A New Global Warming Strategy

How Environmentalists are Overlooking Vegetarianism as the Most Effective Tool Against Climate Change in Our Lifetimes

by Noam Mohr

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The focus solely on CO2 is fueled in part by misconceptions. It’s true that human activity produces vastly more CO2 than all other greenhouse gases put together. However, this does not mean it is responsible for most of the earth’s warming. Many other greenhouse gases trap heat far more powerfully than CO2, some of them tens of thousands of times more powerfully. When taking into account various greenhouse gases’ global warming potential—defined as the amount of actual warming a gas will produce over the next one hundred years—it turns out that gases other than CO2 make up most of the global warming problem.11

Even this overstates the effect of CO2, because the primary sources of these emissions—cars and power plants—also produce aerosols. Aerosols actually have a cooling effect on global temperatures, and the magnitude of this cooling approximately cancels out the warming effect of CO2.12 The surprising result is that sources of CO2 emissions are having roughly zero effect on global temperatures in the near-term.13

This result is not widely known in the scientific community. For instance, Harry Seavoy, a Canadian government official, testified to the House Committee on Agriculture that CO2 emissions account for less than 6% of global warming.14


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environmental community, due to a fear that polluting industries will use it to excise their greenhouse gas emissions. For example, the Union of Concerned Scientists had the data reviewed by other climate experts, who affirmed Hansen’s conclusions. However, the organization also cited climate contrarians’ misuse of the data to argue against curbs in CO2. This contrarian spin cannot be justified.

While CO2 may have little influence in the near-term, reductions remain critical for containing climate change over the long run. Aerosols are short-lived, settling out of the air after a few months, while CO2 continues to heat the atmosphere for decades to centuries. Moreover, we cannot assume that aerosol emissions will keep pace with increases in CO2 emissions. If we fail start dealing with CO2 today, it will be too late down the road when the emissions catch up with us.

Nevertheless, the fact remains that sources of non-CO2 greenhouse gases are responsible for virtually all the global warming we’re seeing, and all the global warming we are going to see for the next fifty years. If we wish to curb global warming over the coming half century, we must look at strategies to address non-CO2 emissions. The strategy with the most impact is vegetarianism.

Methane and Vegetarianism

By far the most important non-CO2 greenhouse gas is methane, and the number one source of methane worldwide is animal agriculture. Methane is responsible for nearly as much global warming as all other non-CO2 greenhouse gases put together. Methane 21 is 21 times more powerful a greenhouse gas than CO2. While atmospheric concentrations of CO2 have risen by about 31% since pre-industrial times, methane concentrations have more than doubled. Whereas human sources of CO2 amount to just 3% of natural emissions, human sources produce one and a half times as much methane as all natural sources. In fact, the effect of our methane emissions may be compounded as methane-induced warming in turn stimulates microbial decay of organic matter in wetlands—the primary natural source of methane. With methane emissions causing nearly half of the planet’s human-induced warming, methane reduction must be a priority. Methane is produced by a number of sources, including coal mining and landfills—but the number one source worldwide is animal agriculture. Animal agriculture produces more than 100 million tons of methane a year. And this source is on the rise: global meat consumption has increased fivefold in the past fifty years, and shows little sign of abating. About 85% of this methane is produced in the digestive processes of livestock, and while a single cow releases a relatively small amount of methane, the collective effect on the environment of the hundreds of millions of livestock animals worldwide is enormous. An additional 15% of animal agricultural methane emissions are released from the massive “lagoons” used to store untreated farm animal waste, and already a target of environmentalists’ for their role as the number one source of water pollution in the U.S.

The conclusion is simple: arguably the best way to reduce global warming in our lifetimes is to reduce or eliminate our consumption of animal products. Simply by going vegetarian (or, strictly speaking, vegan), we can eliminate one of the major sources of emissions of methane, the greenhouse gas responsible for almost half of the global warming impacting the planet today.

Advantages of Vegetarianism over CO2 Reduction

In addition to having the advantage of immediately reducing global warming, a shift away from methane-emitting food sources is much easier than cutting carbon dioxide. First, there is no limit to reductions in this source of greenhouse gas that can be achieved through vegetarian diet. In principle, even 100% reduction could be achieved with little negative impact. In contrast, similar cuts in carbon dioxide are impossible without devastating effects on the economy. Even the most ambitious carbon dioxide reduction strategies fall short of cutting emissions by half.

