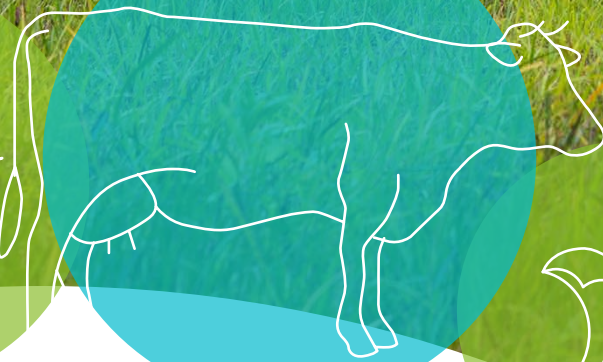
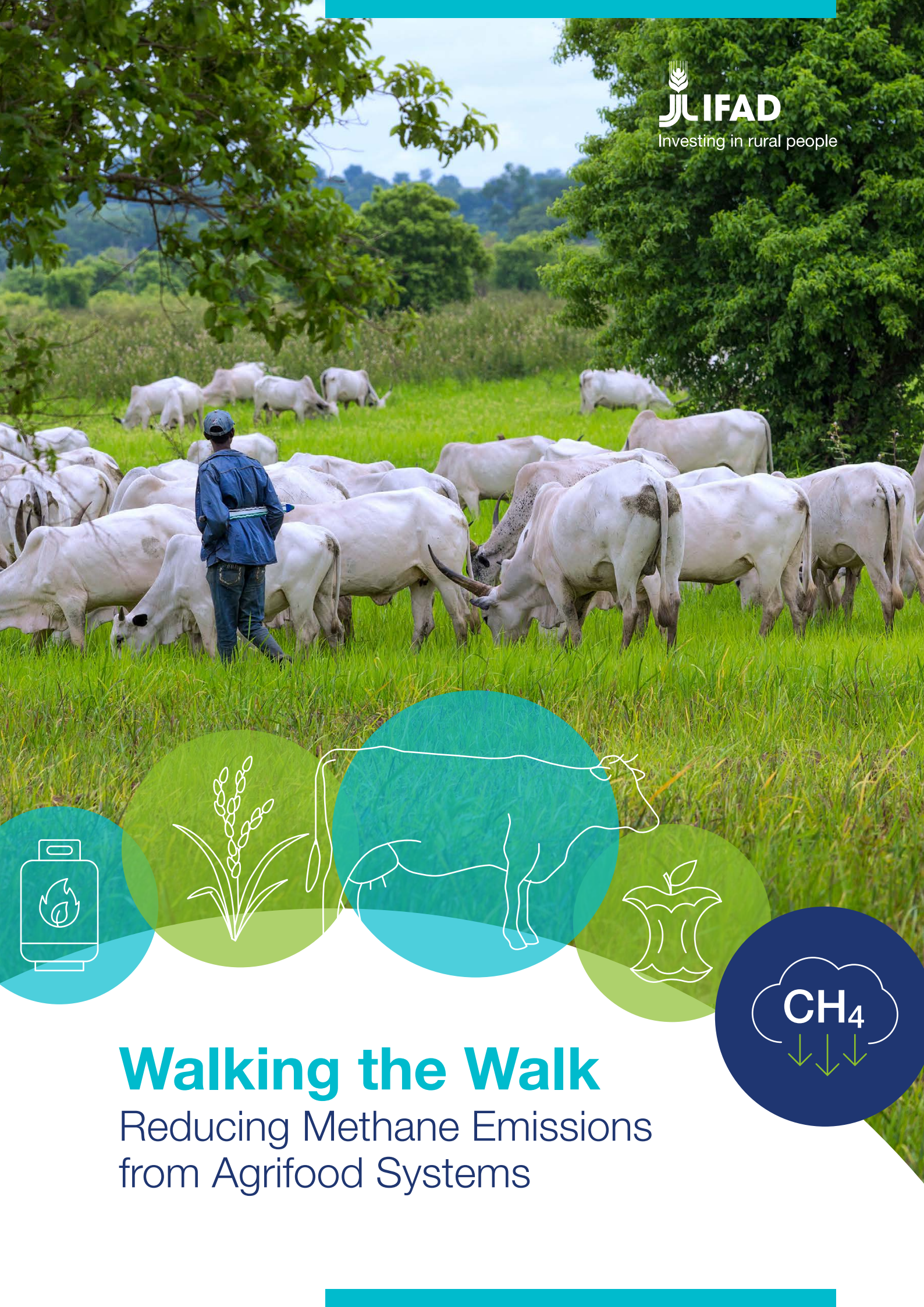




