

The Survival of The American Cattle Beef Farmer in Today's Market

Abstract

Once the world's agriculture leader, the United States has lost dominance over recent decades to international competitors, specifically Brazil. Since the number of American farms reached its peak at 6.8 million in 1935, this number has fallen drastically to 2.1 million by 2002. In this paper I will touch on one specific area of this industry, cattle beef farming. Even with annual beef consumption continuing to increase in the United States, some developing trends might threaten farmers even further in the near future. These trends include the rapid scaling of corporate farming, the increased concern of the environmental impact from red meat, and health concerns. In this paper I will research how the American farmer can survive in the today's quickly changing market, with a focus on cattle beef farming. To do this I will first analyze United States Department of Agriculture (USDA) data and scholarly articles to evaluate the current consumption in this market, problems with cattle beef farming, and the rise of meatless alternatives. After thorough evaluation I will then present recommendations for how farmers can make the necessary adjustments to survive moving forward.

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Introduction – The Gradual Fall of the American Farmer

The United States of America has had many strengths during its history, with one of its well-known strengths being agricultural farming. With its large western farmland, America has been able to supply its citizens and countries around the world with a high supply of food. However, the last few decades have proven difficult for American farmers as globalization has introduced new international rivals while consumers are starting to be aware of negative consequences associated with livestock farming and consumption. In this paper, with a focus on beef cattle farming, I will identify trends in production and consumption, explain the negative effects of beef farming, highlight the rise of plant-based meatless alternatives, and propose recommendations for future sustainable American beef farmers.

The fall of the American farmer first in the mid-1950s as big food companies started preferring a smaller number of farmers with bigger outputs. By 2002, the total number of farms had decreased from its peak of 6.8 million in the 1930s to only 2.1 million, an almost 70% drop-off (Mills, 2018). With the decrease of smaller farms, the industry is now dominated by a selected number of huge corporate farmers. In fact, now only 10% of farms account for 70% of the total US crop land (Mills, 2018). This trend benefits big food companies and large farmers as this economy of scale approach lowers costs while maximizing profit margins. However, smaller farmers are left out in the process.

The government has not helped soften the blow to smaller farmers either. In 2017, congress passed a new bill that gives a 10% tax cut to farmers. This seems like a positive at first, but this 10% cut only applies to farms that reach sales of \$1 million dollars annually (Philpott, 2017). Unfortunately, this requirement only qualifies 4% of all US farmers. This further encourages farmers to scale up or give up.

The rising cost of the farmland itself is also driving away small farmers. A University of Iowa found that in 1970, a farmer could buy an acre of farmland for \$419. This cost has substantially rose with now an acre costing an average of \$7,183 (Mills, 2018). Additionally, with this land being so expensive, many farmers have stopped owning their land with 39% simply leasing it (Mills, 2018). This kills the profitability for smaller farmers and puts them in risk of completely losing land to farm if they have a bad farming season.

The Rise of Brazil Farming

As the United State has lost farmers within its borders, it is also losing its dominance internationally, specifically to Brazil. Even though the United States currently leads the world in beef production and consumption, it is quickly losing ground to the emerging South American agricultural power. Using the data from the United States Department of Agriculture (USDA) found on the next page, in 2017 Brazil's beef production of 9,550 million metric tons totaled in 79.9% of the United States' beef production at 11,943 million metric tons ("Livestock and Poultry: World Markets and Trade"). However, Brazil is quickly catching up as the most recent prediction for October 2020 reports that Brazil's production will now reach 85.5% of the United States' ("Livestock and Poultry: World Markets and Trade").

