Beef

Welcome to the seminar on BEEF

Side 1 Beef

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Slide 2 Introduction

This presentation focuses on the cradle to grave life-cycle of beef, paying particular attention to the social, environmental and public health impacts of the processes associated with beef production and consumption through each process.

We will begin our presentation by looking at the beginning of a cow's life by describing the and breeding and birthing processes of cattle. Then we will examine the raising processes of cattle from birth to the time they are ready to be sent to slaughter houses. Next, we will analyze the working conditions and business practices at the slaughter house/meat-packaging plants. We will examine how the cattle industry has responded to solve environmental and employee safety problems and add value to the consumer. Then we will examine the consumption and distribution of beef and how it relates to marketing schemes and land use. We will conclude by looking at the waste created by beef production and consumption.

Slide 3 Global Cattle Statistics

There are over 1 billion cows alive today in six continents around the world.

Twenty five% of the Earth's land is used as pasture for cattle grazing.

In Australia, the number of cows exceeds the number of people by 40%, and is a major cause of land degradation and soil erosion due to overgrazing.

In South America there are 9 cows for every 10 people.

In Argentina, Paraguay, Uruguay, and Brazil, the # of cows equals or exceeds the # of people.

In America, there is one cow for every 2 ½ people.

Slide 4 Global Beef Production

The United States produces 22% of the total beef output in the world, & North and South American continents combined produce 43% of total output.

USSR produces 18% of total output.

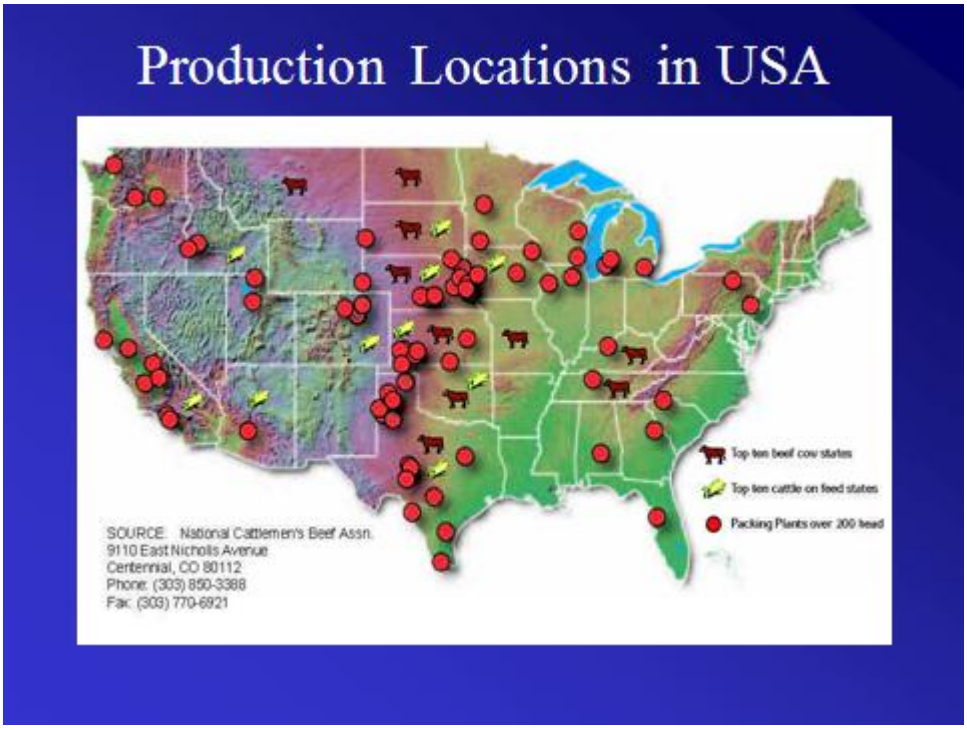
Western European countries produce 17% of output.

Even though only 0.2% of the US population is involved in ranching, total cash receipts total 24% of the farm sector.

The beef industry is the 4th largest manufacturing industry in the country, and generates 36 billion $ annually.

California is the largest dairy producer in the states, with of average of 665 cows per dairy farm, while the national average is 100/dairy farm. California's milk production/cow is 20,788 lbs., 17% higher than the national average.

