, deemed productive by large corporations, will undoubtedly be recognized and be forced to change.

### **Treatment of Cows**

Many slogans such as “Happy Cows Come from California” trick the American consumer into believing that the life of a dairy or beef cow is a pleasant one. It creates an image of a red and white barn and rolling green pastures as far as the eye can see dotted



with black and white cows smiling and talking to each other. While to many, the slaughter of a cow can be considered upsetting, the thought of them living happy lives in the wide open spaces can provide some peace of mind when consuming meat or dairy products. However, in reality the lives of the dairy and beef cows alike are quite dismal. Forced into inhumane conditions by the capitalistic drive to produce more with less cost, the majority of cows live short lives often plagued by disease and chronic stress. While conditions for a cow on a dairy farm is far different than that of a cow living on a feedlot, neither life includes open spaces or green pastures.

Today, dairy cows produce 2.5 times more milk than they did in 1950, but along with this increase in milk production comes consequences. Intensive practices aimed at maximizing milk production place dairy cows under a lot of stress resulting in a decline in the quality of life and more illness. These cows are producing abnormally large amounts of milk, nearly 10 to 20 times more than the amount needed to suckle their calves. As a result, these animals burn out earlier than if they were left to live naturally. The natural lifespan can be up to twenty five years, however 25% of dairy cows are killed before age three and only 25% live past seven years of age. Early slaughter occurs due to illness, injury, low milk production, or poor conception rates resulting in much shorter lifetimes compared to milk producing cows during the 1950s (<http://www.bornfreeusa.org>).

From the moment of birth, the life of a cow is often tragic. Female cows remain on the farm while males are shipped out immediately; often times before they can stand or their amniotic fluid is removed. They are transported to be auctioned off, however many calves die before auctioning can be completed. Male calves are sold into veal

operations which entail a short life often confined to a small crate that prevents them from movement. Lack of muscle development mixed with an iron poor diet produces pale flesh making the meat more desirable to consumers (<http://www.bornfreeusa.org>).

The habitat and treatment of a grown dairy cow is certainly not any more picturesque than a calf. They are often confined to barren fenced lots with hard densely packed dirty floors. Because factory farms rarely provide shade, shelter, or clean comfortable resting areas, cows are forced to endure harsh weather conditions including rain and extreme temperatures. It is common for these cows to be covered in their own filth because they are unable to escape the dirty conditions of the lot. The small spaces combined with compact soils increase the likelihood of injury and lameness among the dairy cattle.

In order to boost milk production, these cows are fed high intensity feeds consisting of grains and injected with growth hormones. A grain diet brings complications in the digestive process causing discomfort and bloating. Injections of the Bovine Growth Hormone (BGH) can boost milk production by up to 25%. Of the nine million dairy cattle in the US, between 7-25% are injected with the hormone. BGH increases udder size as well as the risk of infection. Among dairy cattle, 33% develop mastitis, a painful udder infection that is a common reason for early slaughter. Large udders additionally produce problems for walking because they spread the legs of the cows to an unnatural distance, resulting in a distortion of the female cow's pelvis and spine. The hard grounds on which the cows are forced to live on often aggravate this painful deformation. While many of the resulting health complications can be treated with veterinary help, they are often overlooked. Even a small farm can have up to 1,000 cows making it rare and difficult to



recognize a cow's need for veterinary care before the health problem has progressed beyond the point for successful treatment. In assessing the painful health issues in addition



to the true living conditions of milk cow it becomes quite clear that “happy” cows are few and far between and if they could talk they would most likely be saying something far different from “Thank You America!” (<http://www.bornfreeusa.org>).