Beef and Veal Production - Selected Countries Summary						
1,000 Metric Tons (Carcass Weight Equivalent)						
	2017	2018	2019 Oct	2019 Jan	2020 Oct	2020 Jan
Production						
Argentina	2,840	3,050	3,040	3,120	3,125	3,150
Australia	2,149	2,306	2,300	2,450	2,080	2,085
Brazil	9,550	9,900	10,210	10,225	10,800	10,585
Canada	1,201	1,265	1,330	1,350	1,325	1,370
China	6,346	6,440	6,850	6,850	6,625	6,625
European Union	7,869	8,003	7,910	7,875	7,780	7,780
Hong Kong	6	6	6	6	5	5
Japan	469	475	475	470	470	475
Korea, South	281	279	289	280	296	295
Mexico	1,925	1,980	2,030	2,020	2,070	2,065
New Zealand	654	672	686	686	685	679
Others	15,754	15,845	13,725	1,367	13,981	13,981
Total Foreign	49,044	50,221	36,493	49,223	49,242	49,095
United States	11,943	12,256	12,289	12,381	12,619	12,514
Total	60,987	62,477	48,782	61,604	61,861	61,609
Total Dom. Consumption						
Argentina	2,547	2,562	2,360	2,372	2,365	2,325
Australia	677	656	655	637	650	627
Brazil	7,750	7,866	8,003	7,914	8,240	8,047
Canada	981	999	967	1,012	935	985
China	7,313	7,910	9,233	9,133	9,508	9,508
European Union	7,838	8,024	7,905	7,862	7,785	7,775
Hong Kong	549	547	356	356	355	355
Japan	1,273	1,320	1,345	1,332	1,360	1,360
Korea, South	818	853	926	892	942	920
Mexico	1,841	1,872	1,880	1,865	1,890	1,880
New Zealand	74	51	50	50	49	50
Others	15,344	15,799	13,628	1,792	13,551	13,551
Total Foreign	47,005	48,459	35,472	47,076	47,630	47,383
United States	12,052	12,180	12,240	12,408	12,422	12,321
Total	59,057	60,639	47,712	59,484	60,052	59,704

There are multiple reasons why Brazil is gaining ground on US production. First, land is much cheaper and more abundant in the region. One American farmer that is now outsourcing to Brazil explains this difference by showing the different options he faced after recently raising \$1.3 million dollars. With that money the farmer couldn't buy equipment nor enough land to make a profitable operation in the states, however, it could buy 3500 acres that are ready to start farming in Brazil (Hecht & Mann, 2008). Being able to buy a large amount of land is especially important for cattle farmers as the animals need lots of land to graze. Secondly, the climate is very mild in Brazil year-round which makes gives farmers an opportunity to grow crops in addition to raising cattle for another source of income (Hecht & Mann, 2008). This year-round growing opportunity gives Brazil an advantage over predominant US farming regions, like Illinois and Minnesota, due to their harsh winters. Finally, the rise of globalization and trade has lowered the costs to import foreign food ("Chapter 7. Globalization and the Traditional Role of Agriculture"). With meats and crops from Brazil being cheaper, American food companies are more motivated to import rather than buy from local farmers.

Beef Consumption – A Growing Threat

Referring again to the previous data from the USDA, overall beef consumption continues to rise worldwide. Since 2017, beef consumption worldwide has increased 1.68% (USDA). This trend is expected to continue as it is predicted beef consumption will increase by 95 percent until 2050 (Ramgamathan et al, 2016). This is because as countries become more developed economically & socially, beef starts to become more attractive and an obtainable source of calories. Eating meat is more than just nutrition, its a part of culture in many countries. In developing countries, eating meat can be a way to express social status, a symbol of economic wealth, or to simply consume for pleasure (Macdiarmid et al, 2016). This will lead to further consumption of beef as many emerging economies such as China and India become more developed socially.

This trend should be an encouraging sign for cattle beef farmers, however, researchers are starting to point out may concerns that arise from an increased production and consumption of beef. These concerns include negative environmental effects from emissions, high amounts of natural resources used, threat of too many antibiotics, and an inefficient energy process. All of these are threats to our environment and health.

The first and most well-known negative effect from cattle farming is its environmental impacts. Current and future beef consumption trends will lead to our global temperate going over the 2-degree Celsius limit increase by 2070 (Hendenus et al, 2014). Beef consumption will have a significant impact on this trend as livestock farming is responsible for 18% of greenhouse gas emissions, more than the entire transportation industry (Ilea, 2008). Some of these emissions are obvious such as carbon emissions released from producing feed for the animals, transporting the animals, and the high amount of energy needed for heating and cooling when the animals are

indoors (Ilea, 2008). However, some emissions are more hidden within the process and are just as damageable to the environment. One way is through the digestive and manure processes of cows which release high amounts of methane. This results in farms contributing up to 40% of worldwide methane emissions and has 23 times the global warming potential of carbon dioxide (Ilea, 2008). Cow manure also emits 68% of the world's anthropogenic nitrous oxide which can stay in the atmosphere for 150 years and has 296 times the global warming potential as carbon dioxide (Ilea, 2008). In addition to manure, nitrous oxide is also released through fertilizer and deforestation to convert past woods into pastureland (Ilea, 2008). All of these actions have a direct negative impact on the environment.