Slide 5



Slide 6 Production Locations in the USA (Cont.)

There are five defined areas for beef farms in the United States which include:

The Range Region:

Has a great amount of grazing land. In 1979 we changed our cotton cash crop to Coastal Bermuda grass to meet the needs of local dairies. This proved to be very timely as dairymen struggled through the 1979 drought in Texas. Thirty two years later we are still serving the cattle industry. Our customers hear the message of hope and pick up their bales in the field at Fairlie Farm.

The Corn Belt:

Has exceedingly fertile soil, making it a region devoted largely to the growing of crops, which is perfect for the finishing of cattle.

The Appalachian & Great Lakes:

Region provides nutritious grass on the rolling terrain.

Southeastern Region:

The land is fairly inexpensive, making farming cheap.

Slide 7 The Reproductive Process

The reproductive process begins with the first heat/estrus period which occurs when a heifer (female cow) reaches puberty. Puberty is first observed as early as six months of age, to one year. The heat period is short and rarely lasts longer than 18 hours and occurs in intervals of approximately every 3 weeks. A heifer is usually first bred two to three months after her first period of heat, to ensure that she has reached a desirable age and size (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle.).

The desired weight of a heifer is 600 pounds to ensure that her body has developed to successfully give birth. It is also desired that a heifer is bred after being a year old because when heifers are bred as yearlings, maturity is often delayed 3 to 4 years, and they may never reach their full mature size. When a heifer is bred before she reaches a certain age and size, her first few offspring will average slightly lighter weights than calves produced by heifers bred with the desirable conditions (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle.).

Slide 8 Methods of Mating

There are three methods of mating, which include: hand mating, pasture mating, and artificial insemination. With hand mating a bull is kept separate from the cow herd, and whenever a cow is observed to be experiencing heat she is turned into the isolated area with the bull, and is kept there until the heifer has been served. The heifer is immediately removed from the pin after service, to allow other heifers to be served when they experience heat as well (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle.).

Pasture mating is slightly different as the bull is allowed to stay with the breeding herd throughout the breeding season. This process saves the labor of inspecting the herd each day to determine which cows are in heat and then driving them in the isolated pin for service. From a breeding perspective, this process is not as effective as hand mating because if there is more than one bull in the pin with the breeding herd, it is almost impossible to determine the sire of each calf, which is often important when trying to sell at an auction. (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle.).

Pasture and hand mating techniques are most commonly used on beef farms, because beef cows run with a bull or bulls day after day and bulls are much less inclined to ride a heifer in heat. Beef cattle are not heavily monitored and therefore estrus periods are not expected like they are on dairy farms where artificial insemination is often used.

The breeding of dairy cattle is necessary because pregnant cows produce more milk, and in turn their male and occasionally female offspring are used to produce beef. The nation's 9 million dairy cows produce about 7 million calves a year. Dairy cattle are subject to confinement through the milking process and are therefore heavily monitored to where periods of estrus are expected and charted to better assess when a dairy cattle can be served to be more efficient with milk production.

Slide 9 Artificial Insemination

Artificial insemination of dairy cows was commercially developed in the late 1930's. The technique quickly became popular because the process promises greater profits by genetically manipulating a herd over time to produce more milk (and also to produce more desirable traits for beef). Today, artificial insemination is used in 90 percent of United States dairy herds, and as a result milk production has grown significantly from about 7,000 pounds per cow to about 22,000 pounds per cow (Lovenheim, Peter. Portrait of a Burger as a Young Calf).

There are two commonly practiced forms for collecting sperm for artificial insemination. The most popular method is by using an artificial vagina. In this method, a bull will mount a dummy or a live "jump stock" and at the moment of ejaculation a worker will cover the tip of the penis with a tube and catch the semen. The other method is electric stimulation, which is also called electro-ejaculation. With this method, a probe is fitted with electrodes and placed up a bull's rectum and a micro current is delivered from five to thirty volts to stimulate the sacral and pelvic nerves. This method has been adopted for expediency in mass production. (Lovenheim, Peter. Portrait of a Burger as a Young Calf).

