

# Research paper on livestock and climate change

[Environment](#), [Climate Change](#)



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## **Introduction**

Climate change stands to be one of the major challenges of our modern time and puts a considerable amount of pressure and stress on our planet as well as on our society. Such a problem, if faced by humanity is one of the worst case scenarios imaginable, aside the asteroid hit or a super volcano eruption; major climate change can result in risen worldwide sea level leading to destructive floods, shifted climate zones with food production being threatened. Such climate change impacts are global in scale and might eventually lead to a total human extinction.

Every time the causes of climate change are being discussed, we always put the blame on burning fossil fuels first; natural gas, oil and coal are undoubtedly the major sources of human-caused production of carbon dioxide and other greenhouse gases. Still, there are several greenhouse gases emission sources that are either partially being triggered by the humans' carbon dioxide production, or simply pollute our environment by themselves.

## **Livestock and Climate Change**

There is a strong belief among scholars, which is supported by unquestionable evidence that supply chain of domesticated animals raised for food purposes is actually vastly underestimated as a source of greenhouse gases. Recently gathered data estimates that at least 50% of all human-caused harmful gases are being produced by the livestock (despite some sources claiming livestock to be producing 7, 516 million metric tons per year of CO<sub>2</sub> equivalents (CO<sub>2</sub> e), or 18 percent of annual worldwide GHG

emissions, are attributable to cattle, buffalo, sheep, goats, camels, horses, pigs, and poultry), a different, more not prejudiced analysis clearly indicated livestock and byproducts being actually responsible for 32, 564 million tons of CO<sub>2</sub> per year, or 51% of the annum worldwide emissions. Nowadays livestock is being one of the unnatural human inventions and does account to be a part of pre-human times, thus a single molecule of CO<sub>2</sub> produced by livestock is no more natural than one being exhaled by an automobile. Therefore, today, numerous billions of human consciously grown livestock are emitting CO<sub>2</sub> than it used to be in preindustrial days, while Earth's photosynthetic capacity (the capacity for keeping carbon dioxide out of the atmosphere by absorbing it in plant mass) has been on a declining slope ever since the beginning of wood harvesting.

## **Methane**

Being one of the major causes of environment pollution, carbon dioxide emissions are still even not close as dangerous as one of the potential greenhouse gases – methane.

Methane, though having a shorter life in the atmosphere (8 years against 100 years of CO<sub>2</sub>) before it breaks into water and CO<sub>2</sub> is an incredibly powerful greenhouse gas. A single molecule of methane is actually 23 times more harmful to the atmosphere, than the same molecule of the CO<sub>2</sub>. Moreover, various models calculated in the recent years indicate a warming effect to be 72 times greater than of CO<sub>2</sub> over the next 20 years and 21 times CO<sub>2</sub> over the period of 100 years. Currently there are 5 gigatonnes of methane in our atmosphere, but what is absolutely terrifying is the fact that there are estimated 2000 gigatonnes of this deadly gas that is presently

locked up frozen in high latitude tundra and, especially, in ocean sediments on continental shelves. And we certainly know from history that this frozen methane can be released suddenly by sufficient warming, which in fact is now rapidly occurring, thus the newly arising methane danger has a full potential of greatly affecting the already devastating human-made global warming, and eventually turning it into catastrophic and impossible for any life on this planet.

### **Livestock as a source of methane**

According to the recent data, 37% of human produced methane comes from livestock only, thus producing 103 million tons of methane emissions, the amount equivalent to 2,369 million tons of CO<sub>2</sub>e (using standard ratio of 23 to 1), which accounts for 3.7% of totally produced greenhouse gases. But using a different projectile ratio of 72 to 1 and we will be getting the numbers of 7,416 million tons of CO<sub>2</sub>e or 11.6 percent of worldwide production of greenhouse gases done by livestock. If the assumptions are accurate the only reasonable option in this alarming situation might be to replace livestock products with better alternatives thus possibly reversing climate change. As a result, a significant reduction in livestock raised worldwide would have far more rapid effects on gas emissions and their atmospheric concentrations, than any other actions aimed for fossil fuels replacement with renewable energy, thus slowing the rates the climate is heating up.

## **Rapid warming over the Arctic as a trigger to the potential “methane bomb”**

Rising temperatures due to the rise of level of emitted greenhouse gases have done a slight warming to Earth's surface, with far most strongest warming over land areas and especially in the Arctic. The second half of the 20th century shows an increasing winter warming in different parts of Canada, Alaska, northern Europe and Asia, with summer warming being strong across the Mediterranean and Middle East. Global warming triggered by humans is actually having the greatest impact on snow and ice, especially as a result of strong warming across the Arctic. Recent research claims average annual extent of Arctic sea ice to have been dropping at an astounding rate of roughly 10% per decade since satellite monitoring became available in 1978. This decaying of ice has been especially strong in late summers, leaving large parts of the Arctic Ocean ice-free for weeks at a time. As during winter Arctic ice reflects 90% of the solar energy back into space, but when the ice retreats melts 90% of that heat gets absorbed by the water, the heat that later will later will become the main cause of slow ice formation during the winter period, which will cause more heat to be absorbed and so on thus creating a runaway feedback that will eventually lead to a complete disappearance of ice in Arctic. This process is driving force of temperature increase in Arctic, which is, in fact, rising at a far greater rate than the global worldwide average of 0. 7°C. The surrounding areas in Greenland, Canada, Alaska, Russia and Norway are also being simultaneously affected, thus melting glaciers, ice sheets, and ice caps and producing vast amounts of fresh warm water that contributes to sea-level rise, in such a way causing warming of sea floor and fossil ice and eventually

turning it into runaway – to become self-generating, until the point there will be no stopping it. Measurements provided by satellites indicate a 8 inch (0. 2 meter) rise of global average sea level since 1870.

And these extreme heating rates are incredibly alarming due to the fact that methane is stored as hydrates in the Arctic and sub-Arctic permafrost and fossil ice underneath the ocean sediment. Approximately 1672 gigatonnes of methane is stored under terrestrial permafrost alone, which is twice the current amount of carbon in atmosphere.

Ongoing observations and analysis conclude that the amount of methane currently coming out of the East Siberian Arctic Shelf is comparable to the amount coming out of the entire world's oceans. The melting of the arctic shelf is melting permafrost under the sea, which is releasing methane stored in the seabed as methane gas, taking current average methane concentrations in the Arctic to the average of about 1. 85 parts per million, which is the highest number in 400, 000 years, with concentrations above the East Siberian Arctic Shelf being even higher. The problem itself is partially in the fact that methane gas oxidizes into carbon dioxide before it reaches the surface in the deep waters, when the East Siberian Arctic Shelf methane simply doesn't have enough time to undertake this process, which means direct exposure into the atmosphere.

This will cause further methane release – a runaway methane feedback, which will eventually melt the fossil ice that contains most of that sealed methane to the point with abrupt and catastrophic climate changes that will end humanity as we know it today.

## Conclusion

Immediate response to climate change is needed at present time and this will be about making hard choices in the face of risk. Any course of action, any actions taken will always carry potential risks and costs; but doing nothing at this crucial point may cause the extinction of human race. Even for the most hopeless situations there are options of how to make everything right, but for this higher cause the effort of an every human being on our planet is needed. And unfortunately, this is practically impossible to achieve due to the modern state of morality worldwide.

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