

Are cows really climate-unfriendly?

About Mootral®

MOOTRAL is an AgriTech company based in Switzerland that develops innovative solutions for companies and governments to reduce greenhouse gas (GHG) emissions from the agricultural sector. Our first technology is Mootral Ruminant, a natural feed supplement that significantly reduces methane emissions from ruminants. Mootral Ruminant is based on a proprietary combination of organosulfur compounds from garlic and bioflavonoids extracted from citrus. Our research over the last 10 years under both lab and commercial farm conditions shows a minimum 30% reduction in emitted methane.

In climate debates, you often hear how cows actually pollute our planet; their emissions are as high as those of a car. What does that mean? Cows don't consume fuel like cars. How could cows actually pollute our planet? Why do we only talk about cows and not about other farm animals?

WHY COWS?

Cows are one species of ruminants. Ruminants include cattle, sheep, goats, buffalo, deer, elk, giraffes and camels. Ruminants have one common feature, which is different to other animals like horses, pigs or dogs – it is the ruminant digestive system. Cows are particularly singled out as they are the most abundant species of ruminants.

Instead of one stomach, ruminants have four compartments – the rumen, reticulum, omasum and abomasum. The rumen is the largest section and the main digestive centre. The rumen is a large fermentation vessel, which is filled with billions of

microorganisms (MO). One teaspoon of rumen fluid contains billions of MO. There are more than 200 different types and are yet to all be identified. The MO actually help the cow to digest fibrous organic matter and non-protein nitrogen, which is a unique process. The MO allow the cow to convert plant fibres such as hemicellulose and cellulose into energy by breaking down cellulose into carbohydrates and converting them into volatile fatty acids and gases. During this process, fermentation gases (especially methane and carbon dioxide) are produced, which are expelled into the environment, mainly by belching. The MO of the rumen produce around 500 liters of methane per day. Methane is an incredibly powerful greenhouse gas; it is 28 times more potent than carbon dioxide over a 100 year time period. Methane has a shorter lifetime but a higher energy absorption; so over a 20 year time period, it is in fact 86 times more potent than carbon dioxide. The high amount of methane produced during fermentation contributes to climate change.

ABOUT THE AUTHOR

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Maria is veterinarian. She has worked in a veterinary practice focused on dairy cows as well as in research institutes such as University of Leipzig for several years. She published her thesis that focused on renoprotective effects after extracorporeal circulation in piglets. She has developed research protocols, worked

with different measurement tools, written scientific articles and reports. Her main interest are ruminants, especially the ruminant digestive tract and enteric methane production.

COWS ARE THE UNSUNG HEROES OF AGRICULTURE

Due to this special digestion mechanism, ruminants are the only species that are able to convert plant cell wand (cellulose and hemicellulose) into energy. Therefore, their feed efficiency is great. This mechanism is unique and enables the cow to convert grass into milk and protein that is then a food source for humans.

Furthermore, ruminants are crucial to maintain grassland, especially the grassland that is not accessible for humans. Ruminants ventilate the soil, shorten grass and other plants and fertilize the grass. By doing this, they contribute to the production of biomass in roots and maintain the fertility of the soil (80% of the biomass is located in the roots.) Biomass is actually able to store carbon dioxide and consequently

remove it from the atmosphere.

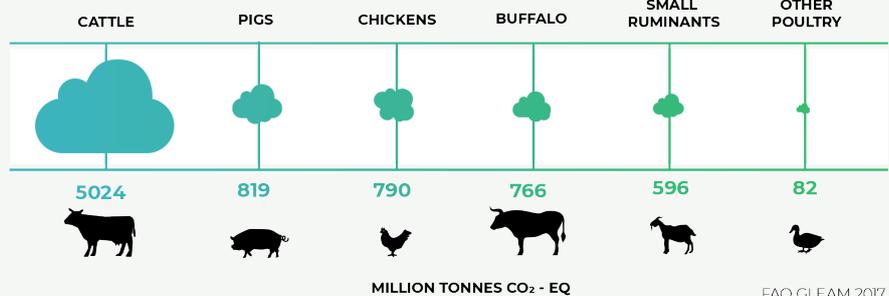
Improving the biomass in the soil actually prevents climate change and is a major climate advantage.

And to further complicate things...

Nowadays, cows are mostly kept inside and fed with more and more concentrates to increase their performance to provide the increasing population with meat and milk. Under these conditions, cows cannot maintain the grassland fertility; therefore carbon dioxide is not stored in the biomass and removed from the atmosphere. Due to their special digestion, they still produce methane (only to a lesser extent) that negatively contributes to the climate change.

GLOBAL ESTIMATES OF EMISSIONS BY SPECIES

It includes emissions attributed to edible products and to other goods and services, such as draught power and wool. Beef cattle produce meat and non-edible outputs. Dairy cattle produce milk and meat as well as non-edible outputs.

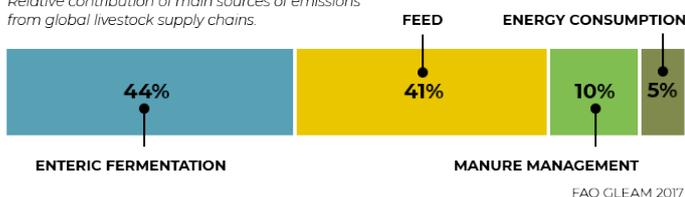


WHAT NEEDS TO BE DONE?

We all need to contribute to meet the Paris climate targets of holding the increase in the global average temperature to well below 2°C. Everybody is aware that we need to reduce emissions in traffic and energy as well as in every single household. Each sector needs to be a part of the effort to ultimately succeed. Livestock accounts for roughly 14.5% of all human-induced emissions (IPPC 2007) and, therefore, has a huge part to play and needs to take urgent action to combat climate change. The fermentation process in the rumen of a cow is principally to blame for high amounts of emissions produced.

GLOBAL EMISSIONS BY SOURCE

Relative contribution of main sources of emissions from global livestock supply chains.



In order to reduce methane emissions different approaches exist...

On one hand, increasing performance and longevity of the cow can reduce the methane emissions per litre of milk. On the other hand, the whole agricultural structure can be changed to profit from the cow's ability to maintain grassland.

Unfortunately, either way, the cow still emits methane; that's the nature of the cow. Therefore, it would be great to develop a solution that reduces the methanogenesis in the rumen without impacting the cow's digestibility or performance. If this solution can be offered, farmers could start reducing agriculture emissions right away and the consumers could still enjoy beef and dairy. That would be a benefit for farmers, consumers and most importantly, for cows and the climate.