IFAD

Investing in rural people



Walking the Walk

Reducing Methane Emissions
from Agrifood Systems

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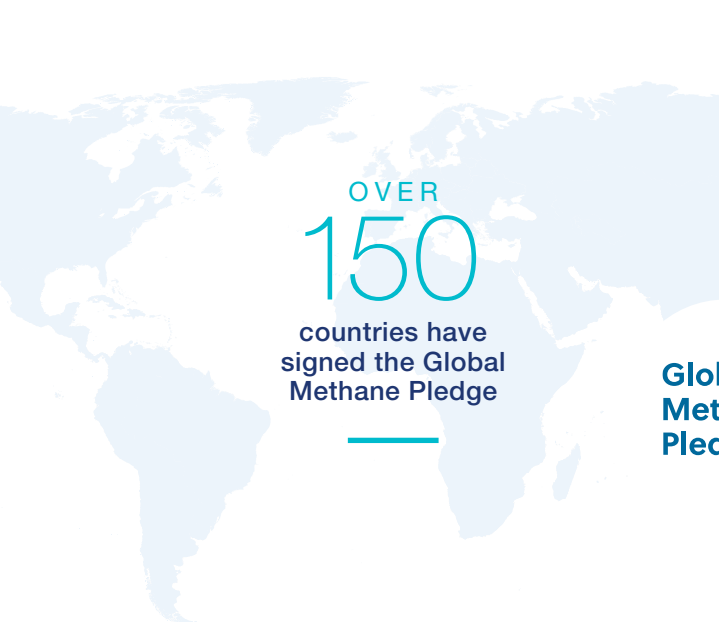
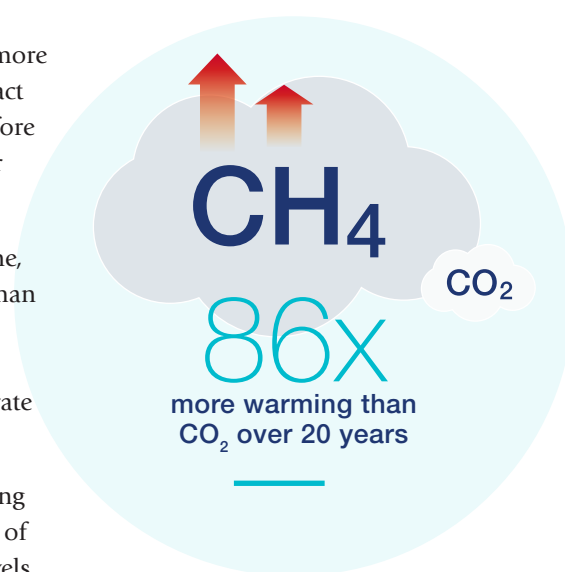
Walking the Walk: Reducing Methane Emissions from Agrifood Systems

Why is cutting methane essential for rapid climate action?

Methane (CH₄), a potent greenhouse gas, causes 86 times more warming than carbon dioxide (CO₂) over 20 years. Its impact is short-lived yet rapid. Reducing methane emissions therefore offers immediate benefits, making it a powerful strategy for limiting global warming to 1.5°C.¹

Methane contributes to the formation of ground-level ozone, a significant air pollutant with detrimental impacts on human health and crop productivity. This means that reducing methane emissions can also improve air quality, boost agricultural productivity, enhance food security and accelerate economic growth.

Acknowledging this, over 150 countries are now participating in the Global Methane Pledge, with the collective objective of reducing methane emissions by 30 per cent below 2020 levels by 2030. If successfully, this initiative would reduce warming by at least 0.2°C by 2050.