Beef cattle spend much of their life in a crowded filthy habitat, breathing noxious fumes, and standing or lying in mud and waste. It is this reality that has led to creation of the feedlot nickname, “cowschwitz”, comparing the slaughter and handling of cows to that of humans in the Auschwitz concentration camp during the holocaust. After calves are weaned they are removed from the farm and are placed on feedlots where they are fattened for slaughter. Weaned cows arrive when they are between 6 and 12 months old



Feedlot in California.  
<http://www.nytimes.com/2008/01/27/weekinreview/27bittman.html?pagewanted=1>

and weigh between 400 to 600 pounds. From that point on they gain approximately 3 pounds a day until slaughter when they have reached between 1,000 and 1,250 pounds. Such rapid weight gain with nearly no opportunity

for exercise puts an abnormal amount of weight on the cows preventing the legs from sufficiently supporting the cow. This results in cartilage damage, limb pain, and difficulties in standing or lying. Collectively, the high density and living conditions on

feedlots result in the cattle suffering from many additional physical and social problems. While there are many management and structural practices that can improve the welfare of the cattle, including sprinklers to cool cattle and reduce dust, few feedlots use these developments.

Pen Feature	Large Feedlots (8,000+ head)	Smaller Feedlots (1,000-7,999 head)	All Feedlots
Wind breaks	10.3%	56.8%	43.8%
Shade	9.6%	15.3%	17.3%
Sprinklers/misters	13.1%	13.5%	13.3%
Mounds	65.5%	59.4%	61.1%

<http://www.farmsanctuary.org/mediacenter/assets/reports/beef.pdf>

Diet provided to the cattle during their time in feedlots is the root cause behind much of the cattle's suffering. Grass is the natural diet of cows, but many US feedlots emphasize a readily fermentable carbohydrate to speed the growth of the steers. Corn is the most common source of this energy concentrate with 98.2% of feedlots distributing it to their livestock. Furthermore, large cattle operations are much more likely to utilize this corn substitute compared to smaller feedlots (The Welfare of Cattle in Beef Production).

This dense carbohydrate is not a part of the natural diet of a cow. Indeed, ingestion of this feed leads to three disorders; bloat, acidosis, and lameness. Bloat, either frothy grain bloat or free gas bloat, is defined as excessive gas. Frothy grain bloat occurs in the initial feeding period and is caused by ingesting a diet with 50% more concentrations of high carbohydrates and protein than a natural grass diet. The free gas bloat occurs throughout the feeding period and is associated with aggressive eating behavior. Acidosis is a metabolic condition caused by over consumption of readily fermented carbohydrates resulting in rapid production and absorption of ruminal acids.

The grain diet of barley, wheat, or corn is often low in fiber and can be consumed faster by the cow decreasing saliva production and rumination. This decrease increases the acidity of rumen (the first compartment of the stomach). Even an acute form of acidosis can result in serious destruction of physiological functions, coma, or death. This disease is so common in feedlots that liver abscesses are considered acceptable if kept under 20% with the use of antibiotics. Both diseases can be prevented by simply added roughage or fiber to the cattle's diet. This increase in acidity of rumen also increases endotoxins which are then released into the blood and ultimately impairs blood circulation to the hoof. This condition leads to lameness which results in difficulty in movement such as walking (The Welfare of Cattle in Beef Production).

Disease	Large Feedlots (8,000+ head)	Smaller Feedlots (1,000-7,999 head)	All Feedlots
Respiratory disease	15.5%	8.7%	14.4%
Acute pneumonia	3.1%	2.9%	3.1%
Digestive problems	2.0%	1.1%	1.9%
Lameness	2.0%	1.3%	1.9%
Nervous system problems	0.4%	0.3%	0.4%

<http://www.farmsanctuary.org/mediacenter/assets/reports/beef.pdf>

The most common disease responsible for 50% of mortality and 75% of morbidity among beef cattle is Bovine Respiratory Disease. Also known as the “shipping fever” this disease occurs shortly after the animals arrive at the feedlots attributed mainly to the stress cause by transport. This illness is caused by bacteria and viruses that rarely make healthy cattle sick, but when introduced to cattle in a stressful environment these pathogens are able to make cattle ill. Characteristics of Bovine Respiratory Disease are fever, dyspnea, and fibrinous pneumonia. Even though 35% of steers receive treatment, pulmonary lesions consistent with pneumonia are found among 72% of steers at

slaughter. With 78% of treated cows exhibiting lesions, 68% of those left untreated also had lesions. Furthermore, nearly half or more of cases go undetected. Such statistics show that the treatment method even when respiratory disease is detected is inadequate (The Welfare of Cattle in Beef Production).

