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ENGR408
Group Policy Paper

[PUBLIC POLICY ON MEAT CONSUMPTION]

An analytical position on meat consumption in the United States of America. Policy suggestions have been provided that could be considered by legislators to potentially put into place to curve the current trend of climate trend.

Executive Summary

The following is a series of policy proposals drawn together by Justin Hendricks, Gavin Conti, Chris Shotter, Chris Lord and Travis Mount. These policies are a collective position on the consumption of meat in the United States due to its effects on climate change around the world. The following policies, which could be implemented in dealing with this situation, will address not only climate changing gases, but also such factors as taxes, land usage, and world food sources. The policies include: the option to do nothing, the opportunity to eliminate all meat from Americans' diets, and what is an alternative to these two extremes. This policy proposal will explore what could feasibly be done in a society where eating meat has become second nature and ponder if it is possible to change the way in which society operates.

Scope of the Document

These policy proposals are being drawn together for the ENGR 408 course (Engineering Leadership) at The Pennsylvania State University on behalf of the College of Engineering Sciences. While at this time these proposals are in their early stages, the group as a whole would like to see that the preferred policy be moved into a stage of more thorough research so that one day it may be able to be put into legislation in some form or another.

The Issue at Hand

Global warming is one of the biggest problems our society faces, and cows are one of the biggest contributors to this. Due to flatulence and burping, a single cow can produce up to 350 liters of methane gas, and 1500 liters of carbon dioxide in a single day.ⁱ These climate changing gases that accumulate in the atmosphere trap energy from the sun, causing global warming. Not only do they produce many green house gases themselves, but the meat often requires transportation which further leads to global warming. Food in the U.S. travels an average distance of 4,000-5,000 miles.ⁱⁱ Livestock generates 18% of greenhouse gas emissions, more than all forms of transportation combined (13.5%).ⁱⁱⁱ Global warming is also causing glaciers to melt. This causes the water level to rise, and reduce the amount of livable space on the planet. The effects of global warming prove to be alarming if not addressed.^{iv}

While the argument that global warming exists is prevalent, there are many that believe it is not a real problem. Some believe the global warming scare is a way for mass media to make money, and that there has not been any real significant increase in temperatures. Many people say that while

temperatures are rising in the U.S., they are not rising in other parts of the world. While others also argue that the air is statistically cleaner now than in the 1980's.^v Though these arguments exist, many believe the scientific evidence to prove global warming holds true.^{vi}

Policy Options

Plan A.) Do Nothing

Americans currently lead the way in worldwide meat consumption. The USA's economic affluence has afforded families the ability to eat a feast each night at the dinner table. The true numbers, in proportion to the rest of the world, are staggering. The United States population averages about 286.4 pounds of animal meat a year.^{vii} For most Americans, that equates to a sum well above their own body weight.

If we consider only beef, for which data is most accurately available, we can project the future production of greenhouse emissions in correlation to the beef industry. The United States Department of Agriculture has shown that over the next 6 years, the US red meat production will continue to grow by about 1 billion pounds, about a 4% increase.² Along with this increase in production, however, we must account for the population growth within the nation as well. It is estimated that the American population will grow by about 18.5 million people, a 6% increase, by the year 2016.³ This, therefore, shows that the outgrowth of the human population over the cattle population will lead to a decrease in per capita beef consumption of about 18%.²

With all this growth in the production of beef we have to look at where that leaves us as a planet. Globally, beef production is responsible for 18% of all greenhouse gas emissions, or 1176.4 Million of 6535.8 million metric tons of carbon dioxide equivalent each year.⁴ If we project this emissions level to grow at the same percentage rate as cattle production, that increases the emissions level by 47.1 million metric tons of CO₂ equivalent greenhouse gas. Keep in mind that this is just in just the next 6 years! Human population growth doesn't look to be slowing down anytime soon either. The best estimates are said to have the global population maxing out around 9 billion⁵, but that isn't projected to be for 40 years or so at least. Imagine the growth that could be extrapolated for such a time period.

