



Enteric Fermentation R&D Accelerator

Annual Report

2024



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The Enteric Fermentation R&D Accelerator (the Accelerator) is the largest globally coordinated public-good investment in breakthrough research tackling livestock methane emissions.

The Accelerator is an initiative of the **Global Methane Hub**.



Accelerating with purpose

When we launched the Accelerator last year, we had three main goals: to be catalytic, mobilizing and aligning research investment for speed and rigor; to be comprehensive, funding research across a range of development stages, geographic locations, and disciplines; and to be collaborative, engaging funding from philanthropists as well as the public and private sectors. Reflecting on all we've accomplished so far, I feel proud of the progress we've made, and energized by what's to come in 2025.



First, I want to extend my gratitude to each of the members of our Science Oversight Committee for their expertise and commitment. They are the authors of our Research Strategy, and they guide its implementation through every grant we and our partners make.

The way we work reflects the urgency of the challenge before us: we act as quickly as we can, because there's too little time to waste. But we will not compromise the scientific integrity of the research we support. Balancing speed and rigor is critical to our mission. Our funding gives us the freedom to be agile, to complement others' work, to be unencumbered by restrictions other funders often face, and to put everything we learn into the public domain.

We also need to attract the most talented people to this effort. Our convenings have played a critical role in this—bringing people from diverse disciplines together, including those who are working outside the livestock/enteric methane field. We will continue to operate this way, because we've seen that it works.

As this report shows, over these last 12 months we have built a strong foundation from which to grow. I would like to extend my sincere thanks to all of our funders and partners. Philanthropy has really stepped up, and we're very grateful. I also want to extend my appreciation and recognise the government of Ireland and Danone for being the first public and private sector funders of the Accelerator. Their insights and aspirations are critical to guide our work.

But, the job is not done. We need more governments and companies to follow Ireland's and Danone's lead and join us in this effort. When they do, we'll be that much closer to bringing affordable, accessible methane mitigation solutions to farmers around the world so they can contribute meaningfully to global mitigation efforts.

Hayden Montgomery

Executive Director, Enteric
Fermentation R&D Accelerator
Program Director, Agriculture,
Global Methane Hub

Science, Strategy, Solutions

Scientists estimate that the global food system is responsible for some 60% of anthropogenic methane emissions. And methane emissions from livestock, also known as enteric methane emissions, are the largest single source of food system emissions.

We already have a few tools for mitigating these enteric methane emissions, but farmers around the world have been slow to adopt them. Some are expensive; others aren't quite fit for purpose; and still others are hard to come by in the places they're needed most.

We know there is no one-size-fits-all solution to livestock methane mitigation: livestock production systems differ from region to region, country to country, and farm to farm. However, we believe there is a solution to fit every farm and every farmer, everywhere around the world. We just haven't found them yet.

That's why, in 2023, the Global Methane Hub established the Enteric Fermentation R&D Accelerator, the largest globally coordinated public-good investment in breakthrough research targeting enteric methane emissions. The Accelerator aims to support the development of a holistic, balanced portfolio of approaches to methane mitigation that are attractive, affordable, adoptable at scale, and available to farmers around the world.

Microbes in the fore-stomach of ruminant animals such as sheep, cows, buffalo, and goats produce enteric methane during the digestion process.



Science, Strategy, Solutions

The Enteric Fermentation R&D Accelerator's goal is to fund research that advances potential livestock methane mitigation solutions across a range of approaches, livestock systems, geographies, and stages of development.

In 2024, the Accelerator formed an expert Science Oversight Committee (SOC) to provide rigorous and independent advice on the highest priority research areas to be addressed by the Accelerator. Their role is to maintain this geographic, strategic, and developmental balance in our grant portfolio.

The SOC identified seven priority research areas with great potential to mitigate enteric methane emissions worldwide:

1. **Inhibitors** or dietary additives that can reduce microbes' methane production in the gut
2. **Genetics** or programs for breeding low-emitting animals
3. **Measurement tools** for livestock methane emissions that are cheaper, more accurate, and easier for farmers to use
4. **Vaccines** that can induce animals to produce antibodies that bind to and inhibit methane-producing microbes
5. **Anti-methanogenic feedstuffs**, such as forage sources, for grazing systems
6. **Underpinning research on the rumen microbiome** and the organisms within it
7. **Underpinning research on animal physiology and behavior** to predict how methane mitigation can affect ruminant productivity

Figure 1 provides an overview of the research areas, their current and expected Technology Readiness Levels (TRLs), and key outputs necessary to reach expected TRLs by 2027. To learn more about the priority research questions and the research outputs we anticipate within each of these areas, [click here](#).

The Accelerator assesses solutions and monitors progress using three Technology Readiness Levels: Research, Development, and Deployment.



