

POPULATION AND CLIMATE CHANGE

THE HIDDEN FACTOR

Global climate change is currently getting a lot of attention. It may be unclear whether the current warming is a short or long term event. However, as complex as this situation is, there are several facts we can be sure of:

- 1) In science, the correct answer is not found by voting.
- 2) Global temperature has changed considerably over 4 billion years.
- 3) Many times in the past, the earth has been devoid of polar ice caps.
- 4) Global temperature is a complex system.
- 5) Complex global problems do not have simple solutions.

It is foolish to focus on a single cause of global warming, i.e. “the burning of fossil fuels and the industrialization of the planet.” Although this cause has received the most attention, it is not the largest contributor to climate change. World fossil fuel and industrial CO₂ production is about 6,000 million metric tons (MMT) annually. However, there are at least two other major causes, which have a larger effect on global temperature. These two factors are being ignored. First, according to an article in Scientific American, 600 million metric tons (MMT) of methane are produced by the world’s forests and rise into the atmosphere each year.¹ Even though this is about 1/10 of the CO₂ produced by industry each year, methane warms the atmosphere 23 times more than CO₂. Thus in terms of carbon equivalents, this methane is equal to 13,800 MMT of CO₂, or over 1/2 the polluting effects of industry.

Second, while most people are aware that photosynthesis removes carbon dioxide from the atmosphere, few are aware that a natural process called metabolism produces carbon dioxide as a waste product. Metabolism is the method by which all animal life on the planet depends for survival. Humans are just one of the animals that exhale carbon dioxide. Consider the following:

1. The average human breathes about 30 times per minute.
2. The human lung exchanges about 4.5 liters of air with each breath.
3. The carbon dioxide content of the average exhaled breath is about 5.5%².
4. Carbon dioxide weighs 1.8 grams per liter

¹ Keppler, Frank, and Rockmann, Thomas; Methane, Plants and Climate Change, Scientific American February 2007, Pg.53

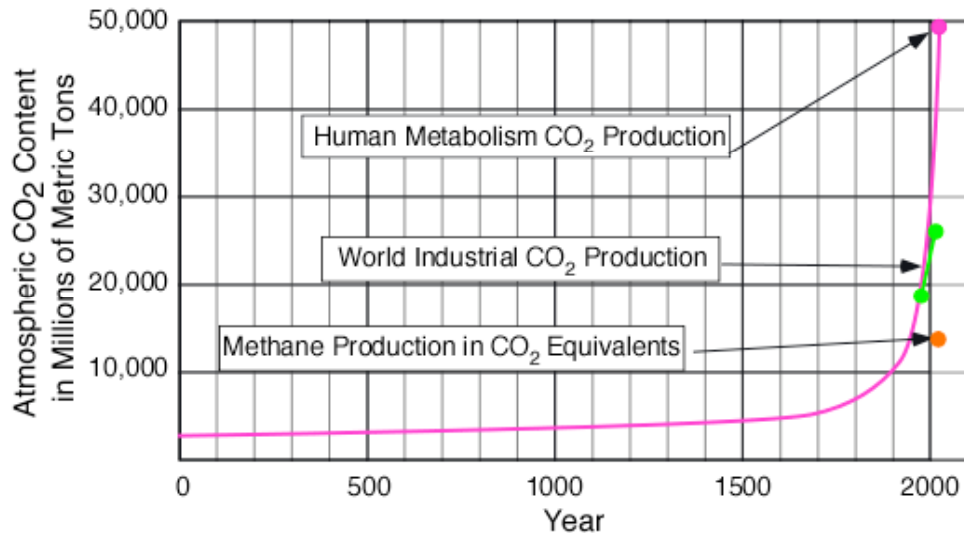
² Fuks, Leonardo; Prediction and Measurements of Exhaled Air effects in the pitch of wind instruments, Proceedings of the Institute of Acoustics Vol. 19 part 5, book 2, page 373 to 378

A few simple calculations based on these facts shows that the average human exhales 7 metric tons of CO₂ each year. Combining this fact with human population data, in table 1 results in a startling conclusion shown in the figure just below the table.

Table 1. World Population and CO₂ Emissions

Year	World Population	CO ₂ Contribution In Millions of Metric Tons
0	300,000,000	2,100
1500	550,000,000	3,850
1804	1,000,000,000	7,000
1928	2,000,000,000	14,000
1960	3,000,000,000	21,000
1976	4,000,000,000	28,000
1988	5,000,000,000	35,000
1999	6,000,000,000	42,000
2007	7,000,000,000	49,000

Plotting this CO₂ production along with the 2007 world almanac’s data on industrial carbon dioxide emissions the two curves in the figure below are generated. Notice that the industrial emissions are half of the CO₂ produced by the metabolism of the population, and that the industry produced waste tracks the population curve very well. That is reasonable because the population uses what industry makes. Population uses the energy, and drives the cars, takes the planes, requires the goods made by industry and shipped around the world, etc. This leads to the obvious fact that by reducing the population by 50 %, the CO₂ production would be reduced by (49,000+27,000)/2 or 38,000 MMT, which is more than was produced by industry in 2004.