A factor that is at odds with human population growth and red meat demand is that of space. Cattle take a large quantity of land to grow and cultivate. As more humans come to exist on the planet, their demand for both food and shelter will lead to the clearing of more land. Most of this land will have to be made habitable. Unfortunately, this means the clearing of even more forests than have already

been cut down. The irony of the situation is that the plants and trees we need to cut down to clear room to for food production are the same flora that would be doing the work to cleanse our atmosphere of the carbon dioxide pollutant. This factor among many others leaves in a scary, yet plausible, future. Our own greedy demand for a flame broiled steak will eventually seal our own fate in our global warming oven of an atmosphere. While doing nothing is technically a feasible option, it does not seem to have our best interest in mind at all.

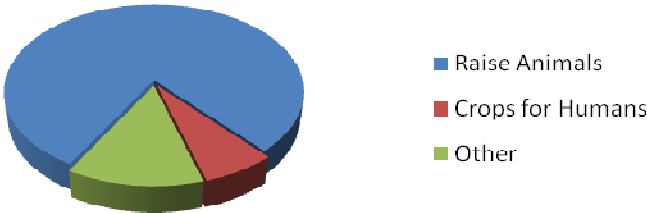
Plan B.) Ban All Meat Production

In order to make the most drastic impact on the emission of climate changing gases, proposal B suggests that all meat products, and their production, should be halted immediately. While it has been suggested time and time again that automobiles should be developed that have higher miles per gallon, or use alternative fuels, the truth of the matter is that transportation worldwide accounts for just 13% of the climate changing gases emitted by humans. Placing this into contrast with the startling fact that meat production accounts for 18% of all climate changing gases, one realizes that a more drastic change can be made when altering the diets of Americans.^{viii}

Alongside the startling facts of climate changing gases, one must observe the considerable amount of space that harvesting meat takes. In the United States, nearly 80% of agricultural land is used, in one form or another, to harvest animals.^{ix} This is compared to the only 7% that is used to grow crops for humans.^x It is important to point out not only the shear amount of climate changing gases that meat production releases, but also the amount of energy and food consumption it takes to produce that meat.

In order to produce one kilogram of beef, it takes thirteen kilograms of grain.^{xi} Statistics have shown that if Americans were to reduce their overall intake of meat by ten percent, this would provide enough food to feed an additional 600,000 people.^{xii} Through data collected in the tables attached, if Americans were to completely eliminate all beef from their diet, they would be able to provide enough food to feed an additional 2.1 billion people. Also, In the same time period that it would take to raise one kilogram of meat, that same land could be used to harvest 160 kilograms of potatoes or 200 kilograms of tomatoes.^{xiii}