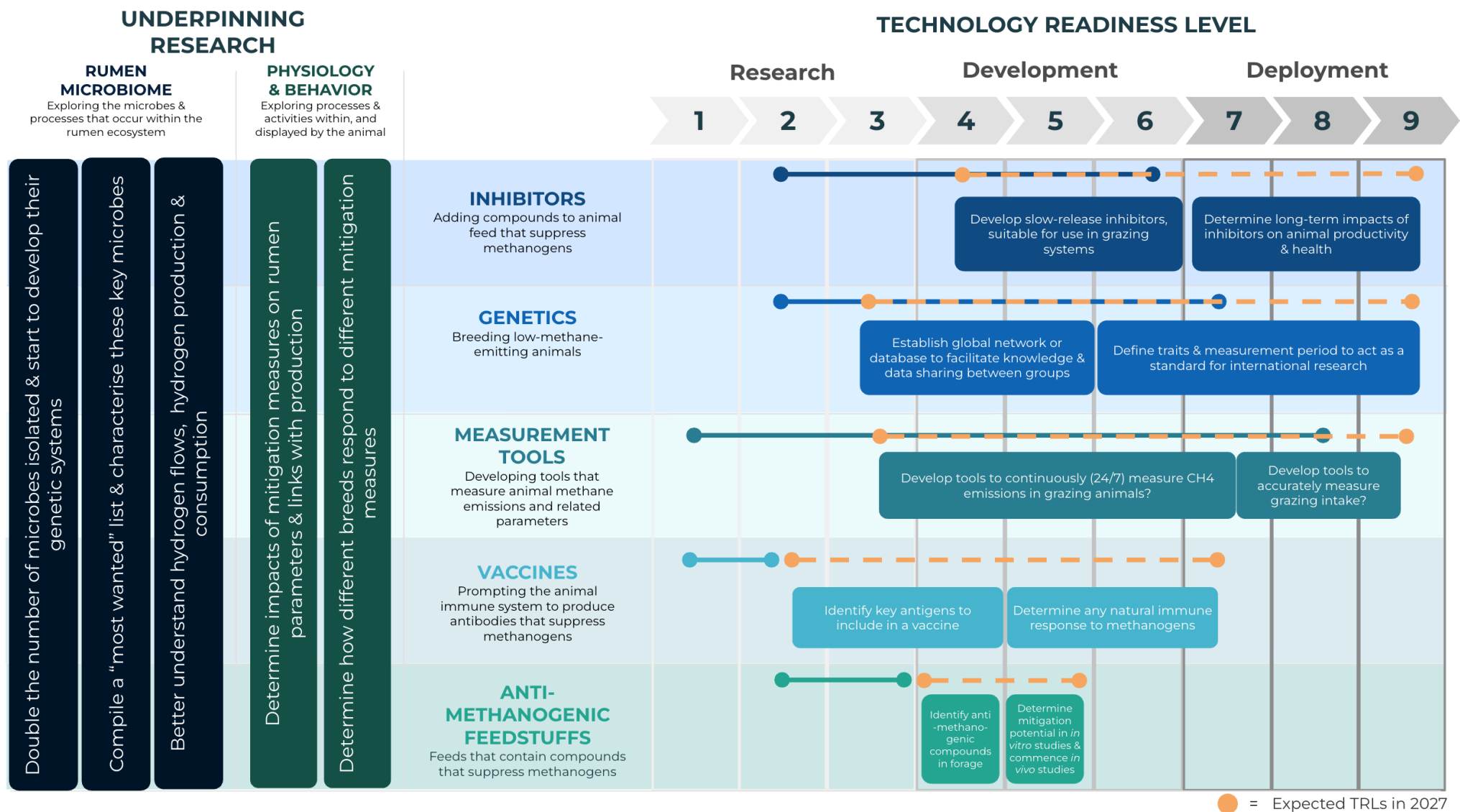


Figure 1. An overview of research areas, their current and expected TRLs, and key outputs necessary to reach expected TRLs within the next three years.

Our Progress

Through December 31, 2024



\$87

**MILLION
SECURED**

from philanthropy,
government (Ireland),
and the private sector;
Danone was the first
private sector donor

\$26

**MILLION
GRANTED**

from the
Accelerator pooled
fund (since 2023)

\$103

**MILLION
GRANTED**

from the Accelerator
pooled fund and
aligned funding
(since 2023)

12

GRANTS

approved from the
Accelerator pooled fund
across six of the seven
priority research (since 2022)

\$77

MILLION

in leveraged
funding through
aligned funders

\$10

MILLION

in leveraged
funding through
In-kind funding

Our Impact

Because we set up the Accelerator to be more agile and efficient than existing funding mechanisms we were able to establish globally inclusive, multidisciplinary research teams, engaging the enteric methane challenge from many points of view.

