The Effect of Red Meat on Climate Change

The Paris Agreement is a major global coordinated effort to mitigate climate change. As part of the United Nations Framework Convention on Climate Change, the agreement includes 196 countries and was ratified in 2016. Under the Trump administration, the United States withdrew from the Paris Agreement in 2019. In 2021, the U.S. was re-admitted into the Paris Agreement in February under the Biden administration.

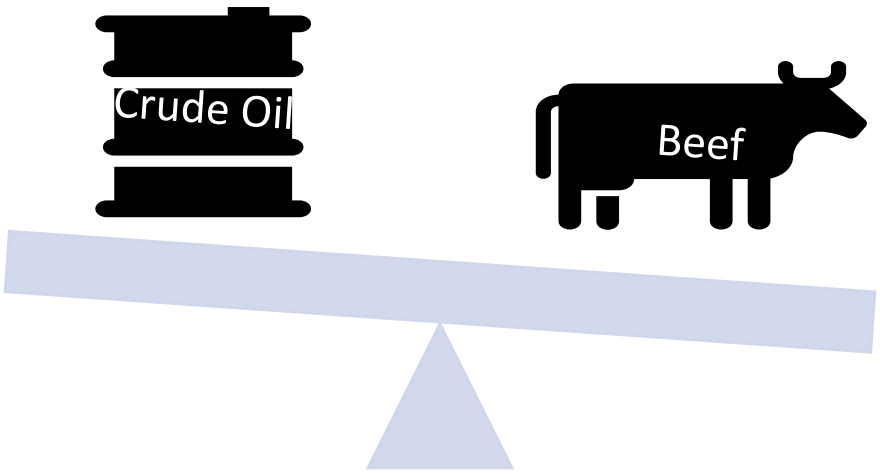
In the second quarter of 2021, a major headline caught the attention of global media outlets: To reduce greenhouse gas (GHG) emissions, President Biden wants to greatly reduce red meat consumption in the United States. According to Fox News, the purported proposal from President Biden includes a "90% cut of red meat from your diet, a maximum consumption of 4 pounds per year, and one burger per month." This supposed proposal ended up on the Twitter accounts of Texas governor Greg Abbott and Idaho governor Brad Little, both of whom rejected the purported proposal.

It turns out the above list is not part of President Biden's official climate plan, but rather a proposal in a research paper written by researchers from the University of Michigan. Fox News anchor John Roberts later acknowledged that his show "incorrectly implied" that President Biden has a plan to restrict red meat consumption. Although the news about a government proposal has proven groundless, is there any merit to a link between red meat consumption and climate change?

Greenhouse gases are responsible for trapping sunlight and heating up the earth's atmosphere. Carbon dioxide is perhaps the most common greenhouse gas produced by human activity. For example, burning one pound of gasoline releases 3.3 pounds of carbon dioxide into the atmosphere. The production of gasoline adds another 20% of emissions, bringing the total tally to about 4 pounds of carbon dioxide per one pound of gasoline usage. Although carbon dioxide is the most common greenhouse gas, it is not the only type. Methane and nitrous oxide are other types of GHGs that can lead to global warming.

Combustion produces CO2

Ruminants produces Methane



To compare the effect of different types of GHGs, the Global Warming Potential (GWP) was developed, a measure of how much energy the emission of 1 ton of a gas will absorb over a given period of time, relative to 1 ton of carbon dioxide. Carbon dioxide, by definition, has a GWP of 1. According to the United States Environmental Protection Agency (EPA), methane has a GWP of 28-36, whereas nitrous oxide has an even higher measure of 265-298.

Whereas gasoline consumption predominately produces carbon dioxide, beef production releases carbon dioxide, methane, and some nitrous oxide (from feed production). Cows and other hoofed herbivores, called ruminants, are among the top producers of greenhouse gases. These animals have four stomachs that allow grass to ferment and digest. As a byproduct of this process, cattle produce methane. Combining the different types of gases released by cows, one pound of beef production is associated with 21 pounds of carbon dioxide emission, much larger than one pound of gasoline consumption.

Does this mean we have to greatly reduce our red meat consumption to save the planet? Not exactly. Although beef production generates more GWP *per pound* compared to gasoline, there is simply a much greater volume of usage for gasoline. According to the EPA, as of 2019, 29% of GHG emissions are due to transportation, compared to less than 10% coming from livestock. Another 25% of emissions come from using fossil fuels to generate electricity. These figures indicate that cutting red meat consumption, while beneficial for climate change goals, is unlikely to have a large effect on total emissions, especially compared to changes made in transportation or electricity generation uses.