Additionally, anguish is placed on these cattle in the form of mutilation. Feedlot cattle are often dehorned and castrated. Dehorning is practiced in order to reduce bruising and hide damage preventing a reduction in the value of the carcasses. Horns are removed, almost always without the use of analgesia by two different methods, “disbudding” and “dehorning.” Disbudding includes the destruction of the horn by applying a hot cautery or caustic paste and is performed on calves less than ten weeks old. Dehorning is the actual amputation of the horn using a scoop, saw, shears, or wire and is performed on older calves. Both have proved to cause tissue damage to the cattle and have been widely acknowledged as painful to the animal. Research has shown that providing sedatives, local anesthetics, and anti-inflammatories before and after would greatly reduce pain. In the United Kingdom anesthetics must be applied to calves undergoing the procedure if the calve is over 7 days old, but in the US it is extremely common to practice dehorning without anesthesia. This inflicted pain is rationalized according to its benefit to surrounding animals as well as the people who work with the cattle.

Similar to dehorning, castration has also proved to cause pain and stress among cows. Castration is performed to prevent physically or genetically inferior cattle from reproducing, improve meat quality, and to reduce aggressive nature of males. This procedure is often performed on animals from birth and up to 9 months of age. All three

methods used in castration immediate pain and distress and chronic pain for up to 42 days is not uncommon. Despite evidence of the hurt level caused by castration, guidelines do not require or recommend the use of anesthetic (The Welfare of Cattle in Beef Production).

The unpleasant life experienced by both the dairy and beef cow is a result of an industry focused on maximum production with little cost. All shortcuts taken to reduce cost have shaped the painful and abusive conditions for these animals. Providing proper diets, shelter, and medical care comes at a cost too high for many large corporations to endure or willing accept. The nature of this competitive market makes it difficult for sincere farmers to provide humane conditions and also survive economically. Being aware of these conditions, and supporting the minority of farms that do practice humane conditions is important to the transform of this industry as well as the lives of cattle.

### **Environmental Consequences**

In addition to issues of animal cruelty in the cattle industry are the increasingly prevalent environmental consequences that are becoming more apparent as the demand for meat becomes greater. As the industry grows, so does the stress on natural resources world wide. Examples of



environmental damaged as a direct effect of this rich industry include an increase in groundwater pollution, the development of dead zones in the oceans, and a significant contribution to climate change as well as deforestation. Such consequences are causing

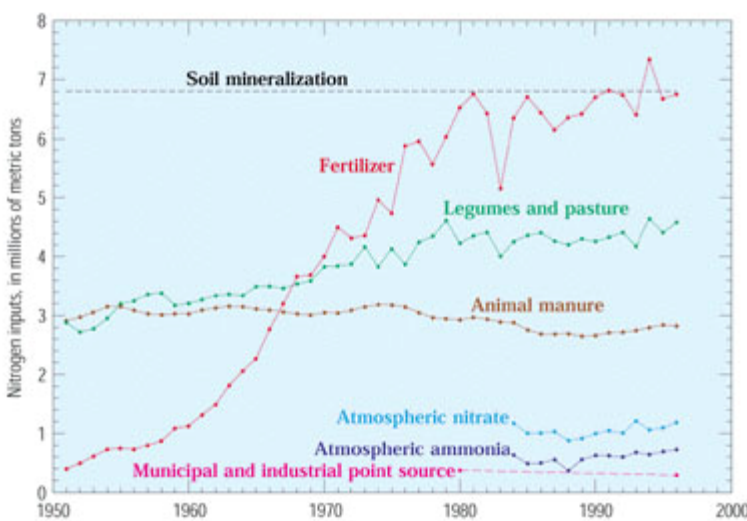
many people worldwide to question their meat consumption as well as the nature and integrity of the cattle industry.