Second, shifts in diet lower greenhouse gas emissions much more quickly than shifts away from the fossil fuel burning technologies that emit carbon dioxide. The turnover rate for most ruminant farm animals is one or two years, so that decreases in meat consumption would result in almost immediate drops in methane emissions. The turnover rate for cars and power plants, on the other hand, can be decades. Even if cheap, zero-emission fuel sources were available today, they would take many years to build and slowly replace the massive infrastructure our economy depends upon today.

Similarly, unlike carbon dioxide which can remain in the air for more than a century, methane cycles out of the atmosphere in just eight years, so that lower methane emissions quickly translate to cooling of the earth.

Third, efforts to cut carbon dioxide involve fighting powerful and wealthy business interests like the auto and oil industries. Environmental groups have been lobbying for years to make fuel-efficient SUVs available or phase out power plants that don’t meet modern environmental standards without success. At the same time, vegetarian foods are readily available, and cuts in agricultural methane emissions are achievable at every meal.

Also, polls show that concern about global warming is widespread, and environmental activists often feel helpless to do anything about it. Unless they happen to be buying a car or major appliance, most people wanting to make a difference are given little to do aside from writing their legislators and turning off their lights. Reducing or eliminating meat consumption is something concerned citizens can do every day to help the planet.

Finally, it is worth noting that reductions in this source of greenhouse gas have many beneficial side effects for the environment. Less methane results in less tropospheric ozone, a pollutant damaging to human health and agriculture. Moreover, the same factory farms responsible for these methane emissions also use up most of the country’s water supply, and denude most of its wilderness for rangeland and growing feed. Creating rangeland to feed western nations’ growing appetite for meat has been a major source of deforestation and desertification in third world countries. Factory farm waste lagoons are a leading source of water pollution in the U.S. Indeed, because of animal agriculture’s high demand for fossil fuels, the average American diet is far more CO2-polluting than a plant-based one.

Recoverations

• Organizations should consider making advocating vegetarianism a major part of their global warming campaigns. At a minimum, environmental advocates should mention vegetarianism in any information about actions individuals can take to address global warming.

• Government policy should encourage vegetarian diets. Possible mechanisms include an environmental tax on meat similar to one already recommended on gasoline, a shift in farm subsidies to encourage plant agriculture over animal agriculture, or an increased emphasis on vegetarian foods in government-run programs like the school lunch program or food stamps.
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natural sources. In fact, the effect of our methane emissions may be compounded as methane-induced warming in turn stimulates microbial decay of organic matter in wetlands—the primary natural source of methane.

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**Recommendations**

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- **Government policy should encourage vegetarian diets.** Possible mechanisms include an environmental tax on meat similar to one already recommended on gasoline, a shift in farm subsidies to encourage plant agriculture over animal agriculture, or an increased emphasis on vegetarian foods in government-run programs like the school lunch program or food stamps.
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SUMMARY
Global warming poses one of the most serious threats to the global environment ever faced in human history. Yet by focusing entirely on carbon dioxide emissions, major environmental organizations have failed to account for published data showing that other gases are the main culprits behind the global warming we see today. As a result, they are neglecting what might be the most effective strategy for reducing global warming in our lifetimes: advocating a vegetarian diet.

Global Warming and Carbon Dioxide
The environmental community rightly recognizes global warming as one of the gravest threats to the planet. Global temperatures are already higher than they’ve ever been in at least the past millennium, and the increase is accelerating even faster than scientists had predicted. The expected consequences include coastal flooding, increases in extreme weather, spreading disease, and mass extinctions.

Unfortunately, the environmental community has focused its efforts almost exclusively on abating carbon dioxide (CO2) emissions. Domestic legislative efforts concentrate on raising fuel economy standards, reducing cloud cover. Hansen, et al., supra note 5. Moreover, since cars have stricter standards than light trucks, it is always better to buy the former. Hansen, James E., et al., “Global warming in the twenty-first century: An alternative scenario,” Proceedings of the National Academy of Sciences, vol. 97, no. 18, 29 Aug. 2000, p. 9876.

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3 Some examples: U.S. PIRG’s global warming site (http://uspirg.org/uspirg.asp?id2=5235) advocates increasing fuel efficiency standards, capping CO2 from power plants, shifting investments from fossil fuels, and ratifying the Kyoto Protocol. The Sierra Club global warming site (http://www.sierraclub.org/globalwarming/gsteps.asp) recommends energy-efficient appliances, fuel efficient cars, compact fluorescent light bulbs, planting trees, weatherizing your home, and contacting your representatives. The Union of Concerned Scientists’ site (http://www.ucsusa.org) recommends curbing our consumption of fossil fuels, using technologies that reduce emissions, and protecting the world’s forests.