Cattle farming also uses a large amount of earth's natural resources. Beef alone uses more land and freshwater per unit of protein than any other commonly consumed food (Ranganathan et al, 2016). In fact, 25% of earth's total landmass is used just for cattle pastures (Ranganathan et al, 2016). This will continue to increase as the human population increases and the demand for beef raises. This results in cattle beef farming being a major cause for deforestation as a 2006 United Nations' report found that 70% of the former Amazon forests had been cut down to make more land for cattle pastures (Ilea, 2008). Additionally, 1/3rd of the world's total water footprint can be traced back to farm animal production, which includes cattle farming (Ranganathan et al, 2016). This includes water needed to care for cattle, keep pastures growing with grass, and in transportation. As demand continues to rise, the cattle farming industry must find ways to reduce consumption of natural resources.

Another downside of cattle beef farming is that it is not a very efficient food to produce. From a "feed input to food output" perspective, only 1 percent of gross cattle feed calories are converted into human edible calories (Ranganathan et al, 2016). In comparison, poultry converts

11 percent of feed calories into human calories. This means that calories and energy is getting lost in waste along the production chain from the farm to plates. Figuring out how to raise this efficiency could lead to benefits in other current negative areas such as less land and water use and less general carbon emissions.

Cattle beef farming also has a negative effect on how we might be able to fight off future diseases. Due to the high amount of antibiotics used in cattle farming, consumption of beef made millions of people antibiotic resistant in 2018 (Roos, 2019). This comes as antibiotics used in farming can end up in meat, soil, water, and the environment at large. Overconsumption of these antibiotics could cause them to be no longer effective in helping humans fight off many of the infections that they are currently used for. United Nations' studies found that by 2050, five million people could die in Asia each year due to resistance of antibiotics (“Antimicrobial Resistance a 'Global Health Emergency,' UN, Ahead of Awareness Week”). This finding lead to the United Nations officially claiming antimicrobial resistance a “global health emergency” that should be attacked with as much urgency as Ebola and HIV (“Antimicrobial Resistance a 'Global Health Emergency,' UN, Ahead of Awareness Week”). This declaration makes consuming beef appear much more dangerous to both the sustainability of the planet and health of ourselves.

A New Meatless Alternative

The increased awareness of negative downsides of beef have left consumers looking for new cleaner and sustainable solutions. One of the most popular solutions that has emerged is meatless plant-based alternatives. Starting out as only tofu, tempeh, seitan, and veggie burgers; meatless food alternatives have seen drastic changes in product offerings over the decades (Olayanju, 2019). Now consumers can find meatless alternatives that resemble the look and taste of sausage, deli slices, chicken nuggets and beef.

Demand for these products is primarily driven by younger millennials and GenZs who are shown to care more about the environment and personal health than previous generations. Specific motivations for these consumers to make the switch include protecting animals, protecting the environment, general health concerns associated with traditional beef consumption, and changing taste preferences (Olayanju, 2019). Sales are proof of this trend as meat alternative sales in North America grew 37% from 2017 to 2019 (Olayanju, 2019). Additionally, 11.9% of all U.S. households now purchase plant-based meat (Olayanju, 2019). Farmers should expect this number to continue to grow in the near future.

It is important to know that there are two different types of meatless alternatives. The first and most popular option are plant-based meats. To make plant-based meats, protein is extracted and isolated from the plant and combined with other plant-based proteins to make the meat (Roos, 2019). Examples of plant-based meat are commonly found in grocery stores and restaurants and include the Impossible Burger and Beyond Burger. The second type of meat alternative is cell-based meat which made by extracting a cell from an actual animal and then growing that cell in a lab (Roos, 2019). By only extracting the animal's cell and not fully slaughtering them, researchers believe this will lead to less overall animal cruelty. However, this is a much more recent innovation and has not been released to the mass market yet.

Unlike traditional beef offerings, meatless alternatives have multiple positive benefits. From an environmental perspective Beyond Meat burgers claim to use 99 percent less water, 93 percent less land, and emit 90 percent fewer fossil fuels than traditional beef (Olayanju, 2019). Meatless alternatives also might be better for our health. When comparing Burger King's new meatless alternative "Impossible Whopper" against their traditional beef Whopper, the meatless alternative has fewer calories and lower amounts of fat and cholesterol (Cassetty, 2019). All of

these benefits show why many younger people are switching to these alternatives and that it is a legitimate threat to cattle beef farmers.

Recommendation for Farmers

Smaller, local cattle farmers must realize that they can no longer compete with national mega farms & international countries in contracts for big food companies. Instead, in order to stay relevant they must take advantage of new market opportunities that can keep them relevant and sustainable for the future.

The first trend that local cattle farmers should take advantage of is the rise of “Farm to Table” restaurants. This type of restaurant is simply one that buys directly from local farmers instead of a middle party such as a grocery store or distribution company like US Foods. Overall, these restaurants place a big emphasis on local products and highlight authenticity in their meals. Additionally, they have a consistently revolving menu that is aligned with the changing produce and livestock of the farmers.