A factory farm with a minimum of 2,000 cows can produce as much sewage as a small city, but there is no treatment plant designed to manage the waste (Duhigg 2009). Big dairies are being criticized nationwide for polluting surrounding air and water because agricultural runoff is the largest pollutant of the country's rivers and streams. Waste from dairies is disposed of in two ways. The first is a procedure in which workers hose off the cement floors where the cows reside. This water then flows into a plastic or clay lined lagoon where the liquid then evaporates. In the second method, waste is collected from the feedlot and then used as fertilizer for grain crops. Rural residents in New Mexico are currently battling a 'Manure War' due to flaws found within both waste disposal methods. On a daily basis an average cow can produce between six and seven gallons of milk, in addition to eighteen gallons of manure. New Mexico has approximately 300,000 milk cows producing about 5.4 million gallons of manure daily. The New Mexico Environment Department reports that 2/3 of the state's 150 dairies contaminate groundwater with excess nitrogen from cattle waste. It is believed that leaking lagoons in addition to excessive amounts of manure placed on agriculture land are the main contributors to this pollution which is only worsened by the tendency for dairies to group together geographically (Duhigg 2009).

New Mexico is not alone in the battle against manure contamination. There is reported contamination in groundwater in the Yakima Valley in Washington, Brown County in Wisconsin, Hudson Michigan, and in California, and Texas. The Dairy Row, an area between New Mexico and Texas, home to 30,000 cows and 11 farms, has been

cited for violating the Clean Water Act for four years in a row due to manure contaminated water being dumped into the tributaries of the Rio Grande. Residents in the surrounding area have been advised not to drink contaminated water and are thus forced to purchase water for drinking and cooking. It is also reported that the amount of flies present due to the pollution make enjoying everyday activities outside nearly impossible (Burnett 2009).

More discomfoting than the barn smell coming from faucets or amount of flies in the area are the health problems that result from the exposure to chemicals and bacteria found in contaminated tap water (Duhigg 2009). More than 40 diseases can be transferred to humans through manure (Natural Resources Defense Council 2007). Each year nearly 19.5 million Americans fall ill due to waterborne parasites, viruses, or bacteria. Rural populaces have reported suffering from chronic diarrhea, stomach illnesses, and severe ear infections (Duhigg 2009). Furthermore, centers for disease control have linked spontaneous abortions to high levels of nitrates found in water wells near feedlots. High levels of nitrates also increase the risk of methemoglobinemia, “blue



Primary Sources of Nitrogen to the Mississippi River  
(<http://earthtrends.wri.org/updates/node/279>)

baby syndrome,” which often results in infant death (Natural Resources Defense Council 2007). Lack of proper disposal of animal waste is significantly decreasing the quality of life for many vulnerable rural families.

Despite the detrimental side effects of residing near dairy farms, not many people are willing or able to evacuate the situation or ask the dairies to leave. Dairy farms contribute nearly 1.2 billion dollars to the economy of New Mexico (Burnett 2009) and approximately 3 billion to the Wisconsin economy (Duhigg 2009). Consequently many people affected are at the mercy of this wealthy industry. Powerful dairy lobbyists have continued to block many tough state regulations preventing any efforts to protect residents. Many dairies refuse to accept blame for such pollution stating that it is difficult to establish the source of contamination, suggesting instead that a leaking septic tank could equally be the cause (Burnett 2009). The Clean Water Act of 1972 regulates only chemicals or contaminant that move through pipes or ditches, but does not apply to waste that is sprayed on fields which often leaks into groundwater. Furthermore, any regulations placed on big farms, of 700 or more cows, by the Environmental Protection Agency are often ignored or avoided. Despite the lack of political success to date, many environmental advocates continue to argue that stricter federal laws are the only way to decrease the pollution caused by the cattle industry (Duhigg 2009).