Slide 10 Giving Birth

Regardless of the method of conception, a cow does not give birth until nine months after she becomes pregnant. During labor, assistance should not be given except when it is absolutely necessary. The process of rushing in and taking the cow is likely to cause injury to both the cow and her calf in the form of torn membranes and strained ligaments. Assistance is occasionally needed in the event of a problem, and is usually given by fastening small ropes or chains above the calf's pasterns to avoid injuring the soft hoofs, and pulling backward and downward each time to remove the calf. When born a membrane surrounds the fetus and should be removed, especially the clearing of the nostrils to facilitate breathing. Normally the mother cow takes care of this process. The umbilical cord is about twelve inches and always ruptures during the act of birth. Typically a newborn spends forty minutes with their mother before being removed and placed in solitary confinement in their own pen. (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle.).

Slide 11 After Birth

After birth cows are usually numbered in sequence of birth and are tagged accordingly in the left ear. Usually at this point, all bulls and freemartins (female twins) from dairy farms are taken to auction and relocated to beef farms.

For the first ten weeks the calves are fed milk replacer, which is a formula of dried skim milk with additives, including antibiotics to help prevent diarrhea (antibiotics unknown). After ten weeks, beef cows are able to eat chopped alfalfa and corn, which is a standard diet for cow being raised for beef. Cows ingest a huge quantity of plants on pasture and then slowly digest them later, made possibly by their four-part stomach (Lovenheim, Peter. Portrait of a Burger as a Young Calf). .

To ensure that the animal reaches a slaughter weight of approximately 1,200 pounds at sixteen months, the cow is typically fed corn for finishing. Since corn is relatively expensive, they are often fed a diet of high bulk grains. (PETA).

Cows are kept in small pins to deprive them from any exercise so they can concentrate all their energy on producing more flesh and fat for human consumption. They are fed growth hormones to fatten them faster and are genetically altered to grow larger than nature naturally intended. (Many ranchers do not use growth hormones and rely on organic methods to grow grains and grass to build weight. Consumers are demanding drug free meat).

Slide 12 Dehorning

A bull is typically dehorned to curb aggressiveness in order to lessen feedlot disturbances. This is especially important when animals are shipped in some distance and are kept in crowded cars or trucks for several hours to prevent damaged hides and bruised carcasses. Also, animals with horns require more shed room per animal, which is not conducive to profit making. Dehorning is done through the process of breeding desirable traits of non-horned animals, also with the application of chemicals, but is most commonly completed with a bell dehorner.

(Lovenheim, Peter. Portrait of a Burger as a Young Calf).

The dehorning process is usually done when a bull is two months old. The dehorning iron is heated and fitted over the horn and held firmly against the head until the horn matrix has been destroyed. This operation takes 15-20 seconds. Calves are thrown to the ground and held firmly and sometimes snubbed to a fencepost when this process is being conducted. Dehorning eliminates injury to other animals and people.

Slide 13 Castration

Bulls must also undergo castration, which typically results in improved texture, tenderness and flavor of the beef, and produces a quieter disposition, which is important on beef farms. Castration is usually completed when calves are 4 to 10 weeks old and the calf is placed on either side and is either held or “hogtied”. The castration process is completed in two ways: the first being the use of a knife that simply removes the testicles from the scrotum. The second method is an attempt to cut off the circulation in

the testes by clamping the spermatic cord and the blood vessels, so the testicles will eventually fall off. (Neumann, A.L., and Roscoe R. Snapp. Beef Cattle).

Slide 14 Off to Slaughter

Once cows make their market weight they are sent to an auction, which leads them most often to a slaughterhouse. Cattle raised for beef are born in one state, fattened in another, and slaughtered in yet another. During transportation, cattle are loaded into metal trucks. (PETA).

