

A TRIUNE CLIMATE SOLUTION FOUND IN OUR CATTLE, GRASS & SOIL

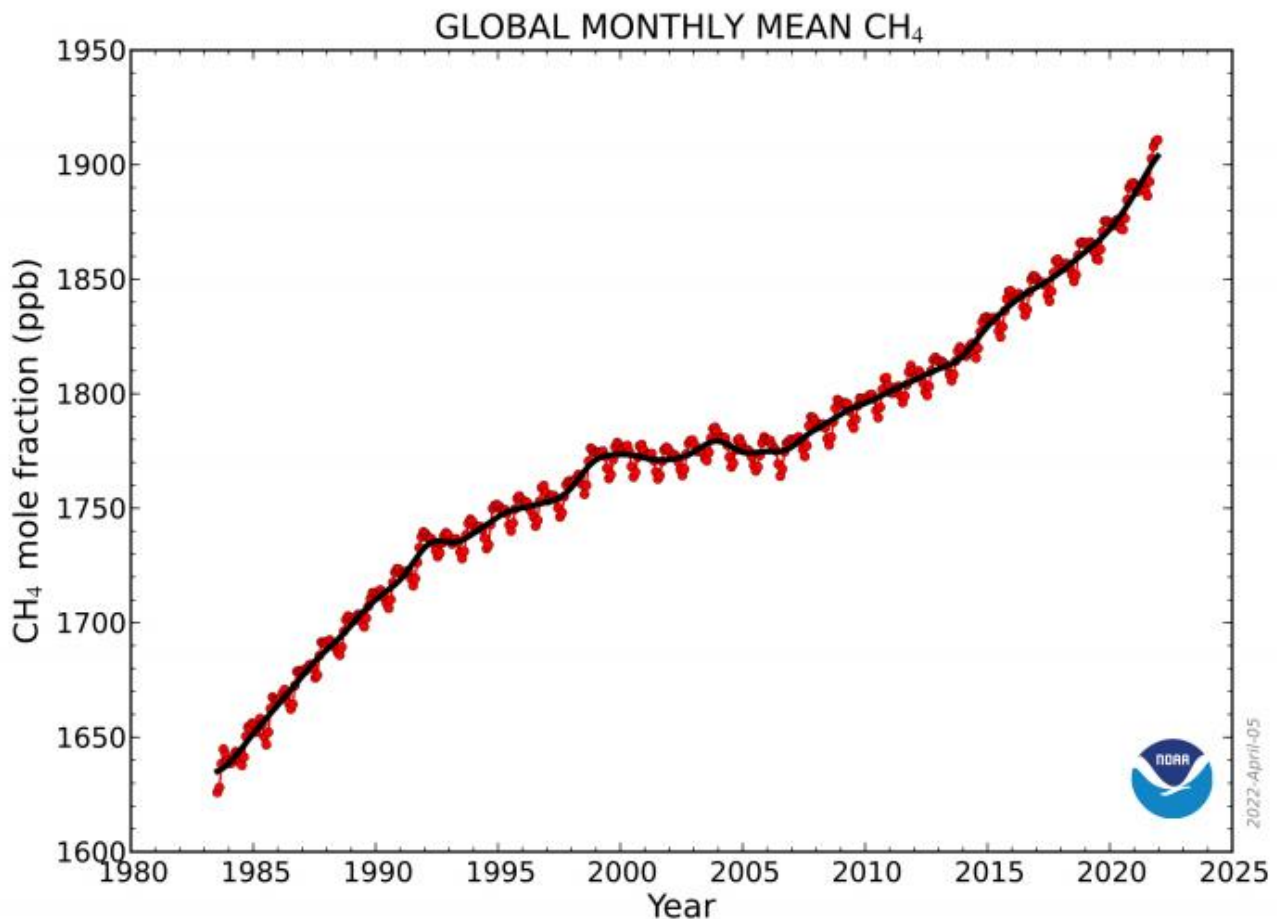


CATTLE

While the rest of the world is busy in blaming cattle for its role in contributing to the rise in greenhouse gas emissions, it appears the cattle industry has largely been silent on the following facts;

- **The world cattle population recorded by the USDA first reached 1 billion in 1975. In 2021 it still remains steady at around 1 billion.** [View here](#)
- Global methane levels recorded the largest annual increase ever observed in 2021 and since 1983 the methane level was 1635 ppb and in 2022 it is now 1900 ppb

So how do you explain the fact that given the global herd population has remained stable over the last 46 years and the biogenic cycle of methane emitted from cows is fully recycled, why are cows being targeted as the enemy and blamed for this problem?



These air samples were measured from NOAA's Mauna Loa observatory in Hawaii. They provide important greenhouse gas data for climate scientists around the world. NOAA announced that analysis of data from their global sampling network showed that levels of the potent greenhouse gas methane recorded the largest annual increase ever observed in 2021, while carbon dioxide continued to increase at historically high rates. (NOAA)

<https://www.noaa.gov/news-release/increase-in-atmospheric-methane-set-another-record-during-2021#:~:text=NOAA's%20preliminary%20analysis%20showed%20the,during%202020%20was%2015.3%20ppb.>

[Frank Mitloehner](#), a professor from University of California who studies animal agriculture and its relationship to air quality and the climate explains the unique cycle of methane produced from cows and other ruminant animals.