Increased animal waste nutrients present in the polluted waters are resulting in dead zones among many oceans worldwide. The second largest dead zone in the world is located in the Gulf of Mexico. It is a result of the Mississippi River along with 41% of the drainage from the United State's industrial livestock farms and live stock feed production flowing into the gulf. When dumped into the gulf, the nutrients from agriculture runoff are consumed in algal blooms, driven by nitrogen and phosphorous. US production of livestock and feed crops is responsible for 1/3 of nitrogen and phosphorous discharged into freshwater within the country. In 2000, industrial farming



contributed nearly three million tons of nitrogen to the Mississippi River. As algal blooms die, they sink to the bottom where they are decomposed by bacteria. This decomposition process drains the water of its dissolved oxygen supply forcing fish, shrimp, and other marine life to relocate in order to survive. The result is a dead zone, where minimal aquatic life can survive. Our demand for meat has doubled over the past 30 years, ultimately our dietary preference will result in both a decline in marine life as well as an expansion of dead zones worldwide (World Resources Institute).

The world's expanding population and changing food preferences have stimulated a heavy demand for meat and milk. Unfortunately, this growth in demand has also increased agriculture's role in global warming and climate change. Livestock is responsible for 18% of green house gas emissions including 9% of CO<sub>2</sub>, 37% of methane, and 65% of nitrous oxide.

Table 1. Recent estimates of the principal natural and anthropogenic global methane sources, Tg/yr<sup>a</sup>

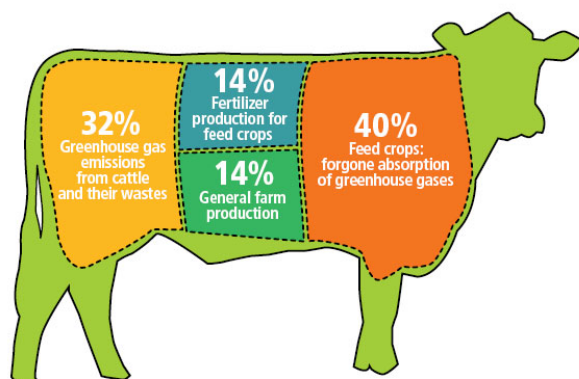
Natural		Energy/refuse		Agricultural	
Wetlands	115	Gas and Oil	50	Rice	60
Oceans	15	Coal	40	Livestock	80
Termites	20	Charcoal	10	Manure	10
Burning	10	Landfills	30	Burning	5
		Wastewater	25		
	160		155		165

<sup>a</sup>Adapted from IPCC (1992). Most authorities estimate total global production to be between 500 and 550 Tg/yr. These estimates reflect entry into the atmosphere. Tg = 1 million metric tons.

Johnson and Johnson 2010

Together, this is more emissions than that resulting from transportation (Knickerbocker 2007). In 2007, a study by the National Institute of Livestock and Grassland Science in Japan estimated that 2.2 pounds of beef is responsible for the same amount of carbon dioxide emission as the average European car driven 155 miles and burns the same