At the slaughter house cows are brought on the kill floor and are shot in the forehead at close range. Typically it only takes one shot to kill the animal, but occasionally a second shot is needed. Once dead, a chain is wrapped around the left hind hoof, and the body is mechanically lifted until the head is about a foot off the floor. The "skinning out the head" process begins by cutting away the skin from the sides of his head, over the animal's eyes, and around the animal's horns. The ears are removed with a straight knife. The head is bent back, and the Adam's apple and the first cervical vertebra are cut through. The mandibular glad, near the lower jaw is removed and examined, and then the cheeks are cut and checked for cysts and parasites. The cheek flesh normally throbs as the muscles are still contracting, and finally the tongue is removed (Lovenheim, Peter. Portrait of a Burger as a Young Calf).

Slide 15 (Picture inside the Slaughter House)

Slide 16 Slaughter House

Next, the cow's chest is opened with an electric saw. The top half of the esophagus is cut, which is called the weasand and the remainder is tied off. The anus is tied off as well, which will keep the animal's insides from spilling out and contaminating the rest of the meat. The four-chambered stomach is cut loose and the kidney, heart and lungs are removed separately. The liver is cut open to check for parasites, and the lungs are examined for abnormalities such as tuberculosis. Then using a four-foot long electric saw, the hanging carcass is split down the middle. The carcass chills overnight and will be cut into quarters and hung in the cooler. Afterwards the meat is distributed (Lovenheim, Peter.Portrait of a Burger as a Young Calf).

Over the last 20 years, the beef industry has changed dramatically by what is called the "IBP Revolution":

-IBP is one of the four largest beef-packaging firms in the country. IBP hires people who receive on the job training as an assembly-line work force that was characterized by:

* being unskilled and having no prior similar training.

*Minimum benefits.

*performing one task for an 8-hour shift on the assembly line.

*high rates of illiteracy, Spanish-speaking only, immigrant workers (Schlosser).

The IBP revolution set the trend for all modern-day slaughter houses and allowed them to increase profits by producing more beef per minute through assembly-line work (Schlosser).

Today, at the ConAgra/Monfort meat-packaging corporation in Greeley, Colorado (1 of the 4 largest firms in the country):

Only 1/3 of the labor force is unionized.

25% of the workers are undocumented immigrants.

1/3 of the work force is illiterate and have no writing skills.

2/3 of the workers speak little or no English.

Average worker quits or gets fired every 3 months.

Annual turnover rate is at 80%, & average salary is $9.25/hour and the employees are glad to have work.

Slaughter houses are the most dangerous of any factory job in the country; however, processing plants conduct safety training programs for employees to reduce accidents:

-The injury rate to workers is 3x higher than any factory in the nation.

-25% of the workers in the meat-packaging industry nationwide suffer and injury/illness beyond minor that require medical attention. This only accounts for cases that are actually reported.

-The most common injury to workers involve self-inflicted lacerations with knives since this is the most common tool used by workers in the assembly line. It is also common to inflict lacerations to other workers working in close proximity to each other (Schlosser).

Other physical problems experienced by workers:

-Cumulative trauma to the muscles, bones, back, and joints; tendonitis, carpal tunnel, shoulder and back problems are all common problems experienced by workers at slaughterhouses.

-Every 3 seconds for an eight-hour shift, workers cut through meat with their knives.

-Through these repetitive patterns, a knife becomes dull, and workers need to exert more physical effort to perform the same job. Workers sharpen knives during break times.

-This activity is done day after day, 40 hours a week (not including overtime).

The night cleaning crew at the slaughter houses have greater job injuries and health effects and they get paid 1/3 less than the average meat packing worker.

-Work with high pressure hoses that shoot water at 180 degrees, which is usually mixed with chlorine. Respirators are frequently used to reduce headaches and nausea from the inhalation of fumes.

-The foggy conditions increase the risk of injury because vision is reduced to 5 feet distance. It is common for workers to accidentally shoot each other with hot water from hoses. Employee communication with other workers has solved many potential accidents.

-Conveyor belts are kept running so that it facilitates cleaning. Every year, there are reports of people losing limbs (fingers, arms). Safety guards on conveyors have reduced worker injuries and company management follows strict OSHA regulations to protect their employees.

-Another problem area involves suffocation from hydrogen sulfide fumes when cleaning 30 feet high blood-collecting tanks. Company safety policies require employees to wear respirators for protection against chemical fumes. Failure to follow company safety rules can result in employee dismissal.

