

Tackling enteric methane:

Designing effective methane solutions informed by U.S. dairy and beef producers' perspectives



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Executive summary

Enteric emissions, emitted during the digestive process of ruminants like cows, is the single largest source of agricultural methane emissions, contributing to increased global warming. Both companies with dairy and beef in their supply chains and policymakers can invest in and build systems to support enteric methane-reducing innovations that slow warming and help drive a net-zero future.

As actors across the agricultural system look for effective solutions to reduce enteric emissions, we must take into consideration the challenges and needs of the end users, in this case, producers. Focusing on solutions and incentives that producers will need is critical for scaling the adoption of new technologies faster and more efficiently.

As companies and policymakers look to drive new opportunities to reduce agricultural methane emissions, understanding where producers are today and how to best address their needs is critical.

This report shares new data about dairy and beef producers' perspectives on enteric methane emissions and mitigation solutions: how likely they would be to adopt an enteric solution today, what kinds of barriers would prevent them from doing so and what features or incentives could streamline implementation.

The research identified three primary reasons why producers are hesitant to adopt solutions for reducing enteric emissions.

1 Limited awareness of the opportunity and the solutions

Collectively, **dairy and beef producers have one of the most powerful opportunities to make a positive impact on our climate.** However, producers currently have a low awareness of the climate opportunity around enteric emissions reduction and the solutions in development. **Only ~20% of surveyed producers believe that it is important to reduce enteric methane emissions from livestock operations now.** And even for those who are aware of the opportunity, because the enteric solutions space is new and evolving, it is often difficult for them to know what they can do to address it.

2 Lack of incentives

Given uncertainty around productivity gains from current enteric solutions, producers need incentives to adopt enteric solutions. **Fewer than ~30% of producers surveyed indicated that they would be willing to bear the cost of an enteric solution** even if it were reasonably priced. The right types of financial incentives need to be developed to ensure adoption is economically viable.

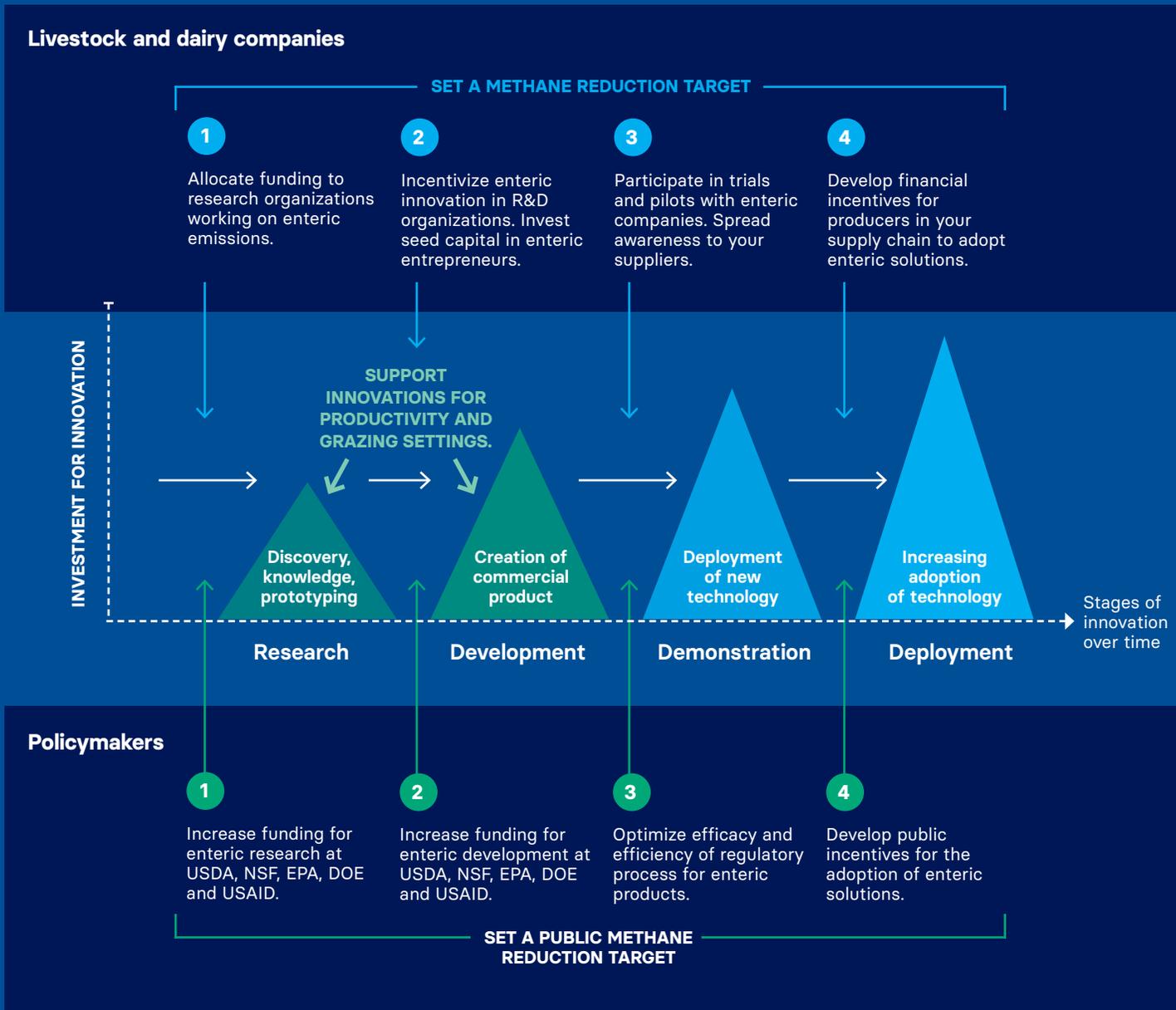
3 Insufficient innovation

While we have seen an increase in potential tools to reduce enteric emissions over the last few years, solutions can continue to expand and improve in their usability, efficacy and applicability to support widespread adoption from producers. Two innovation opportunities stand out:

- a. Increased productivity. **Over half of producers reported that increased productivity is the single most important factor that would incentivize them to adopt a solution,** yet the solutions that are currently on the horizon cannot guarantee such benefits.
- b. Applicability in grazing operations. **Beef producers were significantly less likely than dairy producers to be aware of, or have plans to adopt, enteric solutions.** This is partially because the most promising solutions that are coming to market, feed additives and animal drugs, are most practical on farms where livestock are fed a daily ration. This practice is less common in the beef supply chain because beef cattle are often on grazing land for more of their life span.

Findings in this report give companies that have dairy and beef in their supply chains and policymakers clarity on the most impactful opportunities to support enteric solution deployment and drive innovation. Specific opportunities, broken up into the four stages of innovation, are outlined in the figure below.

Recommended actions to help maximize producer adoption of enteric solutions



For a detailed explanation of all recommendations, please see p. 15.

Introduction

Reducing methane is the fastest way to slow global warming in the near term and is critical to avoiding the worst consequences of climate change. Methane is extremely potent in the short term, and nearly 25% of the warming we experience today comes from methane. Globally, livestock production contributes roughly one-third of human-caused methane emissions, with the largest contribution being enteric emissions. Reducing enteric methane emissions provides a huge opportunity to slow global warming and put us on the best possible trajectory toward a 1.5 degree future.