Land Usage

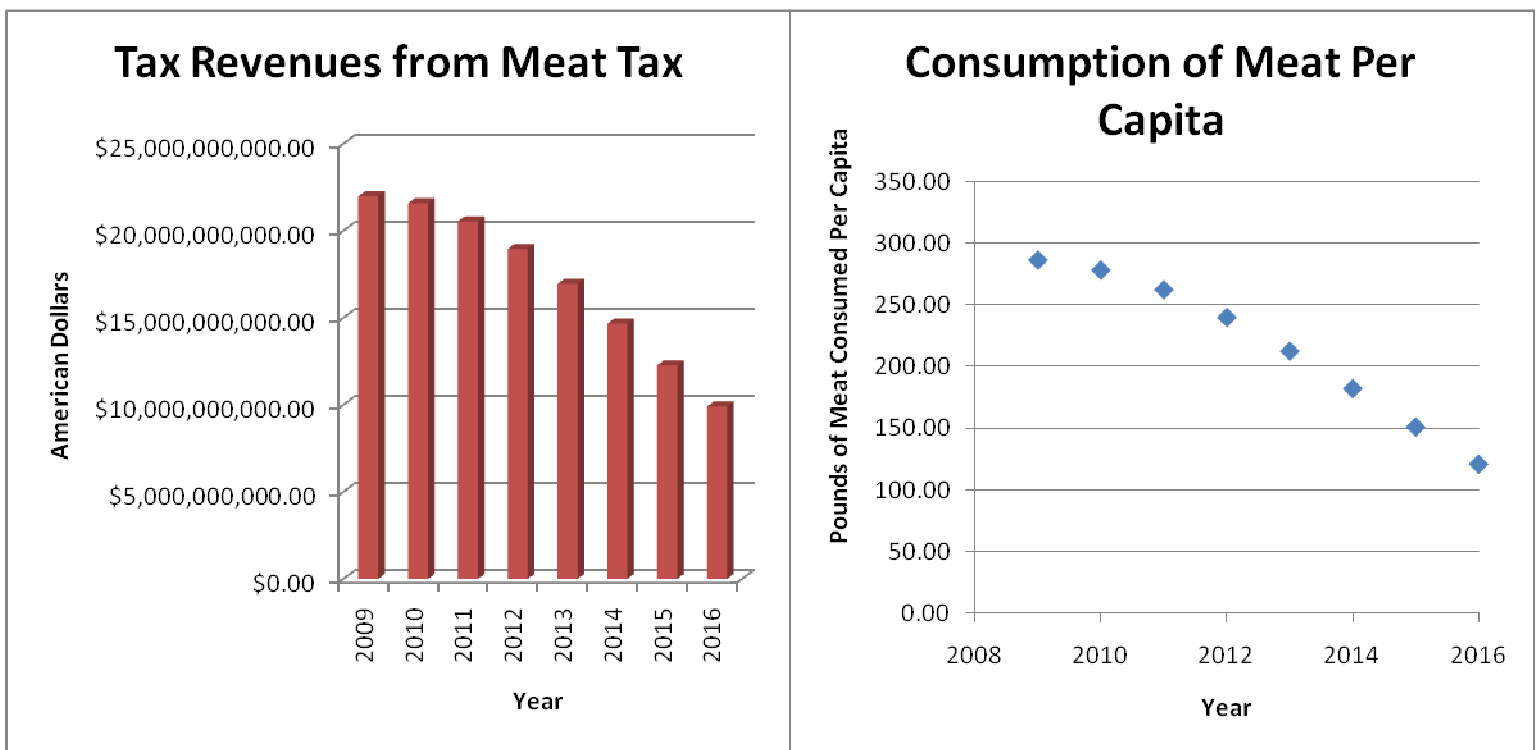


While eliminating all meat from Americans' diets would make the largest difference, it does not appear to be feasibly possible. In a society where meat has become one of the dominating meals, there is no way at this time that this policy is a feasible option. In order to make a real change, a policy must be created which draws together multiple options for eliminating climate changing gases.