4 It’s worth noting that buying fuel efficient cars and light trucks do not directly reduce carbon dioxide emissions. Because auto manufacturers are bound only by fleet-wide averages, every low-gas-mileage car sold simply allows them to sell another gas guzzler. However, choosing efficiency is not for naught: demand for fuel efficiency may help drive technological innovation and reduce industry opposition to improved fuel economy standards. Moreover, since cars have stricter standards than light trucks, it is always better to buy the former. Hansen, James E. et al., “Global warming in the twenty-first century: An alternative scenario,” Proceedings of the National Academy of Sciences, vol. 97, no. 18, 29 Aug. 2000, p. 9876.


10 Hansen, James E. and Makiko Sato, “Trends of measured climate forcing agents”, Proceedings of the National Academy of Sciences, vol. 98, no. 26, 18 Dec. 2001, p. 14778-14783, http://www.pnas.org/cgi/content/full/98/26/14778. The estimated climate forcing of aerosol from 1850 to 2000 is 1.4 W/m2, while the combined forcings of methane, CFCs, nitrous oxide, and tropospheric ozone is 1.6 W/m2 when indirect effects via water and ozone are taken into account.

11 Hansen and Sato, supra note 11. Estimated climate forcing of aerosols from 1850 to 2000, is -1.5 W/m2, larger than the positive forcing of carbon dioxide. Admittedly, estimates of aerosol forcing have large uncertainties; however, there are as likely to be too low as too high. Among aerosols, black carbon warms the atmosphere, both by absorbance and through semi-direct dirty cloud and snow effects, while sulfates, nitrates, and organic aerosols have a cooling effect, both by directly reflecting sunlight and by indirectly making clouds less bright and reducing cloud cover. Hansen, et al., supra note 5.

12 Hansen points out that “Offsetting of global mean forcings does not imply that climate effects are negligible.” Hansen, et al., supra note 5. Moser, p. 1-2, supra note 9.

13 Moser, p. 4, supra note 9.


15 Moser, supra note 5. The focus solely on CO2 is fueled in part by misconceptions. It’s true that human activity produces vastly more CO2 than all other greenhouse gases put together. However, this does not mean it is responsible for most of the earth’s warming. Many other greenhouse gases trap heat far more powerfully than CO2, some of them tens of thousands of times more powerfully. When taking into account various gases’ global warming potential—defined as the amount of actual warming a gas will produce over the next one hundred years—it turns out that gases other than CO2 make up most of the global warming problem.

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18 Hansen and Sato, supra note 11. Estimated climate forcing of methane from 1850 to 2000 is 0.7 W/m², while estimated forcing of CFCs, tropospheric ozone, and nitrous oxide combined is 0.9 W/m².

14 “Global Warming Potentials”, supra note 10.


17 Natural sources emit 770 billion metric tons of CO₂, and 239 million metric tons of methane, compared to 23.1 billion and 359 million, respectively, for anthropogenic sources. “Emissions of Greenhouse Gases in the United States 2002”, supra note 20.

19 Methane emissions come particularly from ruminant animals, like cows, sheep, buffalo, and goats, but also from non-ruminants like pigs and horses. “Emissions of methane from livestock”, supra note 24.

21 Natural sources emit 770 billion metric tons of CO₂, and 239 million metric tons of methane, compared to 23.1 billion and 359 million, respectively, for anthropogenic sources. “Emissions of Greenhouse Gases in the United States 2002”, supra note 20.

22 Hansen, et al, supra note 5. It is also possible that warming may dampen natural sources of methane by drying out wetlands.


26 The role of ‘Other Gases’ in Addressing Climate Change”, supra note 23. Methane emissions come particularly from ruminant animals, like cows, sheep, buffalo, and goats, but also from non-ruminants like pigs and horses. “Emissions of methane from livestock”, supra note 24.


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32 The U.S. Environmental Protection Agency’s efforts to address methane from livestock amount to encouraging changes in feed and increasing the amount of product (meat, milk, offspring) per animal. Even at best such efforts are unlikely to achieve large reductions in emissions per animal, and any such reductions are easily swamped by increases in the number of animals raised overall. Methane emissions from manure can also be captured and used to produce energy.

33 Hansen, et al, supra note 5.