Seeing this opportunity, many advocates, including EDF, support widespread adoption of practices, products and technologies that reduce manure and enteric methane emissions from beef and dairy production by 2030. However, the success of these solutions will rely on ranchers' and farmers' adoption of practices. Too often, environmental solutions are created in a vacuum, without the end-user in mind. As private and public stakeholders look to drive new opportunities to reduce agricultural methane emissions, we must first understand where producers are today and how to best address their needs.

This report shares survey data on dairy and beef producers' perspectives on enteric methane emissions and mitigation solutions. We focus specifically on enteric methane because it is a quickly evolving space in need of both new innovation and more tailored solutions, and because it presents a great opportunity to reduce warming immediately. Leveraging design-thinking principles and a user-first mentality, we hope that private and public stakeholders will use this information to develop solutions, incentives and systems that will be most suited to drive rapid adoption by producers.

Research methodology

EDF engaged The Context Network, an agricultural consulting firm, to collect and analyze insights about enteric emissions mitigation adoption drivers and challenges from the U.S. dairy and beef industries. These insights deepen understanding of the current state of the industries regarding awareness, mindsets, motivations and intentions around enteric emissions reductions.

Enteric methane overview and solutions landscape

Enteric methane is a significant feature of dairy and beef production because it is emitted during the digestive process of ruminants like cows. Enteric emissions are lower when cattle are healthy and receive high-quality feed. Additionally, new enteric solutions are working through the innovation pipeline to drive further reductions, primarily in the form of methane inhibitors that can be incorporated into an animal's feed. Most solutions are in earlier stages of development and piloting, and the new industry is rapidly evolving. At the same time, there are some promising new technologies that dairy and beef companies can consider integrating into their operations in the next few years. EDF's latest summary of today's most promising solutions and actions today can be found [here](#).

A quantitative survey was distributed to approximately 400 dairy and beef producers. Surveys were completed online in November 2021 by ~100 dairy and ~300 beef (including cow-calf, stocker and feedlot) producers in geographically diverse production regions across the U.S. (see detailed results in Key Findings section).

In addition, interviews were conducted with downstream stakeholders, including industry associations, co-ops, food and food service companies, input suppliers, packers, retailers and wholesalers. These interviews provided perspective on broader industry awareness, motivation and incentives with respect to enteric methane solutions.

Summary of findings

In this section, we share detailed producer perspectives and discuss their implications. To successfully achieve enteric methane reduction on a large scale, individual dairy and beef producers, who are the ones closest to these animals, will need to adopt enteric solutions. We hope that these insights will help companies and policymakers align with producers to maximize chances of success.



Producers' perspectives on methane emissions

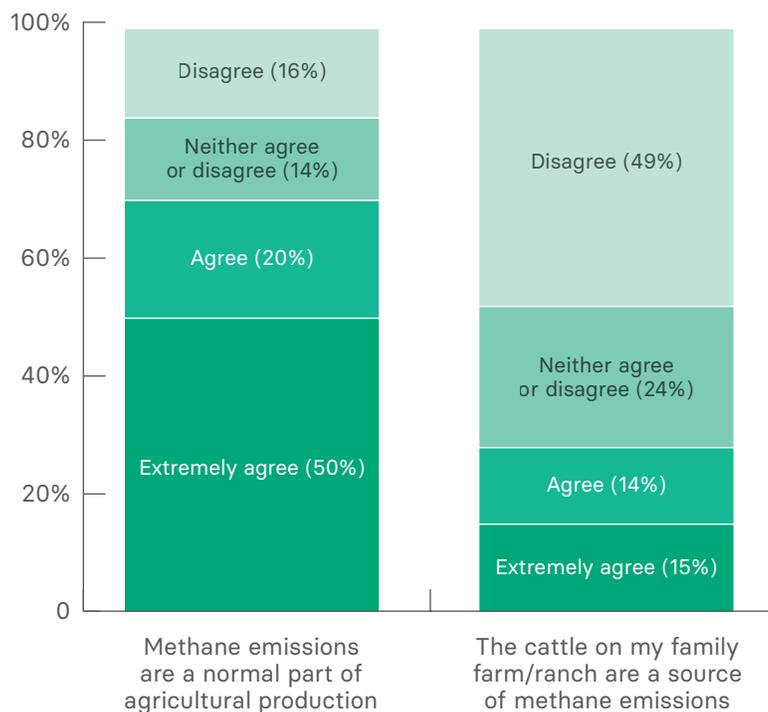
Fewer than 30% of producers surveyed believe that their cattle are a significant source of methane emissions. But these same farmers do acknowledge that their cattle are releasing methane, as roughly 70% of the same producers view methane emissions as a normal part of agricultural production. It is unsurprising that awareness of the significance of enteric emissions is low, given that enteric emissions mitigation is a relatively recent climate objective. These commonly held perspectives reflect the reality that most producers are not yet informed about the positive impact they can have on the climate by reducing enteric methane emissions. These producers may regard their emissions as an unremarkable feature of production, and many may even perceive any statement on the significance of livestock methane emissions as a risk to their operations.

While roughly 20% of producers surveyed agreed that it is important to reduce enteric emissions now, that number grew to roughly 35% when producers were asked whether it will be important to them in three to five years. This difference suggests that producers are seeing some signals in the market that enteric mitigation is on the horizon for their industry. Accordingly, while many producers may not be ready to take action now, they may be interested in learning how they can respond to those market signals in their operations in the years to come.

Our research on the current attitudes of producers indicates that most producers are not yet aware that enteric emissions reduction constitutes a significant opportunity to make a positive contribution to net-zero and climate goals. At the same time, though, producers are receiving signals that reducing enteric methane in their operations may become important to their business within the next five years.

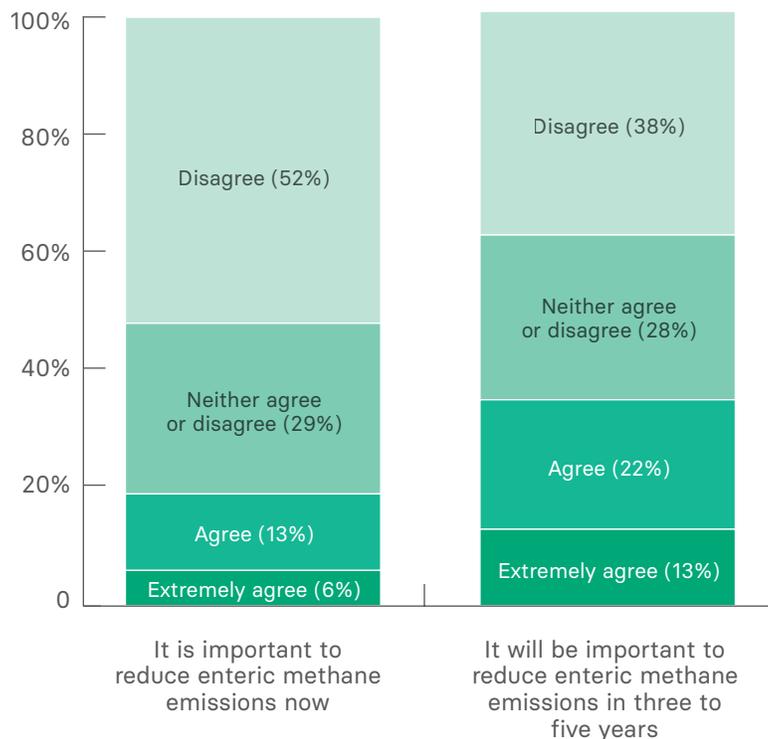
Please indicate how much you agree or disagree with each of the following statements

% OF PRODUCERS SURVEYED



Please indicate how much you agree or disagree with each of the following statements

% OF PRODUCERS SURVEYED



Companies and policymakers who wish to accelerate enteric mitigation have an opportunity to spread awareness and understanding to producers in three impactful ways:

1

Build producer buy-in and motivation by explaining the enteric emissions reduction opportunity in a clear, positive and optimistic way.