Slide 17 The concentration of power within the meat-packing industry

The growth of the fast food industry has consolidated the meatpacking industry, which has increased the concentration of power and total transformation of beef production:-McDonald's is the largest purchaser of beef in the United States, and because of its need for uniformity and efficiency, has reduced its purchasing of beef to 5 of the biggest packers.

-In 1968, McDonald's purchased beef from 175 local suppliers, which made the beef packing industry more competitive.

-Today, the top 4 meat-packing firms (ConAgra, Excel, IBP, and National Beef) kill 84% of the nation's cattle, which is the highest market concentration of beef in the 20th century (Schlosser).

Another reason behind the growth of these beef corporations has resulted from the merging of some of the nation's largest meat packing businesses.

Slide 18 Concentration of power & its social impacts:

Over the last 20 years, 600,000 ranchers have gone out of business with 800,000 remaining.

In the last 20 years, rancher's share of every dollar spent on beef fell from 63 cents to 46 cents.

Small ranchers blame the depression of cattle prices over the last 25 years on these large firms as a result of their monopoly over beef production and pricing. This has forced small ranchers to become better business managers to compete in local markets.

The largest meat-packing firms have control over the beef market by setting prices among themselves, at any given time, and not revealing the true cost of beef to smaller firms. This business practice is in violation of the Sherman-Clayton Antitrust Act carrying stiff fines and severe legal action resulting in jail time for company executives. The drought of 2011 has destroyed pastures and has forced ranchers to sell their cattle.

They also control market prices through “captive supplies “of cattle, which are used to drive beef prices down during inflation. Big meat-packers such as ConAgra have the capacity to hold up to 200,000 cattle in their feedlots. Feedlots are big business and employers must manage resources to be competitive. One feedlot in Kansas distills the grain to make ethanol for fuel, and uses the cake to feed cattle. The hot water from the reactor is discharged into a lagoon where they raise Tilapia.

Slide 19 Beef Consumption & the Food Pyramid

The consumption of meat and other animal products is taught and advertised as part of a healthy and well-balanced diet from the food pyramid’s daily-suggested servings. Children are exposed to the food pyramid and other dietary supplementary educational materials that are actually the outcome of extensive political lobbying by the meat and dairy industries. Many millions of dollars were poured into the campaigns from these industries to produce food charts that have been donated to schools and are used as educational materials that advertise for the consumption of their products. The ideas behind the four basic food groups still provides the foundation of most planning in schools, in hospitals, in the military, in prisons, in government institutions, in public service cafeterias, and in households across the country. (Diet for a New America: You’re Health, Your Planet. Prod. Ed Schuman and Judy).

Slide 20 Advertising

Advertising to children uses a “cradle to grave strategy, by developing a brand loyalty in a young consumer, leading to a lifetime of purchases (Macklin, M. Carole, and Les Carlson, eds. Advertising to Children: Concepts and Controversies.).

Fast food chains spend around 3 billion dollars on television advertising annually but also market their products in other ways:

- The operation of “play lands” brings in children, who bring in parents who bring in money. This market strategy has developed into gathering places for families with young children at fast food restaurants.

- Successful marketing has been including a toy inside children’s happy meals to add a reward incentive for children who are often attracted to toys more than food (Fast Food Nation).

If fast food’s advertising through television, play lands, cartoon, and toys. Fast food chains are now gaining access to school campuses to further promote their products. (Fast Food Nation).

- In 1993, District 11 in Colorado Springs started a nationwide trend, becoming the first public school district in the United States to place ads for Burger King in its hallways and on the sides of its school buses.

- Advertising in schools is a technique adopted by schools to improve financial needs. Schools with revenue shortfalls are most often, if not always found in poor and working class neighborhoods.

- Children without education find work in the fast food industry.

Slide 21 Health Impacts of Consumption

What is never discussed in advertisements and the food pyramid that promotes the consumption of animal products including beef is the adverse health effects of such consumption.

- Diets based around animal protein are high in fat and cholesterol and contribute to obesity and heart disease.