He states that '*..as part of the **biogenic carbon cycle**, plants absorb carbon dioxide out of the atmosphere, and through the process of photosynthesis, they harness the energy of the sun to produce carbohydrates such as cellulose. Cellulose is a key feed ingredient for cattle and other ruminant animals. They are able to break it down in their rumens, taking the carbon that makes up the cellulose they consume and emitting a portion as methane....After about 12 years, the methane is converted back into carbon dioxide through hydroxyl oxidation - a chemical reaction in the atmosphere.....That carbon is the same carbon that was in the air prior to being consumed by an animal which is then sequestered back into the plants and the cycle continues.... **It is recycled carbon. As long as herd emissions remain constant for more than 12 years, no additional methane - or warming - is being added to the atmosphere in the biogenic carbon cycle.***

SOILS & GRASS

Soils hold the largest biogeochemically active terrestrial carbon pool on Earth and are

critical for stabilizing atmospheric CO₂ concentrations.

Soil organic matter (SOM) anchors global terrestrial productivity and food and fiber supply. ***Soil Organic Matter retains water and soil nutrients and stores more global carbon than do plants and the atmosphere combined.*** ([Link to PDF](#))

Aerobic soils are also net sinks for methane, due to the presence of methanotrophic bacteria, which utilise methane as their sole energy source. (Dunfield, P. F. (2007). *The soil methane sink*. In D.S. Reay, C.N. Hewitt, K.A Smith and J.Grace, eds. *Greenhouse Gas Sinks*. pp. 152-170. Wallingford UK.

Research by United States Department of Agriculture investigated soil carbon sequestration under a perennial native grass. ([Link to PDF](#))

Despite the annual removal of aboveground biomass (grass), low to medium rainfall and relatively short growing season, the USDA-ARS research, averaged across 10 sites recorded average soil carbon sequestration rates of 4tCO₂/ha/yr in the 0-30 cm soil profile and 10.6tCO₂/ha/yr in the 0-120 cm profile (Liebig et al 2008).

The best performing site was at Bristol, where soil carbon levels increased by 21.67 tonnes in the 0-30 cm soil profile over a 5 year period. A soil carbon increase of 21.67tC/ha equates to the sequestration of 80tCO₂/ha.

At the three sites where carbon was measured to 120 cm, the USDA research found relatively high sequestration rates below 30 cm. The sequestration rate was higher for the 30-60 cm increment than for the 0-30 cm increment (18.2tCO₂/ha vs 16.5tCO₂/ha, respectively). A possible interpretation is that the deeper the sequestration, the greater the likelihood that the carbon be protected from oxidative and/or microbial decomposition.

There were virtually no 'biomass inputs' to soil in these trials, as all aboveground material was removed for ethanol production. This suggests the liquid carbon pathway (Jones 2008) as the primary mechanism for soil building.

(Liebig, M.A, Schmer, M.R, Vogel, K.P. and Mitchell. R.B. (2008). *Soil carbon storage by switchgrass grown for bioenergy*. *Bioenergy Research* 1: 215-222. DOI:10.1007/s12155-008-9019-5)

So if;

- cows are climate neutral and given they naturally offer us the greatest tool we have in removing the plant biomass through grazing to make way for the stimulation of continual growth in grass/plant biomass (to facilitate the ongoing process of carbon sequestration through photosynthesis which can be stored as soil organic carbon),

and if

- we are actively promoting the production of soil organic matter through land management practices that supports the decomposition of organic material, then this will increase the capacity to store carbon in the soil which is shown to be greater than the amounts of carbon in plants and carbon dioxide in the atmosphere combined.

then;

The cow/grass/soil combination is seriously the winning trifecta in utilizing the largest carbon and methane sink that is available to us which we have control over to sequester the carbon dioxide and methane out of the atmosphere and into the earth.

We need to start mobilizing the great minds and management practices we have out there to gather the evidence and present this information to the governments and policy makers who would otherwise declare it all as the problem (along with the sway of public opinion), instead of looking through to the science and practice of it all to see it as a real solution.

Farmers represent the largest landowners on earth and yet we are a minority population. During a time when the governments around the world are making bold moves to reach net zero by 2050, it's more important than ever that we collaborate and coordinate our efforts in having a seat for ag at the table of climate solutions. This needs to be backed by as many farmers and stakeholders as we can get on board in representing this to the rest of the world.

We have set up a community in ONFARM and created a forum where we can gather to begin the process of contributing towards discussions, pool our insights, share in research work and present any evidence in support of this solution going forward.

If you would like to join and share in this initiative, you can accept the invitation here and then start over at the forum here.

We'd love you to share in leading the way for ag.

Invitation link to The Soil Carbon Think Tank

Community: <https://www.onfarm.co/community/the-soil-carbon-think-tank-dcf71?invite=ffde376>

Forum link inside the

community: <https://www.onfarm.co/forum/the-soil-carbon-think-tank/the-soil-carbon-forum-c62ac>

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