For example, stakeholders can establish that enteric emissions are indeed a normal and natural part of producers' operations, and that they are not doing anything "wrong." With that established, stakeholders can share that producers have a uniquely powerful opportunity to contribute positively to the global effort against climate change by evolving their operations.

Stakeholders can buttress producer motivation by sharing, for example, that the positive environmental impact of enteric mitigation can contribute to the longevity and health of producers' industries in a world where markets are increasingly interested in more sustainable products. In addition to this element of commercial viability, agriculture is among those industries most vulnerable to the effects of climate change so there may be a motivating element of climate resilience and risk management.

To continue to build producer motivation, stakeholders can play a role in communicating the work being done by producers to consumers. Stakeholders can tell producers' stories to help consumers understand the important decisions and changes that producers are making for the good of the climate.

Stakeholders can also show producers that they are sharing the burden of mitigation, by investing in enteric mitigation outcomes in line with the recommendations in this report.

2

Amplify the signals that producers are receiving about how important enteric mitigation may become to their operations in the next five years

One way that private stakeholders like downstream companies can do this is by setting a methane reduction target. Communicating a public metric around methane can send a clear message to producers that your company will look for adjustments from producers in order to meet that goal. Similarly, public sector goal setting, in line with the [Global Methane Pledge](#), can achieve the same high-level goal of suggesting near-term expectations for producers. Expanding the consumer market for beef produced with low methane emissions also has the potential to amplify market signals that could influence producers. Ensuring stringent standards around such a market will accelerate producer participation.

3

Share information on how and with what tools producers will be able to make the relevant operational adjustments.

Sharing the "how" shortly after the "what" can maximize producer empowerment. Education and communications that prepare producers will grease the wheels for smooth integration of solutions throughout dairy and beef production in the next five years.

Producers' likelihood to adopt solutions

Of the producers surveyed, fewer than 30% reported that they would be willing to adopt an enteric solution if they had to bear the cost, even if the product was reasonably priced.

This hesitancy to bear the cost of enteric solutions suggests that producers will require strong incentives to incorporate enteric solutions into their operations.

Fewer than 20% of the producers surveyed believed that sufficient incentives are available today to incentivize their adoption of enteric solutions.

These two findings together expose a significant gap in today's market. To address this important need, private and public stakeholders

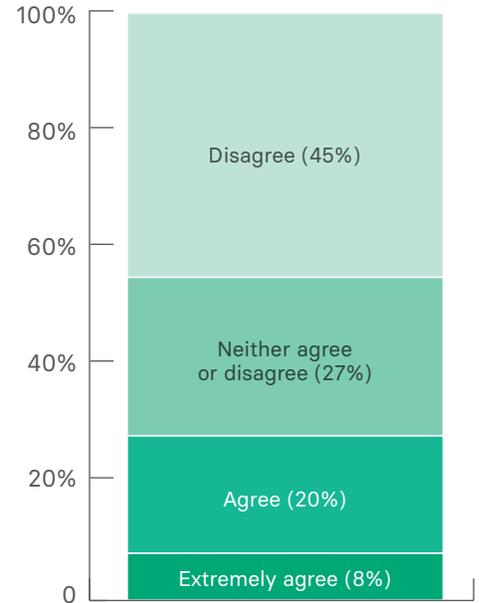
should develop systems of incentives that will bear the cost of enteric solutions so that it is financially feasible for producers to incorporate them into their operations.

For private stakeholders, for example, an incentive system could be a price premium for producers that adopt enteric solutions. For public stakeholders, on the other hand, an incentive could be a conditional subsidy. Incentives should be brand, scale and technology agnostic to ensure continued relevance as scientific capabilities and competitors evolve in the enteric solutions industry.

The producer data in the next section can help inform what kind of incentives should be developed.

Please indicate how much you agree or disagree with each of the following statements

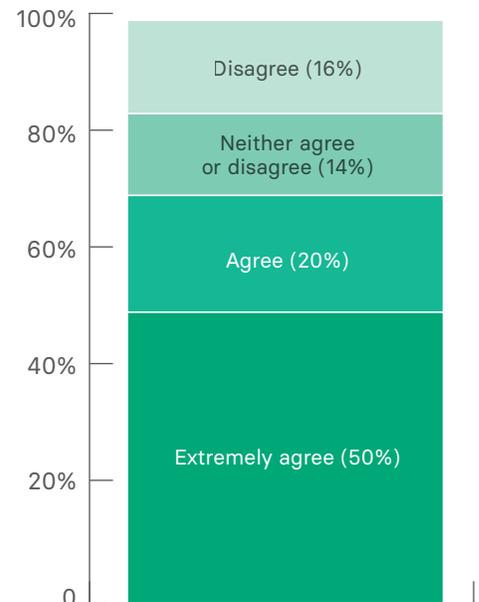
% OF PRODUCERS SURVEYED



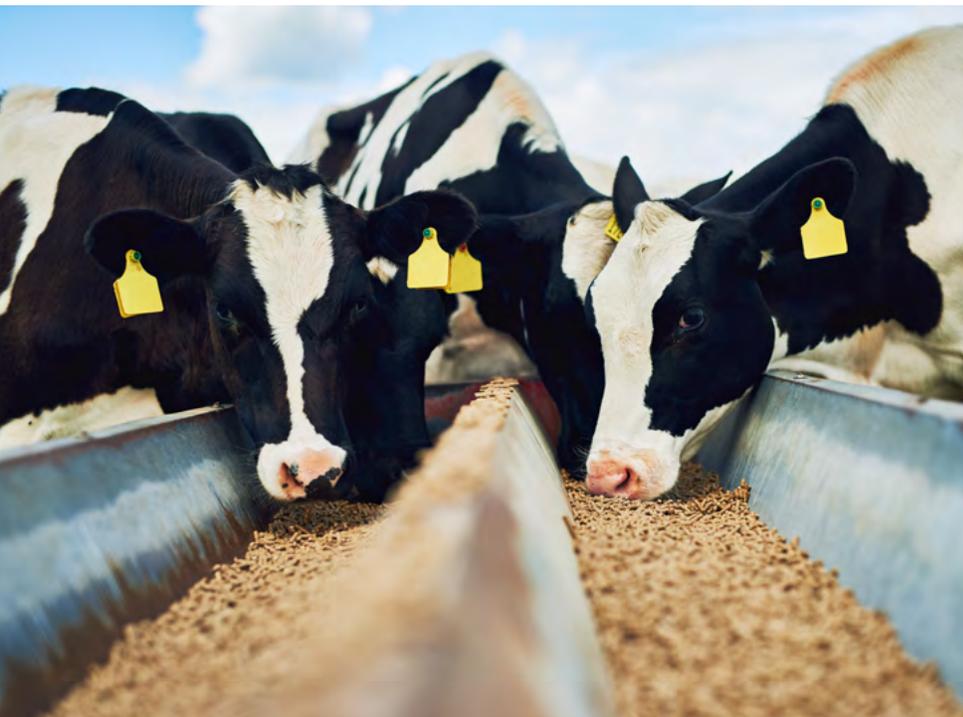
I would be likely to use a feed additive, animal drug or mineral mix solution to reduce enteric emissions, assuming it is priced reasonably and I bear the cost