- The consumption of protein and calcium are heavily stressed for a healthy diet, which are most often consumed through animal proteins, instead of plant-based diets. The average American consumes 90 to 120 grams of protein per day, while the ideal protein intake for a human being in 20 to 40 grams per day. People are eating far more than is necessary and far more than is healthy (Robbins, John. May All Be Fed: A Diet for a New World).

- If we ate nothing but wheat (which provides 16 percent protein), or oatmeal (which provides 15 percent), we would easily be getting enough protein. Because of the focus of animal protein based diets in the food pyramid, plant based sources, which are lower in fat, and whose long-term health effects are not harmful like meat diets, are frequently ignored.

-It has been continually proven that the consumption of meat and high-fat dairy products is known to be a leading cause of high blood pressure, arteriosclerosis, heart attacks, and strokes. (PETA).

Slide 22 Land Use

Less than half the harvested agriculture acreage in the United States is used to grow food for people. The majority of it is used instead to grow livestock feed.

- By cycling our grain through livestock and into beef, we only produce 6 percent as much food available to humans as if we would eat the grain directly.

- It takes 16 pounds of grain to produce a pound of feedlot beef. It takes only one pound of grain to produce a pound of bread.

- A study completed by the University of California Cooperative Extension used agricultural experts to determine that an acre of prime land can annually yield either 40,000 pounds of potatoes, 40,000 pounds of onions, 30,000 pounds of carrots, 50,000 pounds of tomatoes, or 60,000 pounds of celery. But, if that same acre of land is used to produce beef, the yield is significantly less at only 250 pounds.

Land use for grazing and for producing feed is more commonly found in developing countries because of cheaper land:

In Mexico, where millions of people are chronically malnourished, 1/3 of the nation's grain production is used to feed livestock, where 25 years ago it accounted for 6% (Rifkin 149).

In Brazil, the demand for clearing land for cattle grazing and feed production is steadily increasing, often displacing land that had been previous used to grow local staple food crops like white corn and black beans, which increases the price of these crops and decreasing the ability of people to buy them.

23% of cultivated land is used to produce soybeans for animal feed of which more than ½ is exported to Europe, Russia, Japan, and the USA. (While raising foxhounds in Commerce, Texas, I observed that feeding meat provided better stamina, endurance, drive, coat gloss and better muscle tone over 28% soybean based cereal food. We were able to reduce the meat serving size by 30%/hound.

Mass Land Use

While much land and resources worldwide are devoted to the production of beef, it is produced as a market commodity that is consumed primarily by nations and people all over the world who can afford it. Most humans who have relied primarily on grains and plants for most of their calories.

For example, In Jamaica, which is considered one of the poorer countries in the world, beef is the #1 source of protein for the wealthiest 25% of the nation, while wheat flour is the #1 source for the poorest 25% of the nation (Rifkin).

Beef consumption ranks 13th as a source of protein for the bottom 25% people in Jamaica.

America contains 5% of the world population, but consumes 23% of beef produced in the world.

The average American consumes 65lbs. of beef annually, and on any given week, 91% of all US households purchase beef (Rifkin).

The correlation between increased income and increased beef consumption is parallel throughout the world.

Land Use and farm workers

Less than half of the land under cultivation in the USA is used to grow food for people. Most of it is used to produce feed for cattle. (Row crops are very labor intensive).

The way we grow our food today follows the conventional model of agriculture. The use of pesticides, herbicides and fertilizers has improved crop yields.

-Farm worker communities experience cancer rates 30% above the national average. Children are most impacted by cancer such as leukemia.

-Respiratory illnesses and skin problems are common among farm workers.

-The majority of farm workers do not receive health benefits, and have very little opportunity to defend themselves from these conditions because many don't speak English.

-The contamination of the environment due to runoff, aquifer contamination, and drift, are all serious problems that arise from the use of these harmful chemicals. Environmentalists are responsible

for greater legislation driving up the cost of farming. As government regulations increase the cost of food production increases both to the farmers and consumer.

The transformation of land from deforestation has ill effects on the local, regional and global communities.

- Forests provide biological diversity and balance, as they are homes to a variety of plants and wildlife as well as water and soils. Many species of plants and animals are only able to survive in their natural environment, and die along with deforestation.

