

# **The American Meat Industry: Promoting Consumption while Promising Sustainability**

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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## **Abstract**

Much of human evolution can be attributed to meat consumption. Chimpanzees, our closest extant primate ancestors, hunted and shared monkey meat to reinforce social bonds and, among males, to attract females. Carnivorousness throughout history was considered a sign of success and could be used to bridge cultural groups together. Economic modernization has facilitated rising meat consumption by painting it as an integral dietary component. However, we face diverse agricultural, economic, nutritional, and environmental consequences as the trend continues (Smil, 2002). Sociotechnical change is necessary to avoid irreversible health and environmental damage. This paper will summarize the role of various participants within the American meat industry, including producers and consumers, as well as the relevant current regulation, all of which will be used to identify steps we need to take towards environmental sustainability.

Keywords: meat consumption, environment, food sustainability, meat industry

## **Introduction and Methods**

In the United States, an average adult eats 50 grams of protein per day (SCL Health, 2019). For a population of nearly 330 million people in the US, this means at least 16.5 billion grams of protein are consumed daily. In light of rising public consciousness on the unsustainability of red meat consumption, meat industries continued to engage in livestock overproduction, a dangerous, environmentally damaging, and unsustainable practice supported by government subsidies and competition (Rust et al., 2020). Here, livestock overproduction refers to farmers using large-scale breeding techniques to optimize livestock reproduction rates.

This paper will gather data from various participants and stakeholders in the American meat industry who claim to adhere to sustainable practices while promoting meat-intensive diets with very limited regulation. This investigation begins with understanding the current regulations imposed by the Environmental Protection Agency (EPA) and the degree to which prominent meat packing companies and providers follow them. This analysis proves that these companies are either true to their mission or are upholding hypocritical ideologies for the sake of profit. While this paper is not meant to be an exposé of corporate activity, knowing the intentions of such large corporations can help bring awareness to how meat overproduction can contribute to climate change. Also considered is the role of meat-eating Americans in the continued sale of packaged meat to describe how social trends and habits create a reliance on meat-centric diets. Data on participants was gathered through databases like Google Scholar and JSTOR. A participant or participant group is defined by the common, shared agenda its members share, and they can be organized, semi-organized, or unorganized. Results of surveys relevant to the scope of the project were collected primarily through Ipsos, a global market research and public opinion specialist.

The methods described prior are categorized as documentary research, a process through which information from primary sources are gathered and analyzed in order to answer the research question at hand. In this particular case, we are inquiring about the future of the United States'—and, ultimately, the world's—goals for sustainability, which can be done through a synthesis of past and current efforts to produce meat while adhering to regulations on meat production. This synthesis also includes looking at what current efforts are being made by these production companies as well as advocacy groups and organizations to improve the quality and longevity of our environment.

A large part of relieving pressure on the environment needs to be ignited by social change, as the thought of reducing meat consumption is resisted by many Americans (Berg & Jackson, 2021). In a perfect world, resources would be unlimited, and society would not need to consider the implications of overproduction. Since that is not the case, we must consider the impacts of meat depletion, both as a raw commodity and as a packaged product, as a consequence of current trends. We will likely then place significant demands on biomedical engineers to advance the creation of lab-produced meat to supplement the remaining options of vegetarianism or veganism. We must also understand the implications of such discoveries on the environment by examining published research on novel experiments.

Data from the past century along with this analysis can tell us much about the trajectory of the meat-producing industry and predict what kind of environmental risks we are to face. Additionally, it is important that we accurately assess the state of current risks to the environment so that we can make changes to habits in our society to deal with the issue adequately and appropriately in hopes of one day eradicating these risks entirely.

## **Results**

### *Current Regulations*

Our government tasks the EPA with matters regarding research and development on environmental regulations. This includes working with the U.S. government to create policies on all things concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade. All records and regulations are made public so that anyone is able to reference them without obstacles. Besides developing and enforcing regulations, the EPA is also responsible for issuing grants to state environmental programs, studying environmental issues in laboratories, and sponsoring partnerships with businesses who can promote clean energy and environmental protection. Because the EPA deals with such a wide variety of issues under a large and complicated scope, they must write regulations with wording that is general yet concise so that the rules can be applied to a broader population. This results in loopholes or insufficient regulation for specific parts of the supply chain in the meat industry, which is why they fall short of truly preventing overproduction.