Please indicate how much you agree or disagree with each of the following statements

% OF PRODUCERS SURVEYED



There are not sufficient incentives today to adopt a feed additive, animal drug or mineral mix solution

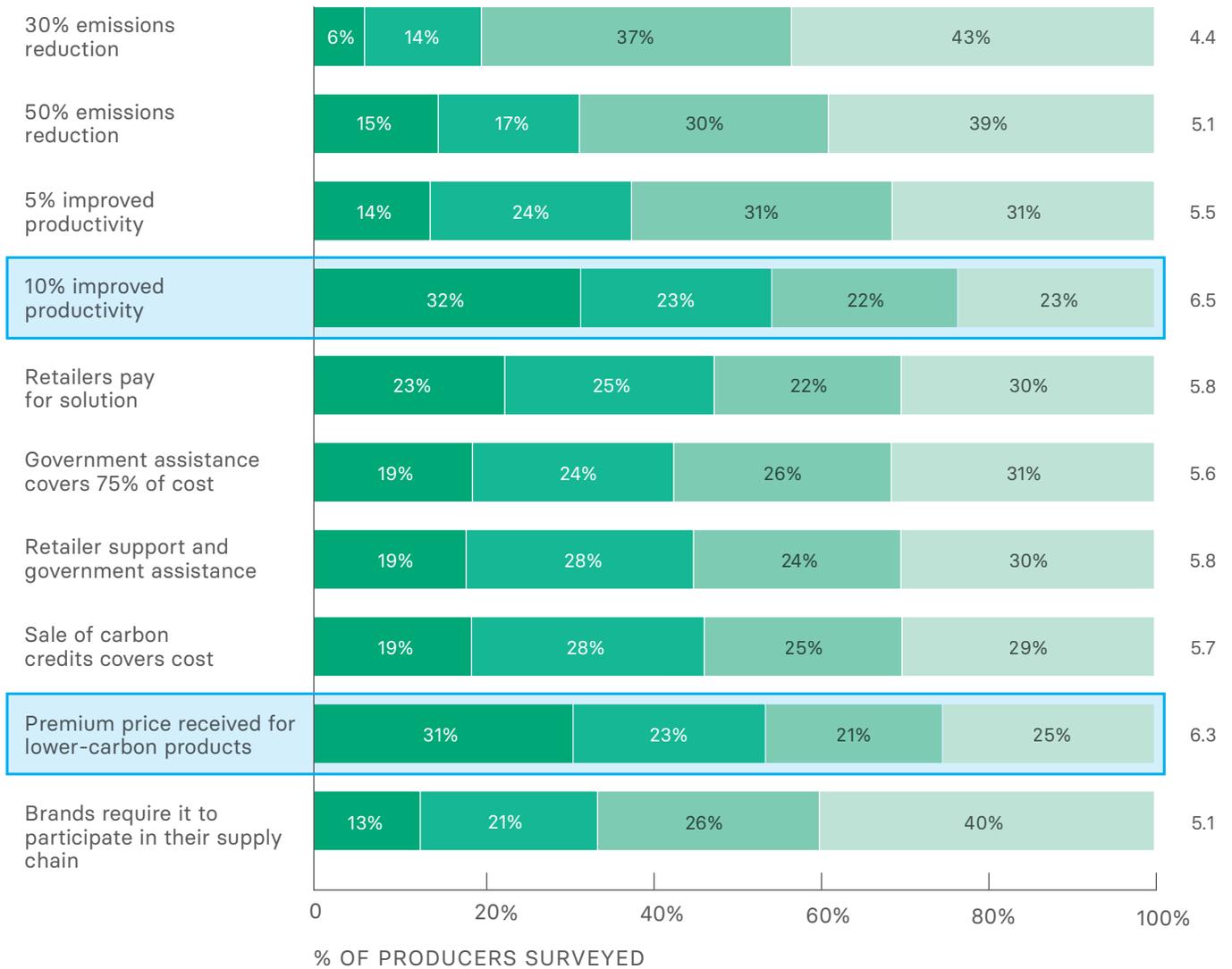


Producers' incentive preferences

Surveyed producers evaluated the relative attractiveness of 10 different types of incentives proposed in the survey. Two incentives stood out to producers: a premium price for lower-methane products and a 10% increase in productivity.

How likely would you be to use a product to reduce enteric emissions of cattle in your operations assuming the following...

■ Extremely likely
 ■ Likely
 ■ Neither
 ■ Not likely



Producers' keen interest in a price premium from downstream buyers illustrates how important the actions of downstream companies will be in determining enteric methane mitigation outcomes. Companies that buy dairy and beef products and are interested in reducing greenhouse gas emissions

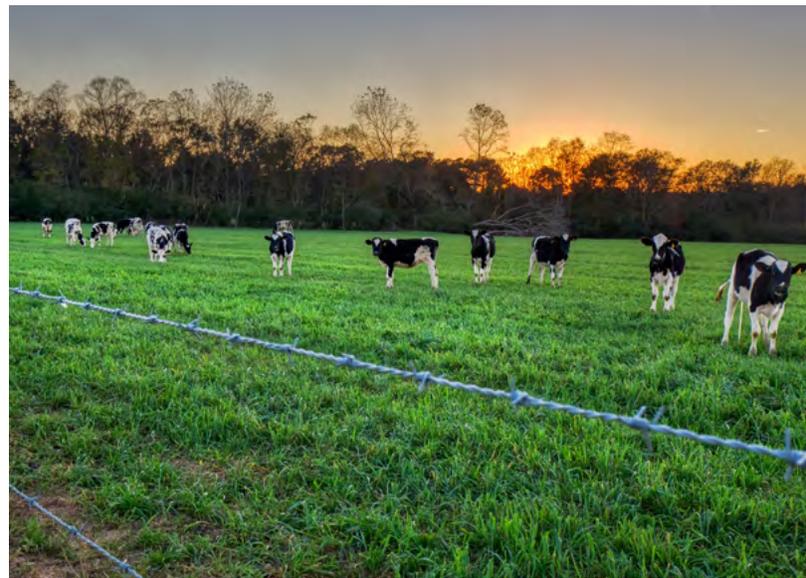
in their supply chains (otherwise known as Scope 3 emissions) should incentivize enteric methane reducing actions in their supply chain. The first step is setting a public methane reduction goal to connect enteric methane reduction objectives more closely to core business objectives.