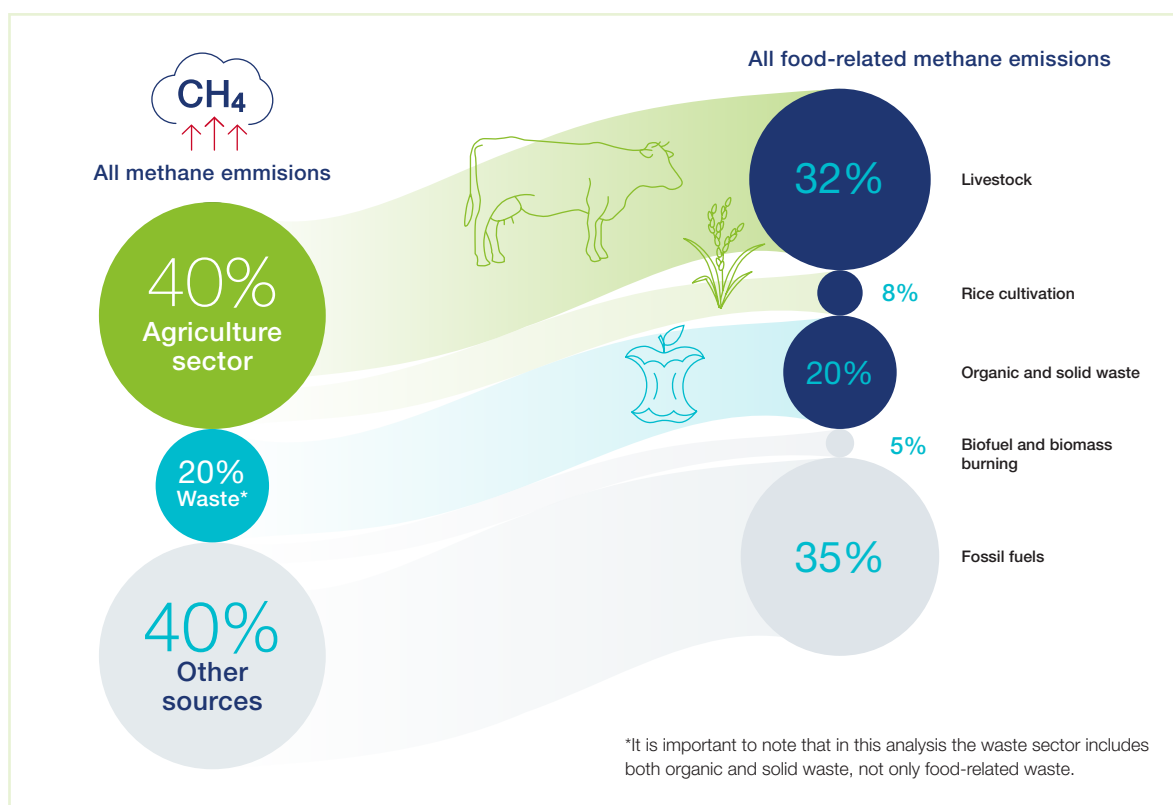
Global
Methane
Pledge



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¹ United Nations Environment Programme and Climate and Clean Air Coalition. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi: United Nations Environment Programme.

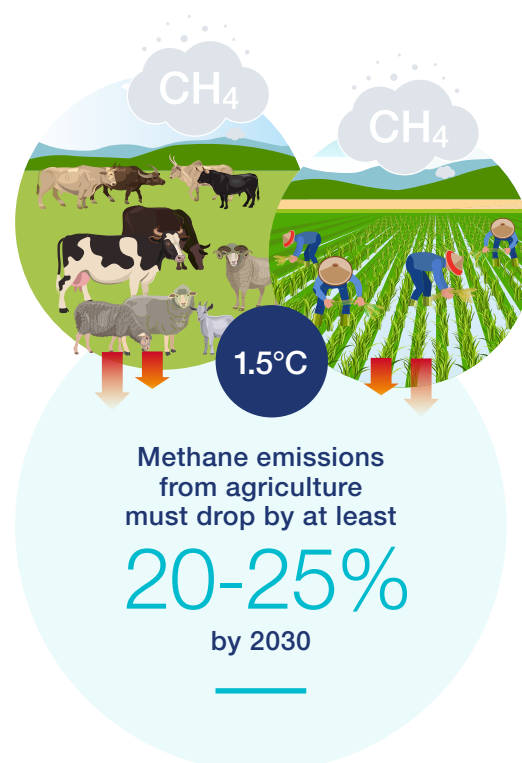
The challenge



The Global Methane Assessment (2021)² shows that approximately 40 per cent of human-caused methane emissions come from the agriculture sector, mainly from livestock (32 per cent) and rice cultivation (8 per cent), while 20 per cent come from the waste sector.