Slide 23 Fast Food Working Conditions

The working conditions in slaughterhouses are not at all comparable to the conditions in fast food restaurants, but workers are trained, and work long hours for low wages. About two-thirds of the nation's fast food workers are under the age of twenty. No other industry in the United States has a workforce so dominated by young adults (Fast Food Nation). To keep costs low, the fast food industry seeks out teenagers. (Fast Food Nation). McDonald's food is predominately prepared with innovative technology, which allows a small number of workers to produce an enormous amount of goods cheaply. Often times machines are programmed with standardized cooking times to ensure customer satisfaction and avoid food waste. The food is already assembled and prepared outside of the restaurant allowing quick service inside. With this simplification of jobs, management no longer needs to depend upon the talents or skills of their workers, because of the reliability of machinery. McDonald's franchise managers are trained to serve consistent quality food and maintain clean stores.

Slide 24 Generating Waste

Animals feeding under the condition to gain three pounds a day produce an extreme amount of waste. Beef cattle that are 500 pounds produce about 30 pounds of waste per day, and beef cattle that are around 1,000 pounds produce around 60 pounds of waste a day. Animal waste with raising beef cattle is not only limited to manure and urine, but also includes: disposal of dead animals, spoiled feed ingredients, silage drainage, and other materials only partially consumed during operation (Lovenheim, Portrait of a Burger as a Young Calf pg.217).

Cow manure is neither a liquid nor a dry solid, making handling difficult. To handle manure, either a sufficient amount of water needs to be added to handle as a liquid, or a sufficient amount of drying to allow handling as a solid. Animal waste is able to be recycled as fertilizer and compost, which makes the soil more fertile to grow crops. Studies in the United States and Europe show that livestock farms in general have the potential to contribute large amounts of nitrogen for fertilizer.

Although the amount varies based on weather, spray field application method, type of livestock species, and manure storage method, the impact can be significant. Up to 80 percent of a swine lagoon's nitrogen may change from a liquid into a gas in the process known as ammonia volatilization (Seaboard Farms, Inc. Environmental Protection Agency Region 6, Emergency Administrative Order, Docket Number: SDWA-06-02001-1239).

Farmers are practicing land stewardship. There are multiple ways that the waste cause's water pollution, kills fish, degrades aquatic habitats, and threatens drinking water supplies. Holding areas can prevent spills, or fail, sending wastewater into streams, lakes, rivers, or estuaries. Liquid waste can be over-applied or inappropriately applied to farm fields through irrigation pivots with resulting runoff into lakes, rivers, and streams or seepage into groundwater. Since animal waste usually collects itself within a pasture, pollution is often caused from runoff during a rainstorm. Run off pollutes ground water as well as drinking water. In 1996 factory farms produced 1.4 billion tons of animal waste, which is 130 times more than humans did. To put this amount in to perspective, animal waste produced in a single year would fill up 6.7 million train boxcars, which would circle the Earth more than twelve and a half times. Thus using proper management has improved grasslands through the use of natural organic fertilizer.

According to the Environmental Protection Agency, factory farming has improved over the last few years some states have required that they be lined and lining includes clay, concrete, and plastic. Concrete liners can offer greater protection, but concrete can crack if builders do not follow specifications related to soil suitability and structural reinforcement. Despite the fact that these specifications contribute to liner stability, there are no requirements that compel builders to follow them (Marlene Halverson, The Price We Pay for Corporate Hogs, Institute for Agriculture and Trade Policy, Minneapolis, Minnesota (July 2000), p.49). Additionally, heavy metals accumulate in the soil sludge in the bottom of holding areas, reaching toxic levels until they are emptied out, or abandoned after many years (Division of Water Quality, North Carolina Department of Environment and Natural Resources, Raleigh, North Caroline Inspection Reports of March 5, 1998). Salt present can also impact soil sterilization making drinking water undrinkable, making irrigation water unusable, and increasing the blood pressure of salt-sensitive individuals (Suggest evaluating desalination) (Water Quality Impacts of the Lagoon and Spray field System, NRDC, pg.31).

Technology has improved in handling waste solving the above listed environmental issues. Treatment ponds have been successfully used in handling both residential and industrial waste.

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