Downstream companies should consider how to financially and operationally deploy a supply chain incentive for suppliers that adopt enteric methane solutions. This should include working with your financial team to allocate budget toward these incentives and engaging the procurement team to build the communications and tracking infrastructure required to appropriately educate, equip and reward producers.

The second of the two incentives that producers found to be most attractive was a 10% improvement in productivity. In fact, this incentive proved so appealing to producers that almost 55% reported that an increase in milk or beef production would be the *most* important factor that would influence their adoption of enteric emission reduction measures.

The incentive of productivity is different in nature from a purely financial tool like a price premium. Stakeholders such as downstream companies and policymakers cannot directly offer this incentive, but they *can* meaningfully contribute to the likelihood that it becomes available.

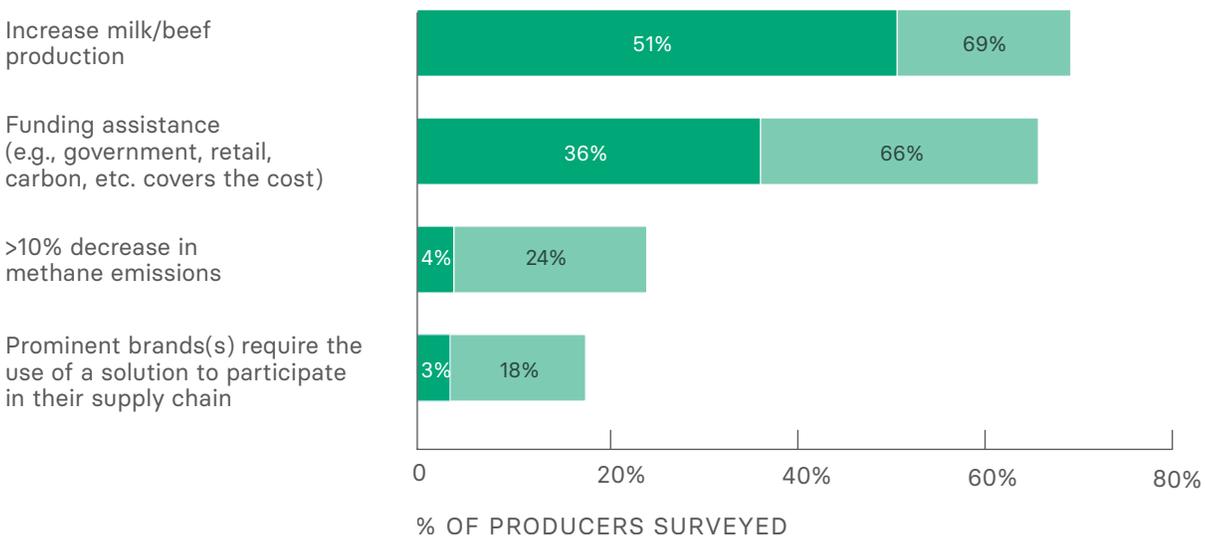
Today, none of the solutions in advanced stages of development have been reliably shown to deliver a 5-10% positive impact on productivity. **Research and development around an enteric solution that drives a productivity benefit is a premier innovation**



opportunity for the industry. Public and private stakeholders can provide funding and resourcing to public institutions, private research organizations or even entrepreneurs to accelerate the basic research and subsequent development that would be required. Investment paid toward this objective, if successful, could ultimately lessen the financial burden on public and private stakeholders in the long term, as a productivity-boosting product would provide a financial incentive to producers in and of itself.

Which factors would influence your likelihood to use a solution to reduce enteric emissions?

■ Would be the most important factor ■ Would be a factor



Differences between dairy and beef producers

Dairy production and beef production are alike in terms of the relevance of methane emissions, but they are operating in very different industries. In the market research survey, we saw two key differences between dairy and beef producers' reported beliefs.

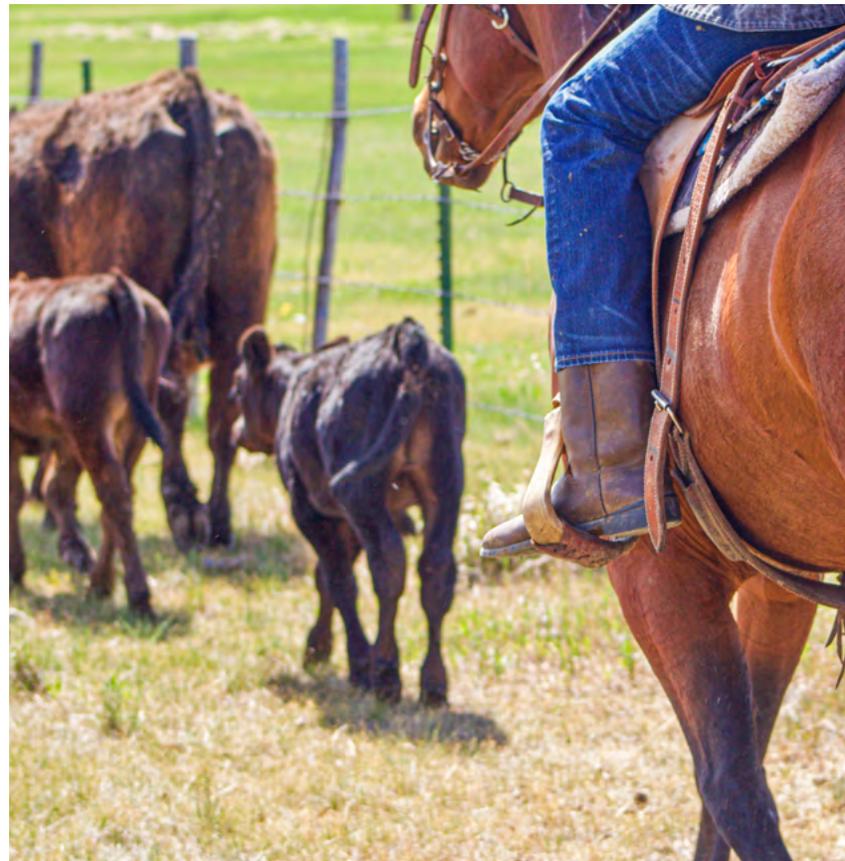
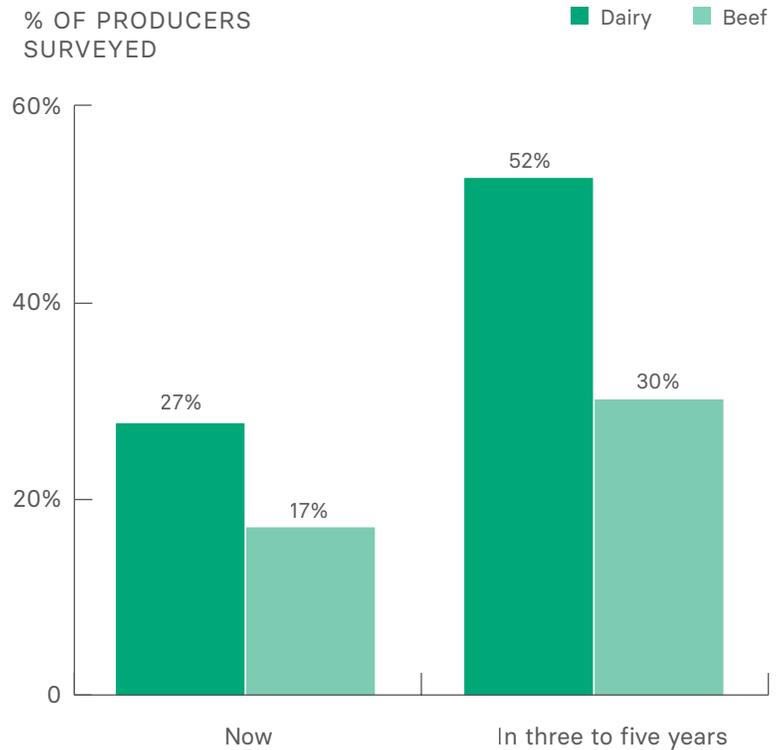
The most notable difference was their reported perspectives on enteric methane emissions. Dairy farmers were twice as likely as beef producers to agree that reducing enteric methane emissions is important today and will be important in the next three to five years.