27

COUNTRIES

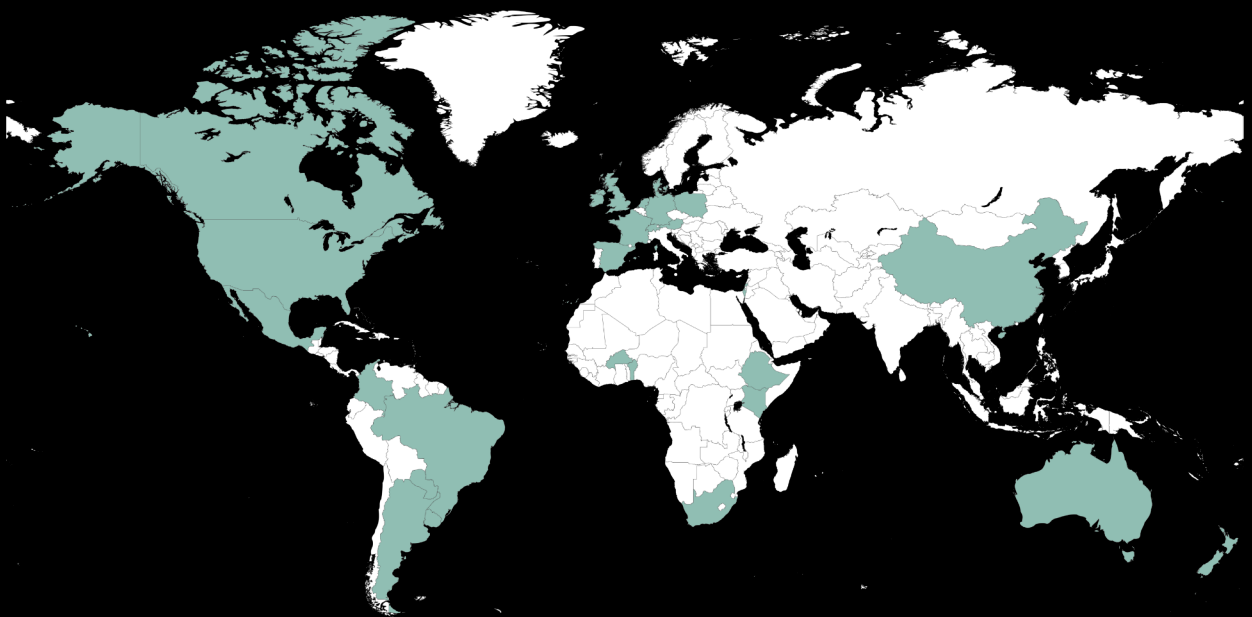
involved in research projects of the Accelerator

48

GRANTEES & SUB-GRANTEES

funded in support of the Accelerator (since 2022)

Geographical Reach of Accelerator Grantees



2024 Impact

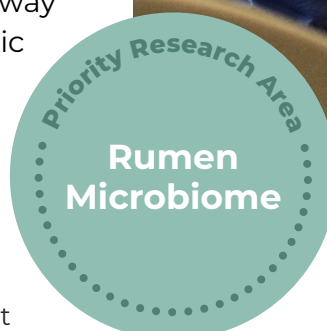
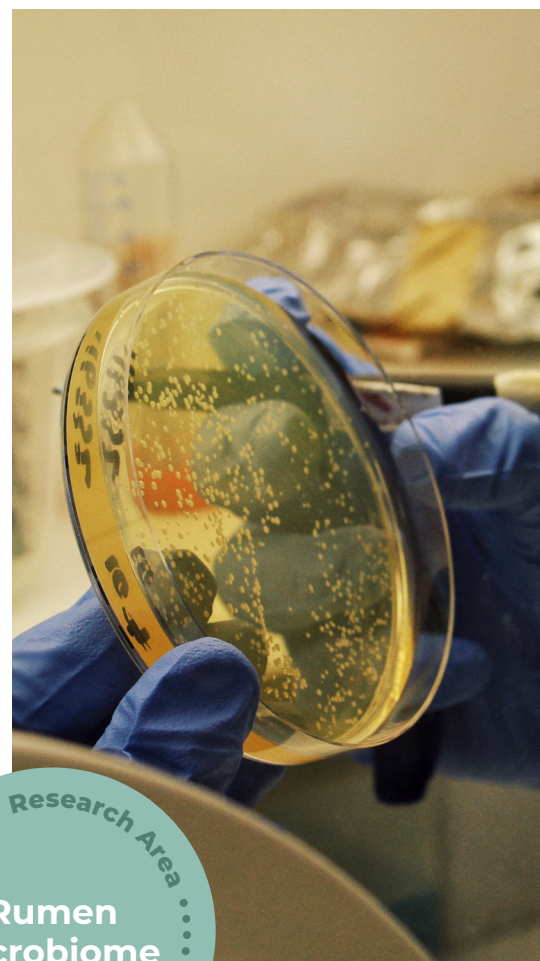


Zelp

We can't assess the success of methane mitigation interventions without precise, high-quality data measurement. In 2023, the Enteric Fermentation R&D Accelerator supported Zelp, an AgTech company based in the UK. Zelp is coordinating the development of a low-cost, scalable, wearable device that can reliably measure enteric methane in grazing cattle continuously and in real time. Zelp has made quick progress and we expect the device will be on the market toward the end of 2025.