amount of energy as it takes to light a 100 watt bulb for twenty days (Bittman 2008). Methane and nitrous oxide both pose a greater threat to climate change because methane has 23 times the global warming potential as CO<sub>2</sub> and nitrous oxide has 296 times the global warming potential (Knickerbocker 2007). The main source of notorious oxide emission is cattle manure while methane emissions are a direct result of cow flatulence. Methane is produced as the cattle digest grass or grains; however the trend to feed cattle a heavy grain diet greatly increases the amount of methane emitted (Walsh 2008). Of all the livestock, cattle are the worse converters of grain to meat. Because they are ruminants that naturally convert grasses inedible to humans to high grade protein, an unnatural diet of grains is more difficult to digest. Under industrial production, grain fed cattle only produce 1 pound of beef for every 10 to 16 pounds of feed consumed (Sustainable Table). Therefore, in addition to warming the world, the cattle industry is putting an intense pressure on natural resources because more feed is required to produce equal amounts of meat. Accordingly, Geophysicists predict that if every American reduced their meat consumption by approximately 20%, the greenhouse gas savings would be equivalent to if everyone switched to a Toyota Prius from a household sedan



How Beef Production leads to Greenhouse Gasses <http://www.rockislandmarket.com>

(Walsh 2008).

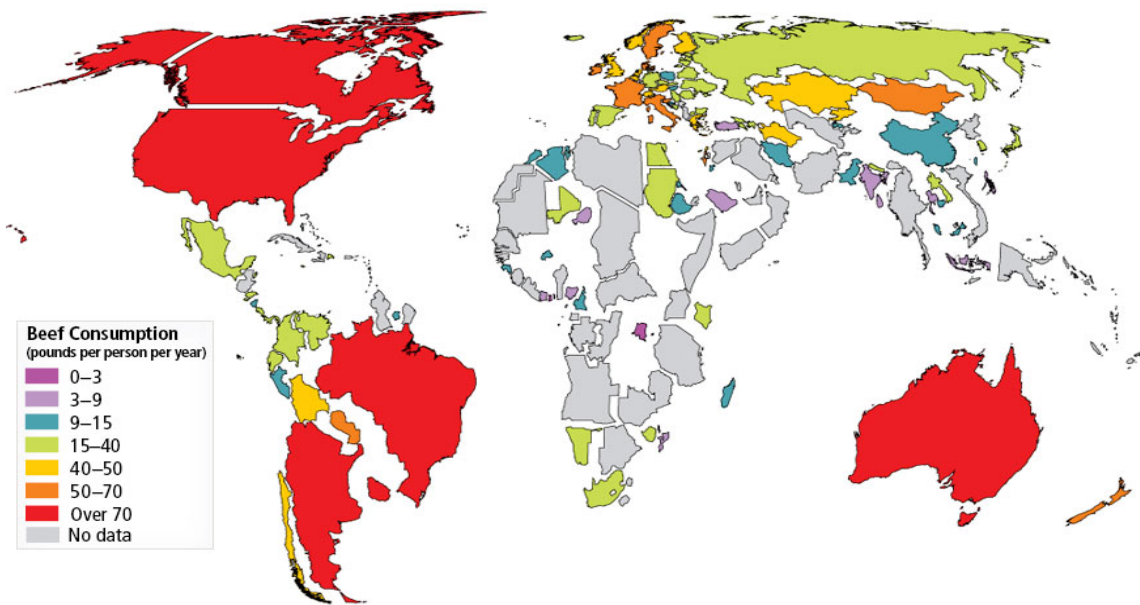
Land use changes, including deforestation to expand pastures and to create arable land for feed crops, also play a large role in climate changes on earth. The livestock sector is the largest anthropogenic user of land. Feed crop

production requires 1/3 of all arable land and grazing occupies 26% of the Earth's terrestrial surface. Expansion of grazing land for livestock is a large cause of deforestation, especially in Latin America where 70% of previously forested land has been converted to pasture land while feed crops cover much of the remaining land (Spotlight 2006). Rainforests and wetlands contribute to climate stability by sequestering carbon as well as absorbing and storing carbon from the atmosphere in their soil and plants. Destruction of these natural environments result in an increased amount of carbon being released into the atmosphere (Sustainable Table). It is predicted that 9% of anthropogenic carbon dioxide emissions are due to the expansion of pastures and arable land for feed crops (Spotlight 2006). Environmental consequences of the cattle industry are becoming more and more evident as meat consumption grows. As nations develop economically, citizens tend to spend their extra money on a meat rich diet increasing the need for more and more meat production (Walsh 2008). Increased air and water pollution in rural areas, growing dead zones, in addition to escalating green house gas emissions all show the direct outcomes of an unsustainable industry.