Several factors could be driving these differences. First, the U.S. dairy industry, led by industry associations such as Dairy Management Inc. and co-ops like Dairy Farmers of America, have set ambitious climate and GHG goals of which many dairy farmers may already be aware.

Second, the enteric solutions that are in advanced stages of development today are more widely applicable to the dairy industry than to the beef industry. This is because the efficacy of feed additives and animal drugs often relies on frequent centralized feeding. This type of operation includes a large majority of U.S. dairy farms, as well as beef feedlots, but it is not relevant to beef cow-calf, backgrounding and stocking operations where cattle typically graze on pasture.

Thus, while we focus on implementing available tools in the dairy industry, we also need to catalyze new innovation to better serve the beef industry by directing funding and resources toward enteric innovations that can be deployed in extensive grazing systems. The grazing elements of the supply chain have the greatest enteric emissions, so finding solutions that work for these systems would have an outsized contribution to supply chain emissions reduction efforts.

How important is it for producers to start implementing practices to reduce enteric emissions?



The second place in the market research survey in which dairy and beef producers demonstrated noticeably divergent preferences was in evaluating the attractiveness of different incentives. Dairy farmers reported price premiums for lower emissions products to be significantly more attractive than did beef producers. And on the other side, beef producers found government assistance significantly more appealing than did dairy producers.

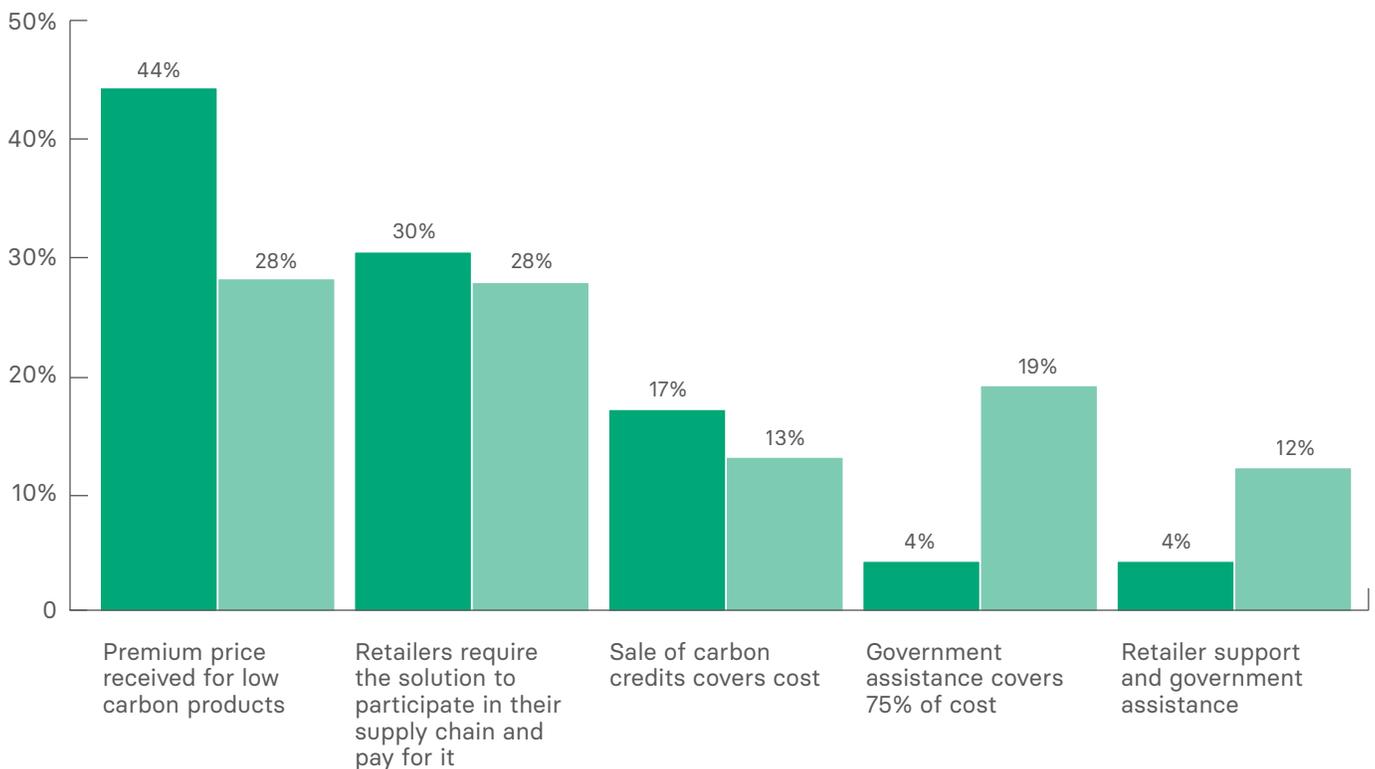
These divergent preferences likely stem from the different financial and operational norms in the two industries. Stakeholders may wish to consider that, as with emissions-reducing solutions themselves, incentive solutions need not be one-size-fits-all across the dairy and beef industries.



Which factor would have the greatest influence on your likelihood to use a solution to reduce enteric emissions?

■ Dairy ■ Beef

% OF PRODUCERS SURVEYED



Livestock and dairy company perspectives

To complement the producer survey, the Context Network conducted interviews with dairy and beef value chain players that operate downstream from producers, such as food and food service companies, retailers, packers, wholesalers and co-ops. These interviews explored downstream stakeholders' knowledge of, and perspectives on, enteric emissions reduction, as well as their opinions on what will be required to achieve success going forward.

Most downstream stakeholders believed that enteric emissions reduction is and will continue to increase in importance. These stakeholders most frequently cited economic returns, higher consumer trust, better competitive position and market access as the most important benefits of reducing enteric emissions in their supply chains. Downstream companies likely anticipate commercial benefits because they see their markets increasingly valuing environmental impact and perceive enteric methane reduction emerging as one promising new tool with which to respond.

Although it is increasingly on their radar, reducing enteric emissions is not currently a top priority for most downstream stakeholders. They report placing greater emphasis on reducing GHG emissions through farm and feed production and manure management practices in their supply chains, as there are more solutions readily available in these areas.

To incorporate enteric reduction more prominently into their supply chains going forward, downstream stakeholders indicated that they will need more information. Awareness of emissions-reducing solutions was generally high, but stakeholders' understanding of the details of specific products was less clear. Additionally, some stakeholders who were familiar with the existing suite of solutions identified the need for continued research and development to optimize the efficacy of solutions and expand their applicability and availability.