Rumen Gateway

An understanding of the microbes and processes within the rumen ecosystem is key to building a strong foundation for the development of methane mitigation strategies across the Accelerator's key the key research areas. With more than twenty five collaborating institutions, the Rumen Gateway has established a global network of rumen microbe culture hubs to accelerate the characterization of the rumen microbiome by isolating, phenotyping, and genotyping archaea, bacteria, and fungi. This funding is also supporting capacity building, which includes 12 PhD students placed in the hubs. The Rumen Gateway community will continue to expand its geographic coverage and associated diversity of animals and microbes, and is poised to accelerate its work to focus on culturing the organisms most critical to advancing the mitigation research agenda.





Low Methane Forages

Certain forages and feedstuffs could contain compounds that reduce enteric methane production. Implementing these forages into grazing systems may also help improve animal productivity and food security. With the support of the Bezos Earth Fund, the Gates Foundation, and the Global Methane Hub, a collaboration between the Alliance of Bioversity International and CIAT (Alliance), International Livestock Research Institute (ILRI) and International Center for Agricultural Research in the Dry Areas (ICARDA), with partners in Pontifica Universidad Javeriana, Colombia, and AgResearch NZ, aims to identify and develop low-methane forages, or grazing crops, for farmers in the Global South. The LMF project currently seeks to identify key anti-methanogenic compounds in the plants grazing livestock eat. Critical new infrastructure to measure methane emissions in cattle and sheep has been constructed at the three CGIAR Centers Alliance (Cali, Colombia), ICARDA (Rabat, Morocco) and ILRI (Nairobi, Kenya). This equipment will be used to validate the effectiveness of these compounds to reduce enteric methane emissions.



Lessons Learned



The Enteric Fermentation R&D Accelerator is actively working to connect research groups to maximize global capacity building and training for young scientists and streamline resources to enhance collaboration and avoid research overlap from different universities across the globe.

Collaboration thrives on structure

In the field of research and development, consortium projects have demonstrated the tremendous benefits of pooling collective expertise and resources. A crucial lesson learned is the importance of clear communication and collaboration among all partners and grantees. Establishing robust mechanisms for regular updates, feedback, and decision-making significantly enhances project efficiency and outcomes.

Strategic alignment fuels innovation

The grants we made in 2024 demonstrate the tremendous benefits that come from pooling resources and expertise from partners and grantees around the globe. Through coordinated efforts, we're ensuring that studies are complementary, fill knowledge gaps, and drive innovations forward. And because we align our grant objectives with the key research areas the SOC identified, our funded projects are on track to deliver answers to priority questions including "Can tools be developed to continuously measure methane emissions in grazing animals?," "What are the key methanogen antigens to include in an effective vaccine?," and "Can we generate a 'most wanted list for rumen bacteria' and characterize those key microbes?"

With your support, we're poised for even more progress in 2025.

2025 Goals

1

Low-methane Genetics

Expand low-methane genetics to new species, breeds, and regions.

5

Early-life Interventions

Investigate pre- or post-natal interventions on methane emissions.

2

Genotype x Environment

Investigate how diet influences the response of low-methane livestock to methane-inhibiting feed additives and identifying synergistic and antagonistic additive combinations.

6

Animal Behavior and Physiology

Examine how rumen and animal physiology influence methane emissions, nutrient absorption and partitioning, and assess whether methane mitigation strategies impact feed efficiency and productivity.

3

Rumen Microbiome

Study electron flow and microbiome adaptation to understand why methane inhibition doesn't consistently improve productivity.

7

Advanced Market Commitments

Assess the potential for funder agreements to secure a future market and drive investment in enteric methane mitigation tools, such as feed additives, genetic selection, and vaccines.

4

Measurement Tools

Develop and deploy wearable methane sensors for beef and dairy cattle, alongside improved feed intake estimates.

8

Fundraising

Expand fundraising efforts to include more government and industry partners.

Our Funders



BEZOS
EARTH
FUND



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Gates Foundation



HIGHTIDE
FOUNDATION



ZEGAR
FAMILY FOUNDATION



Visit our **website** for
more information.