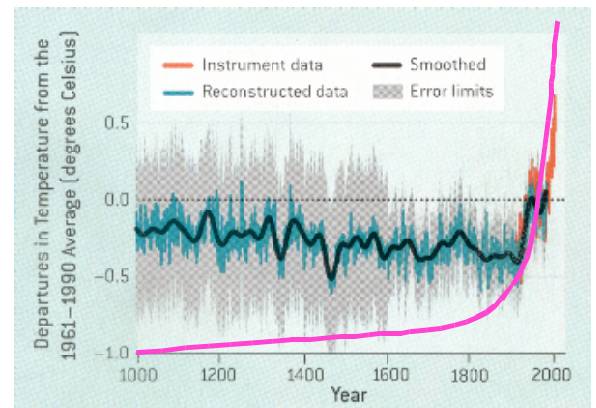
Major Contributors to Global Warming

The fact that humans themselves produce 2 times more CO₂ than industry cannot be ignored if carbon dioxide is contributing to global warming. Unfortunately, humans are not the only animals on the planet. North Pacific Research has not calculated the

contribution to CO₂ that the world population of animals other than humans produce, but it is at least as large as the human contribution. This throws a new light on the protection of species. Note how closely the industrial production of CO₂ (green line) follows the population curve (red line). This is not a coincidence. This shows definitely that the production curve is dependant on the population. That is **as the population grows, so will the need for energy, cars and industry** unless the **quality** of life is reduced. Population by 2050 is expected to be 15,972,000,000 that is an increase of 254%, on the other hand, the most extreme solution to cutting industrial emissions by 2050 is only 80%. **That means that industrial CO₂ emissions will only increase by 174%** without population control. That is an increase in industrial pollution of 96% and ignores the CO₂ emissions given off by respiration. Does this sound like a solution to you?

CURRENT THINKING

It is extremely interesting to overlay the human metabolism CO₂ production curve on the infamous hockey stick curve. In the figure to the right, the black line is the temperature data extracted from tree ring width. The orange line is actual temperature measurements in cities around the world. First it is known, that temperature in the woods is several degrees cooler than temperature in cities cannot be plotted on the same graph without that correction. That correction is typically in the range of 5 ° C. Second note, that human population growth alone supports the rapid temperature increase in CO₂ beginning in 1800 and accelerating dramatically in 1900. The population data is supported as far back as 1650 by census.



On the other hand, the actual extent of industrial pollution in the 19th and the beginning of the 20th century is supposition. No actual data exists to verify the assumption that burning of fossil fuels and industrial pollution produced large CO₂ emissions. The U.S. measurements of power consumption began in 1949. Actual measurements of pollutants began in the 1970s.

In summary, focusing the solution to a global problem on a single cause that produces less than 30 percent of the problem will not solve the problem. The idea that industry and automobiles alone are the cause of global warming has little basis in fact. If the problem exists and needs to be solved, no potential large contributors should be removed from the solution. This analysis shows that the solution must include the methane contribution by wetlands and forests, the CO₂ contributions of humans, and all other animals. If the problem is as bad as it has been portray to the public, all pollution producers should be regulated.

Unfortunately, this produces many complex issues, including population control. Population control was first discussed by Thomas Malthus in 1798 in an “*Essay on the Principle of Population.*” Over the last two hundred years, this problem has been

discussed many times, but its consequences ignored or dismissed by assuming that technology would solve the problem. Technology has not solved it, and cannot solve it without massive amounts of energy. This means that we need to be thinking in terms of population as a major part of the carbon footprint. Presently the only country that has taken the necessary steps to control population is China. It may be time for the rest of the world to follow its lead. The top 20 offending countries producing 75 % of the population increase are listed in table 2.

Table 2. Top 20 Population Contributors by Country

Country	Growth Rate	Population Increase
India	1.64%	23.49%
China	0.62%	10.49%
Pakistan	2.15%	4.59%
Indonesia	1.38%	4.12%
Bangladesh	2.15%	4.08%
Nigeria	2.35%	3.99%
Brazil	1.04%	2.52%
Congo	3.04%	2.45%
Philippines	1.95%	2.25%
Ethiopia	2.31%	2.23%
Mexico	1.60%	2.21%
Egypt	1.77%	1.80%
Sudan	2.55%	1.35%
Uganda	3.51%	1.32%
Kenya	2.83%	1.31%
United States	0.31%	1.19%
Vietnam	1.07%	1.16%
Afghanistan	2.63%	1.05%
Tanzania	2.13%	1.03%
Turkey	1.06%	0.96%

Those in Red have greater than 2 % annual increase. Forty-Five other countries of the 192 countries in the world have greater than a 2% annual growth rate. Only 24 have a negative growth rate. If humans are to survive, population growth must be stopped. If humans are to thrive, population must be reduced to between two and three billion. The truth is that without population control the fate of the human species and much of the other life on the planet is not just inconvenient, it is extremely grim.

CONCLUSIONS

There is a direct connection between population and energy/industry. **Cleaning up industrial pollution without solving the population problem will not reduce global warming.** As the population grows, so will the need for energy, cars and industry. On the other hand solving the population problem will, also solve the energy/industry problem by reducing the need for both as well as reducing world hungry. We must somehow change the thinking to terms of a population footprint rather than just a carbon footprint.

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