Downstream players tended to predict that the most likely and effective incentives for upstream producer adoption would be either a productivity benefit from the product itself or a lower-methane price premium offered to producers. This is aligned with producers' views expressed in the survey, and emphasizes how important it is for downstream buyers to begin setting goals and strategies for operationalizing enteric methane reduction incentives in their supply chains.

“Most people may know a little bit about methane, but as they learn more it’s only going to increase their concern about it.”

– Dairy cooperative

“Increasing interest in enteric emissions is driven by public perception. That social acceptance of beef is essential.”

– Retailer

“From a priority standpoint we cannot make significant gains or improvements in the climate impact without working on enteric emissions. It’s important to play the long game.”

– Food company

“We need to care about enteric emissions to be relevant and competitive in the future. There will still be barriers in five years most likely, but I hope that progress has been made too.”

– Retailer



//
I'm not as well versed on the specific feed additives available, but would love more education."

- Retailer

//
I'm trying to get more education on these products. I'd like to see research and make sure science is not discarded in the process. The carbon side needs to be explained and there needs to be an expectation of no harm to the animals and production or feed efficiency benefit."

- Food company

//
I have not seen any one supplier be able to prove the emissions reduced from cows, and thus we haven't changed purchasing volume from or toward any certain supplier. I'm happy to hear there is research in this space and there are more things coming."

- Food company

Recommendations for stakeholder action

Private and public stakeholders who would like to see the deployment of enteric emissions solutions succeed can address the identified gaps to producer adoption by strategically allocating resources and funding. The two most valuable opportunities for innovation that were identified by this research are the development of solutions with improved productivity impact, and the development of solutions that will work in grazing operations. We encourage stakeholders to bear these two opportunities in mind within the broader push to expand and improve the set of solutions available to producers.

It is a long journey from scientific research to on-farm use and addressing gaps to producer adoption will require engagement at critical points along that entire pathway. At EDF, we think about the innovation timeline as anchored by four sequential stages. At each of these stages, stakeholders can provide targeted support, and taken together, these interventions will be critical to realizing safe, effective, usable and affordable solutions that reach them in a timely manner.



1 Support Research:

Provide researchers the funding they need to make breakthroughs in enteric science and innovation and develop initial prototypes

2 Support Development:

Accelerate the translation of early-stage research and design prototypes into commercial products or processes, with an emphasis on encouraging the development of a full suite of safe, effective and widely applicable enteric solutions

3 Support Demonstration:

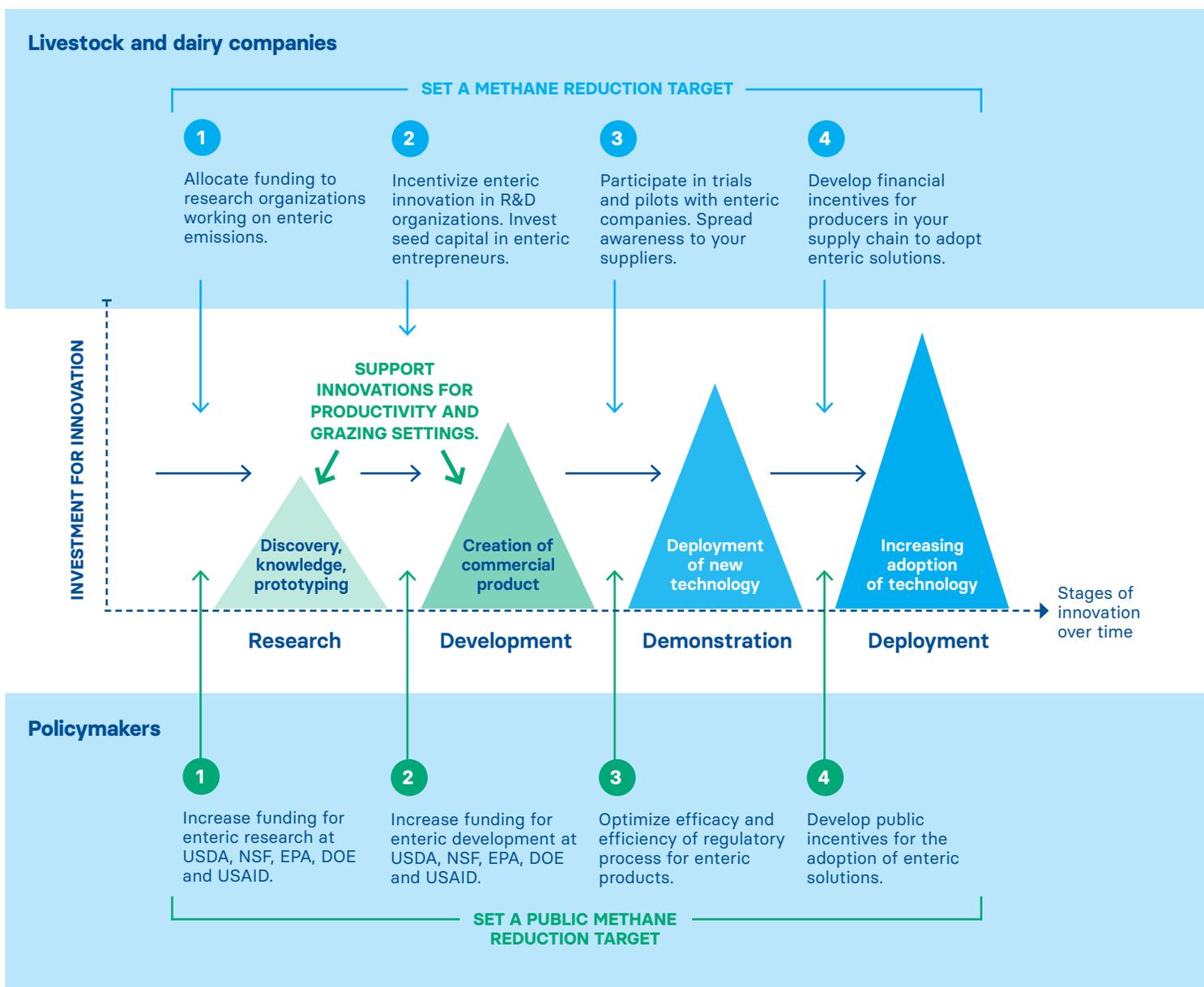
Establish a sufficiently supportive foundation to enable initial use and follow-on momentum by demonstrating the safety and viability of enteric solutions via pilots, trials, regulatory testing, etc.

4 Support Deployment:

Construct the necessary education, outreach, and financial and operational incentives demanded by the market to drive widespread adoption of enteric solutions by producers

EDF believes that two stakeholder groups in particular are positioned to have the greatest potential for impact: In the private sector, this is downstream companies, and in the public sector, policymakers. The recommendations below provide guidance on allocating funding and resources for these two stakeholder groups respectively.

Recommended actions to help maximize producer adoption of enteric solutions



For livestock and dairy companies

For co-ops, packers, wholesalers, food and food service companies, or retailers, reducing enteric methane emissions in the supply chain can be one of the most impactful ways in which to make progress towards an organization's climate goals. Here are some ways in which one's company can address the needs of producers in the supply chain in order to maximize widespread adoption of enteric solutions.