### **Health Consequences**

America has developed an ever increasing love for beef which has resulted in many negative impacts on the overall health of its citizens. A greater demand for more meat has developed an industry both detrimental to the health of the cow as well as the consumer. Over consumption of red meat products, including beef, have shown to increase the risks of heart disease and multiple forms of cancer. In addition, shortcuts taken by the industry to meet high consumer demands have led to the development of

fatal pathogens. As the world's total meat consumption increases, so do the health consequences (Bittman 2008).



Annual beef consumption per capita. Colors and distortions of the countries reflect the variety in the amount of beef consumption.  
<http://www.rockislandmarket.com>

In 1961 the total meat supply was 71 million tons and in 2007 that number more than double to a staggering 284 million tons. It is predicted that at this rate the world's meat consumption will double again by 2050 as a result of the relentless growth in livestock production. Americans are no exception to these shocking numbers. In actuality the US, one of the leading red meat consumers, consuming an average of 8 ounces of meat per day, twice the global average and twice the amount recommended by the federal government for a healthy diet. It is likely that consumers would be healthy ingesting only 30 grams of protein, mostly from plant sources, compared to the current consumption of 75 grams of protein from animal sources (Bittman 2008). Because the

average American diet includes much more animal protein than is necessary, reducing meat consumption to better our environment and health is easily plausible without sacrificing a healthy lifestyle.



“Western beef consumption.”  
<http://c-pol.com/Fun/blog/giantburger.jpg>

The current large scale consumption of red meat by American eaters has multiple health consequences; specifically it heightens one’s risk of heart disease and cancer. There are many explanations as to why an excess amount of red meat in one’s diet is unhealthy to the consumer. Those who eat red meat frequently are more likely to have high blood pressure and cholesterol increasing their risk of heart disease. The nature in which red meat is prepared or cooked generates cancer causing compounds. Moreover, a heightened exposure to these compounds as well as the high levels of iron found in the meat increases the individual’s risk of cancer. Furthermore, red meat is high in saturated fat which has been associated with breast, colorectal cancer, as well as heart disease (Stein 2009). Saturated fat content is heightened containing more artery clogging fat in marbled red meat when cows are fed corn and grains compared to a cow that is fed a natural diet (Robbins 2001). Similar conclusions can be observed in the National Cancer Institute study of whether or not red meat increases the chances of a premature death.

This study, conducted by the institute’s epidemiologist, Amanda Cross, is the largest to date that investigates the effects of red and processed meat on multiple cancer sites. Cross and her team analyzed the results from 500,000 people ages 50-71 over a course of 8 years. Meat consumption habits as well as other lifestyle choices such as

exercise and smoking were observed. Over the course of 8 years, there were 53,396 cases of cancer reported. Cross came to the conclusion that high meat consumption, at least a quarter pound burger or small steak per day, elevated the risk of colorectal, lung, esophageal, liver, as well as pancreatic cancer. From this study the National Cancer Institute was able to conclude that the more red meat and processed meat consumed, the greater the risk of cancer. Furthermore, the American Cancer Society also recommends reducing red and processed meat consumption as well as maintaining a healthy weight to lessen the risks of cancer (Stein 2009).