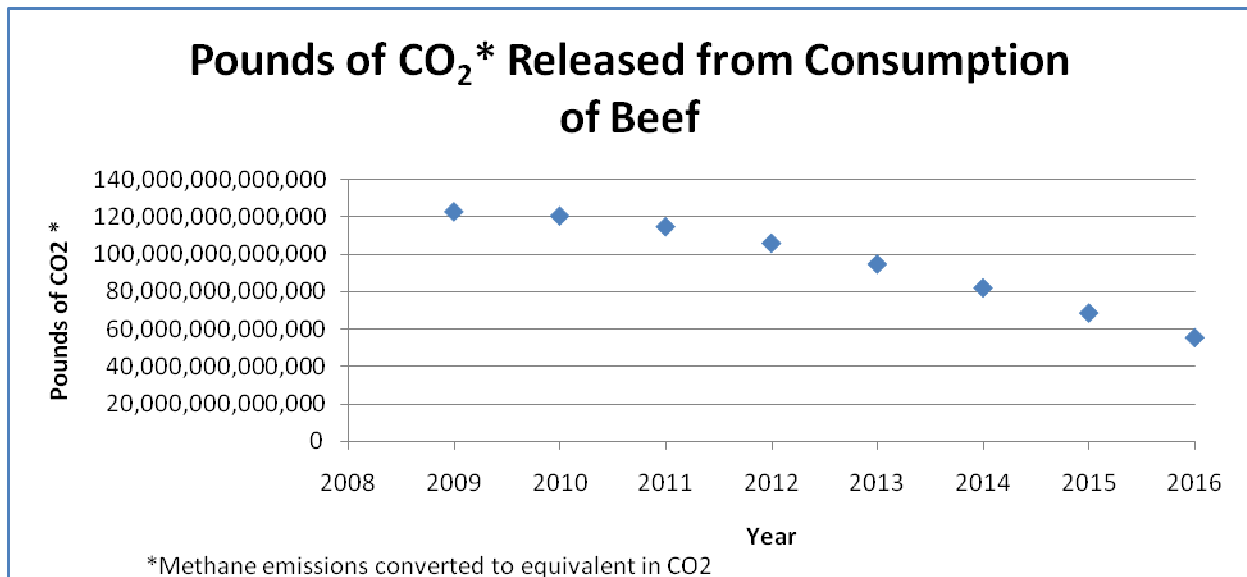
Plan C.)Meeting in the Middle Ground

While Policy B clearly would have the greatest impact on the climate, it is clearly not feasible in the today's American Society. Instead of proposing to eliminate all meat, it appears at this time that it would be most beneficial for the government of the United States of America to suggest a meat consumption reduction of 28.6% per capita. With a reduction of this percentage, it is recommended that every American reduce intake of meat by only two days per week. In addition to such a suggestion, this proposal suggests that a twenty-five cent tax per pound should be placed on all meat products. While taxes placed on any item is generally unfavorable, the advantages of such a proposal will be outlined in the following paragraphs.

In 2002, the citizens of the United State of America consumed 286.4 pounds of meat per capita.^{xiv} If ten percent of Americans each year between 2009 and 2016 were to implement this plan into their diets, the meat consumption per capita rate would drop from 286.4 lbs to 120.6 lbs.^{xv} This is with an effective rate of 70% of all Americans cutting their meat consumption by the proposed 28.6%. This would also net a total difference of 48 billion pounds of meat. If the meat consumption tax was also put into place in the year 2009 and continued to be in effect through 2016, the government would be able to draw in revenue of over 136 billion dollars.^{xvi}



Following these trends, one could also expect there to be a fall in the release of climate changing gases as well. Due to limited data at this time, exact figures could only be provided for the release of carbon dioxide and methane per pound of beef produced. According to the WorldWatch Institute, Americans' consume approximately ninety-seven pounds of beef per year.^{xvii} Also to be considered is the fact that to produce one pound of beef, eighty pounds of carbon dioxide will be released and 176 pounds of methane will be released.^{xviii} Due to methane having a potency of twenty-six times stronger than carbon dioxide, this can be equated to 4,048 pounds of carbon dioxide. By implementing the policy above, Americans can expect to reduce their carbon dioxide footprint in 2009 to 2016 from, beef consumption alone, by 6.7×10^7 million pounds.^{xix} By factoring in the other 180 pounds of meat consumed, it is safe to say that this figure could easily be doubled.



The final aspect of this policy involves the revenues generated by the meat tax act which would be put into place. These funds would be funneled mainly into two initiatives. The first and most important initiative would be to fund the construction of green energy supplies such as wind turbines. These turbines, or even solar power farms, could be constructed on land that would now become vacant due to the lower demand of meat. The second major initiative would deal with educating Americans about the issue at hand.

In the year 2009, revenues from the meat tax could result in revenue of approximately 20 billion dollars.^{xx} If 15 billion were proportioned towards funding the construction of green energy, one could expect to see the construction of 4,000 wind turbines.^{xxi} This construction of wind turbines alone would be able to provide 8.5 thousand megawatts of electricity, or the equivalent of 2.5 million homes.^{xxii}

Risks Associated with Preferred Plan C

The major risk associated with this proposal has to deal with the fact that this is not a mandated change. Due to this being partly a societal change, people can't be forced into making the decision. A change of this magnitude can be related to the prohibition act. While the government tried changing how society worked, through looking at history it is evident that this philosophy did not work. In order to address this, funds are also being allocated for the education of American citizens. If citizens were exposed to knowledge of the effects of meat consumption, perhaps the estimates provided in this proposal could come to life. As stated, the major risk associated with enacting such a policy is the fact that its success rate depends solely on the nature of citizens; therefore education does in fact become a major factor in the success of this proposal. To show the importance of education, a sample powerpoint presentation has been created and attached to this proposal.

Summary

In summary, the suggested policy will not solely solve the issue of climate change. Through the reduction of consumption of beef alone, CO2 emissions can be reduced by 55% between 2009 and 2016.^{xxiii} It is important to point out that as the population continues to grow and countries develop, the amount of carbon dioxide emissions from industry and transportation will continue to grow exponentially. If these continue to go unchecked, any advances made in the reduction in meat consumption quickly will be absorbed by these other unchecked factors.

ⁱ Steinfeld, H. *Livestock's Long Shadow: Environmental Issues and Options*, Livestock, Environment and Development (2006).