1 Support research

Issue calls for public funding to accelerate foundational research on enteric emissions reduction. Basic research that can be shared industry-wide could prove instrumental in addressing high-value opportunities like productivity impact and grazing applicability for the greater benefit of dairy and beef industries. While foundational research may be most efficiently funded by public actors, there are opportunities for companies to directly fund research, should budgets allow. One example of a research organization that receives private funding is the Greener Cattle Initiative.

2 Support development

Consider allocating seed capital from the venture arm of your organization to promising entrepreneurs who are developing enteric solutions, where opportunities align with your company's investment criteria. The financial return that these companies may offer to the dairy and beef industries in a market that is increasingly valuing environmental impact may make them especially attractive for your portfolio.

In addition to allocating capital externally, prioritize innovation within your own company by incentivizing and elevating new and exciting ideas that address enteric methane. In doing so, engage the R&D and Innovation arms of your organization to be aware of, and empowered by, the enteric methane opportunity.

3 Support demonstration

Invest in commercial partnerships with companies that have developed a product and are conducting trials and pilots. These companies often need well-

resourced commercial partners to help validate their solutions on a large scale to prove and optimize their product for on-the-ground use.

At the same time, use this as an opportunity to build awareness of the need for enteric emissions reduction among producers in your supply chain. Fewer than ~30% of producers surveyed believe it is important to reduce enteric methane emissions. To address this awareness gap, build producer motivation and buy-in by sharing with them that they collectively have one of the most significant opportunities of all stakeholder groups to have a positive impact on our climate and combat planetary warming. Building awareness of this opportunity into supplier engagement programming will be important for supplier behavior change, laying the foundation for deployment in your supply chain.

Producers could also benefit from operationally focused education that highlights the workflow and health and safety impacts of recommended solutions. In this later phase, consider engaging nutritionists and veterinarians, as these stakeholders make feed recommendations on farms and ranches.

4 Support deployment

Explore how you might incentivize the use of enteric solutions in your supply chain. Producers are unlikely to adopt a product simply because it reduces enteric methane emissions; when surveyed, fewer than ~20% of producers agreed that a 30% reduction in enteric methane emissions would be an important incentive. In light of this, producers will need stakeholders like downstream companies to make adopting these solutions financially feasible for them, through mechanisms such as a price premium for a lower methane product.

Finally, to support these objectives all along the innovation timeline, consider setting a methane emissions reduction goal as a discrete part of the overall GHG reduction plan. Doing so can help to unlock funding in your company for enteric emissions reduction objectives. A goal that provides a clear, specific metric to work toward will help hold business leaders accountable in achieving supply chain deployment results and prime the pump for allocations of funding. If you are interested in learning more about the goal-setting process, please use [EDF as a resource](#).

For policymakers

Here are some ways to address the needs of dairy and beef producers in order to maximize the chances of widespread adoption of enteric solutions:

1

2

Support research and development

Increase public investment in R&D for agricultural methane solutions, and enteric methane solutions in particular. The federal government currently funds a wide variety of R&D for agricultural issues ranging from nutrition to food safety and sustainability. However, ongoing EDF analysis has found that research focused on reducing emissions of agricultural methane is significantly underfunded, both in comparison to other categories of climate-smart agricultural solutions, as well as in comparison to the significance of these emissions for reducing the rate of near-term warming.

Public investment is a critical component for making progress on enteric methane reduction technologies and products. For one, private capital tends to undervalue products that provide a public good in the form of reduced climate impact, meaning that the private sector is unlikely to invest in this research at the level that is warranted by its potential public benefits. In addition, public resources could play a uniquely helpful role in supporting basic scientific research that could help the industry at large.

Some research questions (such as improving the applicability of solutions for grazing systems), while important to the industry, may not be commercially applicable or proprietary enough to attract private investment. And finally, to maximize access to enteric methane emission reduction solutions for all producers, and especially low-income or small-holder farmers, having some industry learnings accessible outside of intellectual property could help keep prices low enough for more universal adoption, especially outside of the U.S.

Several government agencies have the potential to contribute to accelerating innovation on enteric methane innovation. Most notable among these is the U.S. Department of Agriculture, which is the largest source of federal agricultural R&D. While

several USDA offices currently engage in R&D activities related to climate mitigation and adaptation, addressing climate change is not currently listed among the statutory priorities for these offices. Policymakers could address this gap by making climate mitigation and adaptation an explicit goal of all of USDA's R&D programs and by encouraging USDA to dedicate a portion of funding toward innovation in enteric methane solutions.

Additional agencies and programs with potential to contribute to advancing enteric methane innovation include the National Science Foundation, the Environmental Protection Agency, the Advanced Research Projects Agency - Energy program within the Department of Energy, and the U.S. Agency for International Development.

3

Support demonstration

Policymakers can evaluate the barriers to innovation more broadly, including the regulatory process. In the U.S., products that make methane-inhibiting claims must be reviewed and approved by the Food and Drug Administration as new animal drugs. Industry participants estimate that the new drug approval process can take five to 10 years and cost an average of \$30 million. It is vital to uphold robust human and animal health safeguards incorporated into FDA approval, but it may be possible to reduce the time and cost burdens through capacity or process changes at the Center for Veterinary Medicine.

Additionally, new or revised approval pathways that streamline applications, standardize submissions or prioritize promising products may also reduce cost and time, in turn spurring innovation. For example, the European Union provides an expedited regulatory approval process for products that may have a significantly positive environmental benefit. Exploring opportunities to expand or fine-tune regulatory options in the United States can help to better achieve the parallel goals of ensuring product safety and efficiently bringing solutions to market that can have a significant impact on our climate today.

4 Support deployment

Policymakers should develop public incentives for the adoption of enteric methane solutions. One relevant reference point for a type of incentivizing mechanism exists today in California. There, dairy farmers are incentivized to mitigate manure methane emissions by selling credits through California's Cap-and-Trade and Low Carbon Fuel Standard programs. The environmental and social outcomes of these specific programs are still under consideration given that they are relatively new. But generally speaking, a credit-based approach could be adapted for enteric methane reduction.

There are several other incentivization models with which a policymaker could incorporate

enteric emissions objectives. For example, direct subsidization to farmers is an established practice in the dairy and beef industries. Policymakers could explore opportunities to connect that practice to the newly prominent imperative to reduce enteric methane solutions for the health and longevity of the dairy and beef industries.

Finally, to support these objectives all along the innovation timeline, consider ways to galvanize private action and investment to supplement public funding. One way in which policymakers can do this is by setting public enteric emissions reduction goals, thus sending a demand signal to the market that investment in enteric mitigation is a high-growth opportunity and more attractive than ever.



Conclusion

The enteric emissions mitigation opportunity is one that the dairy and beef industries cannot afford to miss. Mitigation solutions in the form of feed additives and animal drugs are on their way to market and interested stakeholders should do what they can to make sure that producers are ready and willing to adopt them. But market research shows that dairy and beef producers are often unaware of the opportunity they have to positively impact the climate and are in need of incentivization. EDF hopes that stakeholders will reference the recommendations in this report as they work to meet the needs of dairy and beef producers for the benefit of the dairy industry, the beef industry and our climate.

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