Among the industries that must follow the EPA's guidelines are the meat and poultry industry. The regulations extend to slaughterhouses and processing facilities all over the country. The EPA page for Meat and Poultry Products (MPP) Effluent Guidelines is most relevant to the concerns outlined in this paper. It lays out the current protocol that meat processing facilities must follow in order to abide by the EPA's determination of ethical production. Under the section titled "Current Rulemaking," however, we learn that the regulation "only applies to about 300 of the estimated 7,000 MPP facilities nationwide. Recent data indicate that MPP facilities discharge the highest phosphorus levels and second highest nitrogen levels of all industrial categories," which then create downstream wastewater pollution (US EPA, 2015). It is practically impossible—from both a cost and manpower standpoint—to dedicate oversight to each and every farm across the country. Additionally, we should be concerned that only about

4% of the nation's facilities are under the strict regulations of the EPA, since these regulations are in place to ensure that farmers and farms behave with the nation's—and ultimately the world's—best long-term interests. Instead, we prioritize product optimization and meeting market demands of meat when we should be taking the time to consider how the chemical discharges from farms and livestock might be contributing to widespread and irreversible climate change.

Researchers have found that worldwide, “global food production is the largest pressure caused by humans on Earth, threatening local ecosystems,” yet “820 million people have insufficient food” (Willett, 2019). The pollution effects of meat production are impossible to measure precisely, in part because the pollutants can seldom be reliably traced to their widely scattered sources. Additionally, farms across the country are plentiful and scattered. Because regulating and inspecting food producers is expensive and labor intensive, regulators put little direct pressure on farms to comply with safe animal harvest standards (Treich, 2021). As of late, the EPA has been working to submit an Information Collection Request (ICR) to the Office of Management and Budget (OMB) in the Executive Branch. An ICR is a collection of documents that outlines what kind of information a federal agency, like the EPA, wants to collect from a regulated sector, and this particular ICR will work towards approving industry questionnaires to perform data collection on MPPs. Part of this supporting document highlights the estimated labor burden and direct costs of a 5-day sampling period per participating facility during which the EPA will collect data via web-based survey platforms and work with contractors to review the data. This sampling is undeniably expensive, with total labor costs for wastewater plant operators and facility majors coming to \$10,645 per facility, valid as of February 2022 (US EPA, 2015). However, we must see this cost as a small investment in comparison to having to face the

unimaginable cost of having to reverse climate change, a cost that we cannot predict until it becomes a burden we have to undertake.

### *Consumption Habits*

A majority of the output from meat and poultry farms supplies meat to production giants like Cargill, Tyson Foods Inc, JBS SA, and National Beef Packing Co (Reuters, 2021). Tyson Foods Inc, for example, imports cattle from 4,000 independent feeders and ranchers, which feed into the beef plants located in the Midwest, South and Pacific Northwest (Tyson Foods Inc., 2022). National Beef Packing Co. sources product from facilities in Liberal and Dodge City, Kansas (National Beef Packing Co., 2022). Because Americans consider red meat such an integral part of their diet, these corporations have worked and will continue to work to meet the demands of Americans nationwide. Thus, meat-eating Americans are the entity most responsible for and most affected by changes to meat-consumption habits in the U.S. Part of meat consumption is centered around nutrition and building a well-rounded diet for a healthy lifestyle. Most Americans follow the U.S. Department of Agriculture's recommendation of about 4 ounces of meat a day, but that amount for every person living in the U.S. means a sizable dependence on large meat producers to supply that protein (North American Meat Institute, 2021). We mentioned earlier that although it is difficult to instigate social change and have it make a widespread impact, that sort of change is necessary in this situation. Many see the idea of eradicating red-meat consumption as an "attempt to control what Americans eat," without understanding its long-term impact (Berg & Jackson, 2021). Unless Americans stop viewing meat-alternatives as a non-American way of life, we will never reduce our dependence on the meat industry, which will ultimately allow them to continue to contribute to global climate change.