Farm to table restaurants have increased in popularity as more and more Americans are going out to eat. The share of money Americans spent on “food away from home” grew from 44 percent in 1987 to over 50 percent in 2013 (Saksena, 2018). Millennials are contributing heavily to this trend with over 44% of their food spending going directly to restaurants (Talty, 2017). These numbers are assumed to grow as the economy continues to improve and apps like Grubhub and Uber Eats that deliver restaurant food directly to people’s homes become more popular.

This is an encouraging trend for smaller, local farmers as they have a much higher chance of being able to sell their meat to local restaurants rather than to large food corporations or chain

grocery stores. In a study of local restaurants in the Boston area, 84% claimed to obtain their produce and meats from farms between 10-100 miles away (“The Rise Of Farm-To-Table Restaurants”). Additionally, 79% of them said to have purchased the products directly from the farmers themselves (“The Rise Of Farm-To-Table Restaurants”). This is beneficial for both sides as they save transportation costs and the time that they would’ve spent negotiating with a middle party company.

This partnership between farm to table restaurants and local farmers has additional benefits to the environment and local communities. Since there is less distance between the farms and restaurants, less carbon is emitted during transportation and lower amounts of fuel is consumed. This reduces the overall carbon footprint of this relationship and increases the sustainability of cattle farmers. Less time is needed to transport the products as well which allows the food to be much fresher when served to customers. This improves the quality of the meal and motivates the customer to continue to pick the fresher farm to table restaurant over other options.

For farmers that want to stay away from restaurants and continue competing for spots in grocery stores there is another trend to catch onto, cell-based meats. As mentioned earlier, cell-based meats extract animal cells and continue to grow that cell in a lab until it creates a piece of meat. Unlike its predecessor plant-based meats, cell-based meats are still in the very developmental stages. Many see the potential for this alternative as over \$300 million dollars have been invested in relevant companies, the most notable being Memphis Meats (Danley, 2020). However, costs have not been lowered enough for the product to be placed in grocery stores and go to the mass market.

Like plant-based meat, cell-based solutions have the potential to give many benefits to consumers and environment. For consumers, cell-based meat will greatly reduce the intake of unintentional antibiotics found in cattle. This comes from cell-based meat being grown in a well-maintained laboratory that does not need to use antibiotics to keep the animals healthy. This decrease in consumption can help with the fight against antibiotic resistance emergency. On the environmental side, cell-based meats are estimated to reduce land use by more than 95%, lower climate change emissions by 74% to 87%, and nutrient pollution by 94% (Cameron & O'Neil). These numbers show that cell-based meats are an attractive option for a sustainable future.

American cattle farmers can get involved in this trend by supplying cattle for current cell-based meat startups. Given that the process to create cell-based meats requires fewer overall cattle, these companies are a perfect fit for smaller, local cattle farmers. These farmers generally have lower amounts of cattle which makes it difficult to compete with mega farms for traditional big food companies. However, now local farmers can simply just work with cell-based meats.

Depending on the supply needs of the cell-based meats, the smaller farmers may realize they do not need as many cattle. If this happens, I recommend that the farmers reduce the size of their previously used grazing field to give both financial and environmental benefits. One option would be to sell the unused farming land. As previously mentioned, farming land has gotten very expensive in the United States so this would ease a huge financial burden. Additionally, farmers will spend less money on maintenance and property taxes. An alternative option would be to keep their land and plant trees to create forests. This option would reduce previous negative environment effects and instead start producing oxygen to reverse climate change. Both of these options would promote the sustainability of American farmers.

Conclusion

American cattle farmers have struggled to stay relevant in previous decades. Even as consumption of beef has continued to rise worldwide, emerging international agricultural powers and large corporate farms have cut into the sustainability of smaller, local cattle farmers. Consumers have also started to become aware of some of the negative consequences of cattle farming. These include high amount of greenhouse gas emissions that lead to further climate change, extensive use of natural land and water resources, dangerous use of antibiotics, and an overall inefficient energy chain. With this in mind, consumers have started to turn to meatless alternatives instead. Sales for these alternative have skyrocketed over the past decade as consumers are realizing the environmental and health benefits of consuming plant-based meats.

To survive, farmers can first look to sell their meat directly to local farm to table restaurants. This will be beneficial on both sides through reduced transportation costs and increased freshness. A second option is for cattle farmers to start selling to newer cell-based startups by allowing them to use their cattle. This will allow farmers to be part of the next consumer meat trend and might lead to farmers saving costs through reduced field sizes. Both of these recommendations give hope for the future of American cattle beef farming.

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