To meet the 1.5°C target set by the Intergovernmental Panel on Climate Change by the end of the century, methane emissions from agriculture must drop by at least 20-25 per cent by 2030 and 40 per cent by 2050. Rapid cuts could prevent 26 million tons of crop losses annually,³ promoting sustainable, resilient food systems.

Numerous well-understood strategies exist to reduce methane emissions from agriculture. These measures have the potential to decrease emissions intensity, meanwhile improving farmer incomes and boosting food production. For example, increasing livestock productivity and cutting food waste have shown to enhance food security and accelerate economic growth, while improved waste management delivers health and air quality benefits.



² United Nations Environment Programme and Climate and Clean Air Coalition. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi: United Nations Environment Programme.

³ Global Methane Pledge. 2023. *Key messages on Methane for COP28*. GMP. <https://www.globalmethanepledge.org/sites/default/files/documents/2023-11/GMP%20key%20messages%20on%20methane%20at%20COP28%20-%20final%20for%20website.pdf>

Coordinating efforts to tackle methane emissions in agrifood systems

At COP28 in Dubai in 2023, 10 organizations came together to form the Reducing Agrifood Systems Methane Emissions Informal Coordination Group. Members include the UNEP-convened Climate and Clean Air Coalition (CCAC), the Food and Agriculture Organization (FAO), the German Agency for International Cooperation (GIZ), the Global Methane Hub (GMH), the International Fund for Agricultural Development (IFAD), the NDC Partnership, The Nature Conservancy (TNC), the United States Agency for International Development (USAID), the World Bank and the World Biogas Association (WBA). The goal of the group is to share knowledge and collaborate on global agricultural methane reduction efforts.

THE KEY OBJECTIVES OF THE GROUP INCLUDE:



Our group documents each organization's activities, by country and programme, to boost collaboration and maximize impact on agricultural methane reduction. This publication showcases some of our solutions, successes and lessons, ahead of COP29, for action.

The examples in this publication show that we are not just talking the talk anymore – we are walking the walk. By working together, we are making significant strides in the fight to reduce methane emissions. With the establishment of this group, even more progress is on the horizon.

Scaling up these efforts, however, requires targeted financing to accelerate innovation, adoption and amplification of these initiatives.

Case studies and solutions: a snapshot



LIVESTOCK

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Livestock

In agrifood systems, the majority of methane emissions come from the livestock sector, primarily driven by inefficient production practices such as insufficient feeding, using low-digestibility forages, failing to control herd diseases and poor reproductive performance. Approximately 32 per cent of anthropogenic methane emissions originate from manure management and enteric fermentation,⁴ a natural digestive process in ruminant animals such as cattle, sheep, goats and buffalo. To mitigate these emissions, best practices include improving animal health and husbandry through feed modifications, supplements and selective breeding to enhance productivity and fertility. Additionally, effective manure management – such as treatment in biogas digesters, reducing storage time, improving storage coverings, upgrading housing systems and bedding, and manure acidification – can further reduce methane emissions.⁵

32%

of anthropogenic methane emissions originate from manure management and enteric fermentation

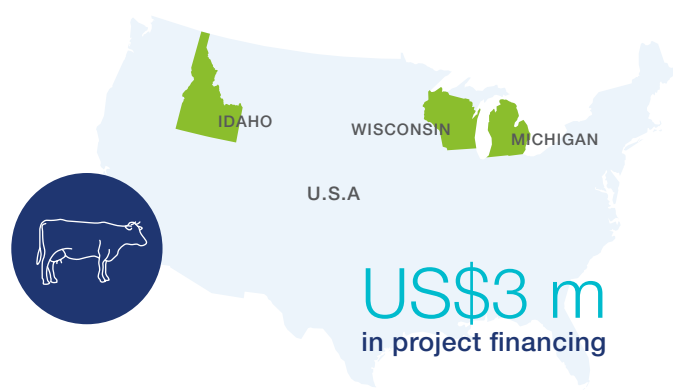


⁴ United Nations Environment Programme and Climate and Clean Air Coalition. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi: United Nations Environment Programme.

⁵ Ibid.

