

# ‘Over 20 years, methane warms Earth 80 times more than CO<sub>2</sub> — but it offers us opportunities’

**Robert C. Stowe** is Executive Director of the Harvard Initiative on Reducing Global Methane Emissions. Speaking to Srijana Mitra Das at Times Evoke from COP29 in Baku, Azerbaijan, he discusses the urgency — and methods — to lower methane releases:

Photos: Getty Images & iStock

## What are the most profound impacts of methane on the environment?

■ Methane (CH<sub>4</sub>), like carbon dioxide (CO<sub>2</sub>), is a greenhouse gas — it warms Earth. However, it is different from CO<sub>2</sub> in two ways — it is a more powerful warming agent. Over 20 years, methane is 80 times more powerful than CO<sub>2</sub> in retaining heat near Earth’s surface. Also, methane is very short-lived compared to CO<sub>2</sub> — it disappears in just a few decades, rather than hundreds of years like CO<sub>2</sub>. These two scientific facts combined make methane a terrific opportunity for climate action.

By reducing methane emissions, we can have an immediate impact on global average surface temperature, keeping 2°C or even the 1.5°C target within reach.

## What are the most important sources of methane emissions?

■ To start, there is energy. Natural gas is basically methane to a close approximation — when it leaks into the atmosphere, whether from fracking or other kinds of oil and gas production, this is methane escaping. There is often some confusion about flaring here. At times, in the production of oil, either the oil company doesn’t care about the natural gas or it doesn’t have the pipeline capacity to get it to market — so, it burns it at the production site, as with flares seen in oilfields. This actually turns the methane into carbon dioxide and other byproducts. However, a lot of the natural gas doesn’t get combusted, so there is still methane leakage.



**WEAK LINKS:** CH<sub>4</sub> leaks via energy



**WILL A NEW RICE RISE?** For centuries, farmers have grown paddy by flooding their fields — today, however, this is a major contributor to both methane emissions and water loss, spurring research on alternative ways of farming rice

Another source is agriculture — there are two distinct areas here. One is livestock — ruminants produce methane in the course of digesting food. Most of this comes from cattle used in the dairy and meat sectors.

The other area is paddy rice. There are two kinds of rice production, flooded and dry upland, and the flooded or paddy rice method produces a great deal of methane. The next source is waste and landfills — putting organic matter like food waste, plant debris, etc., into landfills results in a lot of methane production. Finally, a fair amount comes from coalmines operating in some parts of the world.

## You’ve described a wide range of sources — what are some remedial measures to reduce CH<sub>4</sub> emissions?

■ Given how diverse these sectors are, the approaches to mitigation, with the technologies, economics, etc., involved are quite different. In many ways, the oil and gas sector is the easiest one — once you find the leak, it’s quite simple to fix it. A portfolio of technologies to pinpoint such leaks, from satellites to handheld devices, exists now and it’s only improving. This will cost but if you’re a natural gas producer, you get that money back because the otherwise escaped amount now goes to market.

With livestock, there is a lot of research underway on developing feed additives which could affect cattle digestion and reduce methane production — many startups doing this rely on Asparagopsis, for instance, which is a particular type of seaweed. Also, adjusting the ratio of pasture feed to processed feed is a strategy.

With paddy, there is research on water management — perhaps flooding the rice all the time isn’t necessary. The amount of water used could be reduced at different stages of growth, thereby helping to lower emissions. Research is also being done on some rice strains which produce less methane.



**SKIP IT:** Compost food waste instead

Importantly, methane is formed from the decomposition of organic matter in the absence of oxygen — so, anaerobic digestion produces methane. The chemistry of this differs across sectors but the principle applies. So, if you provide a chance for organic matter to be exposed to oxygen, you can reduce the methane produced.

With waste, the key is to keep food and other organic matter out of landfills — the second-best method is to capture the methane from waste sites. This is often done via PVC pipes placed atop landfills but it’s much better to keep organic material out of waste sites in the first place. In an ideal world, this would be composted, letting matter decompose in the presence of oxygen.

## With such pressing impacts, which international agreements govern this area?

■ The most significant is the Global Methane Pledge (GMP), put forth by the European Union and the United States at COP26 in 2021. Currently, 159 countries have signed this — the GMP aims to reduce aggregate global emissions by 30% below 2020 levels by 2030. There are no national targets though, with each country pledging to do what it can. China and India haven’t signed yet — but that doesn’t mean they are not working to reduce methane.

## READERS WRITE

Dear Times Evoke,

TE acts as a true light to readers. The conversation with Lisa A. Levin (16<sup>th</sup> November) illuminated how the general public can mistake marine mining as being helpful in combating climate change when the opposite is true. TE enables me to see through the eyes of a benthic ecologist!

— **Dhanika Gaikwad S.**, Chennai

Reading Sunil Amrith and Lisa A. Levin in TE sent shivers down my spine! Over millennia, humans have considered themselves superior to all other species, damaging every lifeform. As the deep-sea is now threatened, the enlightened should feel enraged at further damage done to Earth. Readers are indebted to TE for showing us the right direction!

— **Rashi Beriwal**, Delhi

I love TE and was enthralled reading about extractive fossil fuels. As the TE editorial said, we didn’t know much about this issue before. With the public unaware, we have now landed in a global environmental crisis. Kudos, TE, for presenting such important knowledge beautifully!

— **Naveen Kulkarni**, Hyderabad

This was my first time reading TE and I found it really very insightful. I’d learnt about endangered species in school but TE had a detailed explanation, wonderfully written by Srijana Mitra Das. I had not even heard about sturgeons and ibises before! Thank you for knowledgeable TE, TOI.

— **Musham Hasan**, Mumbai

TE featured such a timely article on global warming in the deep ocean. Industrial activities are now driving even seabed mining, wrecking marine life. Lisa A. Levin underscored the immense risks posed and emphasised the dire need of action by governments. It is hoped COP29 addressed this.

— **BM Rao**, Ahmedabad

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