ⁱⁱ "Want To Reduce Your Food-related Carbon Footprint? What You Eat Is More Important Than Where It Came From," Science Daily: News & Articles in Science, Health, Environment & Technology, 22 Apr. 2008, 15 Feb. 2009 <<http://www.sciencedaily.com/releases/2008/04/080421161338.htm>>.

ⁱⁱⁱ Christopher Matthews, "Livestock a major threat to environment," FAO: FAO Home, 29 Nov. 2006, 15 Feb. 2009 <<http://www.fao.org/newsroom/en/news/2006/1000448/index.html>>.

^{iv} Rothschild, David de. *The Live Earth Global Warming Survival Handbook: 77 Essential Skills to Stop Climate Change* (Rodale Books, 2007) 66.

^v "BBC NEWS | Health | Cleaner air 'adds months to life'" BBC NEWS | News Front Page, 15 Feb. 2009 <<http://news.bbc.co.uk/2/hi/health/7839336.stm>>.

^{vi} Dejewski, Thomas. "Global Warming is Not Real- What's behind this hoax?" 27 Sept. 2007. Associated Content. 13 Feb. 2009 <http://www.associatedcontent.com/article/392319/global_warming_is_not_real_whats_behind_pg2.html?cat=9>.

^{vii} "United States Leads World Meat Stampede | Worldwatch Institute," Worldwatch Institute | Vision for a Sustainable World, 2 July 1998, Worldwatch Institute, 15 Feb. 2009 <<http://www.worldwatch.org/node/1626#1>>.

^{viii} Christopher Matthews, "Livestock a major threat to environment," FAO: FAO Home, 29 Nov. 2006, 15 Feb. 2009 <<http://www.fao.org/newsroom/en/news/2006/1000448/index.html>>.

^{ix} "GoVeg.com // Meat and the Environment," GoVeg.com: Vegetarian and Vegan Information, 15 Feb. 2009 <<http://www.goveg.com/environment.asp>>.

^x Worldwatch Institute | Vision for a Sustainable World, 15 Feb. 2009 <<http://www.worldwatch.org/system/files/EP174A.pdf>>.

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- ^{xi} "Sustainability of meat-based and plant-based diets and the environment -- Pimentel and Pimentel 78 (3): 660S --," American Journal of Clinical Nutrition, Sept. 2003, 15 Feb. 2009 <<http://www.ajcn.org/cgi/content/full/78/3/660S#R30>>.
- ^{xii} John Robbins, "*Diet for a New America*"
- ^{xiii} "Vegetarismus-Video-Skript: Devour the Earth," Schweizerische Vereinigung fuer Vegetarismus (SVV), 15 Feb. 2009 <http://www.vegetarismus.ch/video/vsuk_skripte.htm>.
- ^{xiv} "Meat Consumption: Per capita," EarthTrends | Environmental Information, 2007, World Resources Institute, 15 Feb. 2009 <http://earthtrends.wri.org/searchable_db/results.php?years=2000-2000,2001-2001,2002-2002&variable_ID=193&theme=8&clD=190&ccID=>>.
- ^{xv} Excel Sheet 1
- ^{xvi} Excel Sheet 1
- ^{xvii} "United States Leads World Meat Stampede | Worldwatch Institute," Worldwatch Institute | Vision for a Sustainable World, 2 July 1998, Worldwatch Institute, 15 Feb. 2009 <<http://www.worldwatch.org/node/1626#1>>.
- ^{xviii} "Pound of beef produces 36 kilograms of CO2 emissions," Conservation news and environmental science news., 15 Feb. 2009 <<http://news.mongabay.com/2007/0718-beef.html>>.
- ^{xix} Excel Sheet 1
- ^{xx} Excel Sheet 1
- ^{xxi} "How much do wind turbines cost? | Windustry," Welcome | Windustry, 15 Feb. 2009 <<http://www.windustry.org/how-much-do-wind-turbines-cost>>.
- ^{xxii} "AWEA," If Not Wind..., 15 Feb. 2009 <<http://www.ifnotwind.org/we101/wind-energy-basics.shtml>>.
- ^{xxiii} Excel Sheet 2

All data used for graphs provided in this proposal can be found on Excel Sheet 1 and 2