## *Novel Discoveries*

Within the past decade, a number of environmental sustainability advocacies, like Good Food Institute, have made strides towards a more sustainable environment. To promote sustainability, GFI's director of policy recommends substituting plant-based proteins in place of meat (Ipsos, 2018). Thanks to innovations in engineering, we now have meat alternatives available to us in the market such as the Impossible Burger™ as a classic hamburger substitute or Tofurkey™ as a sliced deli meat substitute. Creating clean meat is a goal that can be achieved through diverse methods, including differing cell lines, scaffolding and structuring methods, or even cell culture media geared towards chemically modifying components of protein. Using science to their advantage, biomedical engineers are applying “antibody protein therapeutics, cell-based therapies, and regenerative medicine” to food production to yield tissue-engineered meat without the slaughter of actual animals (Specht et al., 2018). The general process starts with cell-proliferation in which undifferentiated or semi-differentiated cells are reproduced to a desired cell density and mass. Next, these cells are planted onto a scaffold, on which they can complete differentiation into final cell types like muscle, fat, etc. The mature cells will match the morphology and physiology of the material that they have been grown to mimic. This process takes between ten days to six weeks depending on the production parameters, but has been known to successfully produce about 4,000lb to over 10,000lb per 20,000L batch. If demand for this method of production grows over time, companies also have a plan for developing a pipeline industry growth and large-scale commercialization. If researchers succeed, meat eaters may forego real meat without difficult dietary adjustments. Beyond Meat™ is a company seeking to develop plant-based products that are healthier, better for the environment, and not implicated in animals' suffering. It claims its products generate “90% fewer Greenhouse Gas Emissions” than their U.S. beef counterparts (Beyond Meat, 2021). If a giant meat company, such as Tyson's



Food Inc., follows in Beyond Meat™'s footsteps, the movement toward more sustainable diets may accelerate.

Currently, however, these novel discoveries are in no position to take on the burden of demand quite yet. The scale with which engineers are able to produce lab-made meat cannot satisfy this country's meat consumption as is, but this method in tandem with lowering reliance on protein-centric diets might help greatly alleviate the strain that meat production puts on our environment. Joseph Poore and Thomas Nemecek contend that "dietary change can deliver environmental benefits on a scale not achievable by producers," (2018). Lab-produced meat appears to offer some relief without difficult social change. Yet, social change is also necessary.

Effects of this relief on the climate from integrating lab-made meat into our diets also include: reduced food land use by 76%, including a 19% reduction in arable land; 49% reduction in food's greenhouse gas emissions; and 49% reduction in eutrophication, during a body of water becomes overly enriched in nutrients like phosphorus and nitrogen. In today's age, livestock are responsible for the majority of ammonia and methane emissions (Dopelt et al., 2019). Ammonia leads to the acidification of ecosystems, and methane is a greenhouse gas more potent than CO<sub>2</sub>. Freeing up land could reduce around 8.2 billion metric tons of CO<sub>2</sub> every year over the next 100 years as the land is able to reestablish vegetation and re-accumulate soil carbon. Poore and Nemecek especially emphasize the benefit of communicating product impacts to consumers so as to raise awareness on how sustained reliance on the meat packing industry and producers can negatively affect the environment. As mentioned earlier, although we have some measures in place to begin to address the issue, our society will require larger and more widespread social and behavioral change in order for us to effectively work against global warming and irreversible biodiversity loss.

## **Discussion**

Now that we understand the role of each participant in the meat industry contributing to climate change, we must ask ourselves why it is so imperative that we start to care more enthusiastically and critically about our decisions. With many climate change-related issues, much of the blame and burden is placed on the individual consumer to make environmentally-conscious decisions like recycling, reducing use of single-use plastics, or using public transportation instead of personal vehicles. This concept of reducing one's "carbon footprint" was an intentional and coordinated effort by the petroleum industry in the early 21st century to guilt the consumer into believing environmental sustainability was their responsibility, allowing oil companies to escape the blame (Solnit, 2021). However, alternatives to many of these problems can be expensive or not readily available. A consumer from a lower-income category who wishes to change their eating habits might not be able to purchase products from brands like Tofurky™ or Beyond Meat™ if it remains more expensive to produce these products than it is to slaughter the animal itself. Products like vegan meat or plant-based meat are some of the few market-ready options that exist today, and since these companies operate in a free-market, they aim to achieve maximum profit over all else.

Again, we emphasize the need to initiate widespread societal change in order to push this country onto a better track for the future of our climate. Until a majority of Americans start to understand the gravity of the situation and begin to act on it, we will not vary from the path that we are headed towards today. The approach, however, must be multi-faceted; a majority of consumers must explore options for consumption that don't rely on large meat-producing corporations, and this drawback will reduce the impact that these corporations have on our environment.

A few changes must be made in order for the consumer to be able to comfortably explore their options. This begins with reducing the price of meat alternatives like vegan or plant-based meat. Further developments in lab-produced meat will undoubtedly add more variety to the available options for consumers to purchase and enjoy. Next, existing corporations must attempt to reduce their footprint as much as possible by perhaps beginning with the eradication of single-use plastics to sell their products, as many of the meat that we buy comes in Styrofoam, plastic bags, or plastic wrapping. These changes would certainly agree with the mission that these companies claim they are trying to abide by, but their adherence to regulations and commitment to the mission long-term would be the most effective way to achieve the nation's collective goals.

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