

## **Myths and misinformation on methane, cows and our climate.**

Methane is a gas, made up of a carbon and four hydrogen atoms, that has been produced naturally on Earth for billions of years; both geologically and via the microbial breakdown of organic matter in habitats with low oxygen availabilities such as wet soils or the intestines of insects and animals.

Despite its widespread production methane levels in the atmosphere were miniscule, at some 700 parts per billion, for millions of years. This is because methane is naturally and rapidly broken down, by soil micro-organisms or photo-oxidation processes in moist air that oxidize it to Carbon dioxide.

In the latter hydroxyl radicals that form naturally when sunlight splits water molecules rapidly oxidize any methane in that air. The moist air above green pastures can generally photo-oxidise 100 times more methane than what is able to be produced by the soil or animals grazing that area.

Consequently while the Earth has sustained vast quantities of soil micro-organisms, termites, insects and grazing animals for millions of years all of which may emit methane, its level has remained low and stable. That is until some 30 years ago when levels doubled, largely in the northern hemisphere.

This doubling of even low methane levels was of concern as methane can absorb heat re-radiated by the Earth's surface as part of, and to increase, the greenhouse effect. This concern generated claims that farmers should be prevented from grazing animals as they may produce methane emissions. To try to make this case 'scientists' have sought to measure the methane emissions from such animals. These data have then been used in the media and policies to vilify farmers and make them account and be liable for the emissions from their livestock and their greenhouse and climate impacts.

However valid science must involve the analysis of the total 'system', not just a single part process. When it does it is clear that the soil and photo-oxidative processes in and above green pastures oxidize far more methane from the atmosphere than is produced by the animals grazing and sustaining that pasture. Furthermore as that ecologically grazed pasture can fix and bio-sequester up to 10 tonnes of carbon per hectare per annum from the atmosphere this draw down of carbon must be credited, and paid to that farmer in any fair objective net carbon accounting system.

Similarly as these pastures without grazing inevitably degenerate, often inducing hot wildfires, the climate effects of the avoided; CO<sub>2</sub> and particulate emissions, soil carbon oxidation and impaired subsequent draw down capacity, needs to be credited to the grazing operators that avoided them.

Rather than being liable for methane emissions, such ecological grazing systems may need to be paid substantially for the draw down and climate benefits they provide under any fair accounting system. Certainly no objective independent court could uphold such false claims given these scientific facts.

So why is there this deliberate mis-information and vilification of grazing animals by interest groups?

Certainly narrow vested interests against the eating of meat have sought to exploit these myths. Could these interests in turn have been exploited by others aware of the marked rise in fugitive methane emissions from the rapid expansion of gas and fossil fuel mining and the poor maintenance on leaking infrastructure and their lack of policy responsibility or accountability for controlling them? Could both interests have benefited from generating this mis-information so as to deflect attention and scapegoat grazing, farmers and eating meat?

However this methane mis-information may also hide a much more significant, dangerous reality.

In addition to hiding the long known scientific reality of our major industrial methane emissions from gas-fields, mines, landfills, sewage ponds and exhausts as well as the major industrial methane emissions from animal feedlots that are both largely unaccounted and where the soil and photo-oxidation processes don't apply, by deflecting the focus onto grazing animals could we have:

- Deferred public concern about the now inescapable exponential increases in methane emissions from the vast areas of soil and formerly frozen tundra that are already warming due to climate changes?
- Deferred scientific and public alarm at the hard evidence that methane emissions are already increasing exponentially from the vast stores of formerly frozen methane hydrates on many continental shelves?

There are at least 4000 billion tonnes of carbon currently stored in the Earth's soils and frozen tundras as well as 10-15,000 billion tonnes of carbon stored in the frozen marine methane hydrates. By comparison the earth's atmosphere currently holds some 750 billion tonnes of carbon.

It follows that any abnormal increased emission of methane from either of these sources could rapidly double atmospheric carbon levels resulting in not just climate change but the catastrophic rapid extinction of most terrestrial life. There is no ecological greater risk or reality facing humanity.

These methane emissions and risks are, real, intensifying now and dwarf those from grazing animals.

However our myths and misinformation and focus onto cows may be needed as neither science nor humanity has any means to reverse or neutralize these increasing emissions; except via the natural methane oxidation processes in soils and fostered by ecological grazing.

Indeed the only hope humanity may have to neutralize them is to extend the regeneration of healthy soils and green pastures so they can hopefully oxidize enough of these emissions in time via the same soil micro-organisms and photo-oxidation processes that our mis-information and policies currently deliberately ignore.

Similarly the only hope that humanity may have to stabilize these exponentially increasing methane emissions is to regenerate adequate areas of soils and forests and thereby restore the hydrological processes that naturally cooled the planet and may again freeze these tundra soils and adequately cool the arctic ocean to re-stabilize the methane hydrate deposits.

As it has done many times after previous geological releases of methane, there is every likelihood that nature can and will again use these same soil micro-organisms and photo-oxidation processes to reduce such methane levels and re-stabilize the climate. The question is, have we retained and can we regenerate adequate healthy grasslands and their herbivores for nature to be able to do this.

Certainly there is no chance of doing so if we allow our public understanding and policies on such fundamental issues to be perverted by non scientific mis-information and vested interests that seek to vilify nature, farmers and cows and avoid us taking responsibility for our pending climate crises.

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