While heart disease and cancer are long term risks of ample red meat consumption, there are also many bacterial illnesses that are traced to the cattle industry. Many of these illnesses stem from cows being fed a grain or corn diet as a substitute for a natural grass diet (Robbins 2001). Every year 17 million shots of antibiotics are given to cattle for infections. Ground beef is frequently made from culled dairy cattle that were not originally raised for consumption; often times these animals were treated with antibiotics very close to slaughter in attempts to cure a disease that ultimately resulted in their killing. These antibiotics then enter the human food chain through consumption of meat and milk. Routine and continual feeding of antibiotics necessary when a cow is grain fed leads directly to the development of antibiotic resistant bacteria making human treatment with antibiotics much less successful. These “super bugs” perpetrated by excessive consumption of antibiotic tainted animal products significantly threaten human health (<http://www.bornfreeusa.org>).

A carbohydrate loaded diet is also responsible for the heightened prevalence of E. coli. Grain feeding creates the ideal living habitat for microorganisms. When cattle are

grain fed their intestinal tract becomes more acidic, in turn favoring the growth of E. coli bacteria. Today, E. coli is found in the intestinal tract of most feedlot cows in the US which can result in human death when such meat is consumed before it is fully cooked. Author Michael Pollan argues that when we acidify a cow's gut with corn, we have break down one of our food chain's barriers to infections. Previously microbes that survived in the gut of a cow were killed by the heightened acidity of a human stomach. Now microbes developed in the new acidic environment of a grain fed cow can survive in human stomach acid and ultimately kill us (Robbins 2001).

While consumption of cattle products are not necessarily detrimental to the health of humans, the increase in demand of these products combined with the lack of regulations have developed extreme health consequences. Eating red meat products in large quantities heightens the risks of many diseases, but when safe meat is consumed in moderation it is seemingly harmless. The large demand for meat has forced the cattle industry to develop short cuts, such as substituting the natural diet of the cow with that of a cheaper grain diet, which have proved to pose a potent threat to human well being. In addition to the health benefits of cutting down red meat intake, the society will benefit as well from lessened emissions and environmental degradation (Stein 2009).

## **Conclusion**

“If the past cannot teach the present and the father cannot teach the son, then history need not have bothered to go on, and the world has wasted a great deal of time.”

~Russell Hoban

(<http://www.quotegarden.com/learning.html>)

The human race is ultimately at the mercy of the Earth and its natural resources. The lifetime of our society depends exclusively on the condition of our environment and the manner in which we treat it. We are unable to sustain ourselves without the gifts that the Earth provides us and therefore we should learn from the mistakes of previous civilizations in order to lengthen our time on earth. Similar to the ancient Aztecs, who collapsed due to their needs outreaching the natural resources available, we are moving towards tragedy if we fail to recognize the unsustainable consequences of the cattle industry (Butler 2010).

As the destruction caused by this industry is becoming more apparent, new developments are being proposed to move towards sustainability. Waste management as well as improved practices to reduce the carbon footprint of this business are both essential in reducing its negative impact. Countries such as Korea and Israel have begun experimenting in using animal waste as a means to generate electricity and the US is working towards turning animal waste into fuel (Bittman 2008). Some farmers themselves have taken the responsibility in showing concern for our environment by implementing renewable energy sources, such as wind turbines on farms, to cut back on fossil fuel consumption (Global Perspectives 2009). Further technological advances aimed at reducing this problem include the “meat without feet” research in which meat produced in vitro is being tested. This process consists of growing animal cells in rich nutrient environments then further manipulating it into a burger or steak. Such technological advances give hope that this currently detrimental industry has potential to transform into a sustainable one (Bittman 2008).



Moreover, many environmental problems in the US stem from food and meat production alone, it is important that consumers become aware of the true costs of meat production when making dietary decisions (Bittman 2008). In a capitalistic society, consumers are the main driving force. Change will not be achievable unless it is demanded by this prime sector of the market. Action can be made possible by educating oneself and following Michael Pollan's advice in asking, "Where does your food come from?". In response, supporting farmers with ethical and sustainable practices is crucial in beginning the transformation of this multibillion dollar industry. The survival of our society is greatly reliant on the way in which we manage our environmental resources and it is up to us to take action to ensure the proper sustainable use of these resources.

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