CASE STUDY

Tackling methane emissions in the United States dairy sector



PROJECT TITLE	Dairy Feed in Focus Program: Economic and Environmental Benefits for US Dairy Farms of All Sizes
IMPLEMENTER	The Nature Conservancy
COUNTRY	United States of America
PROJECT AREA	US – Idaho, Michigan, Wisconsin
TARGET GROUP	Dairy farmers and other dairy supply chain stakeholders
IMPLEMENTATION PERIOD	2022-2026 (5 years)
PARTNERS	This effort is led by The Nature Conservancy in support of U.S. Dairy's Net Zero Initiative, partnering with Dairy Management Inc.
PROJECT FINANCING	Total project amount: US\$3 million from public and private sources (e.g. National Fish and Wildlife Foundation, General Mills, Nestlé, Dairy Management Inc.

Improved farming practices for the dairy sector have reduced the amount of water and land required to produce a single gallon of milk.⁶ However, most of the sector's greenhouse gas (GHG) emissions come from methane from cow burps and manure. Growing specialized crops for cow feed has been a targeted solution to this issue, but the situation is clear: even if fewer farms produce more milk, they must still focus on reducing methane emissions to help combat climate change.

TNC is addressing dairy methane with its **Dairy Feed in Focus (FiF)** programme. The programme aims to pilot, replicate and scale up the adoption of best management practices (BMPs) in feed/forage production and feed efficiency to drive environmental and economic benefits for dairy farms of all sizes. For the first time, TNC is **incentivizing the use of commercially available, FDA-approved or GRAS (Generally Recognized as Safe) status feed additives** as a BMP. By also focusing specifically on dairy feed grown by the dairy farmer, alongside improved practices such as grazing management, TNC aims for significant reductions in GHG emissions by 2030.

⁶ Capper, J. and Cady, R. 2020. The effects of improved performance in the U.S. dairy cattle industry on environmental impacts between 2007 and 2017. *Journal of Animal Science* 98(1):skz291. <https://doi.org/10.1093/jas/skz291>

This initiative involves on-farm testing of feed strategies, targeted agronomic guidance from experts and continuous stakeholder engagement. Currently, over 40 dairy farmers are enrolled in FiF across Idaho, Michigan and Wisconsin in the United States. These farms represent almost 20,000 acres of direct impact through their practice implementation. Farmers in the programme have chosen from a variety of BMPs, including cover crops, reduced till, nutrient stewardship, edge-of-field buffers, feed additives and more. The FiF programme provides data tracking, non-prescriptive technical support, monitoring, reporting and verification, and incentive payments for participating farmers who adopt conservation practices. By trialling these innovative feed products in tandem with BMPs, the data needed to convince cautious stakeholders will be provided, while guiding them towards sustainable choices.

Scaling up and impacts



IMPACTS AT A GLANCE

- 40 dairy farmers enrolled in the programme and 20,000 acres of direct impact through their implementation
- It demonstrates sustainable dairy farming can increase production without raising emissions
- TNC's global initiative expands to multiple continents, using bottom-up approaches to meet industry methane reduction goals

The FiF programme, which has a **direct reduction potential on methane emissions of around 15 per cent**, will advance the United States dairy industry by ensuring scientific accuracy, fostering innovation, boosting investment and supporting farmers. It represents a shift towards more sustainable dairy farming, where increased production does not mean increased emissions, and a greener future. TNC's larger initiative aims to cut methane emissions globally, including new projects in the United States, Latin America, Asia and Africa, drawing on lessons from past successes such as the FiF programme. Globally, a bottom-up approach to meeting value chain goals and industry commitments to reduce methane emissions will be crucial.



CASE STUDY

Enabling climate ambition and action in Costa Rica

US\$847,136
in project financing

COSTA RICA



©FAO/Max Valencia

PROJECT TITLE	Creating an enabling environment for enhanced climate ambition and action through institutional capacity-building
IMPLEMENTER	Food and Agriculture Organization
COUNTRY	Costa Rica
PROJECT AREA (CASE STUDY)	Costa Rica
TARGET GROUP	Government institutions and livestock stakeholders
IMPLEMENTATION PERIOD	2021-2023
PARTNERS	Climate and Clean Air Coalition
PROJECT FINANCING	US\$847,136 (budget allocated to both regional and national activities)

In the heart of Central America, where lush landscapes meet rich biodiversity, Costa Rica's agriculture sector plays a pivotal role in the nation's economy. Agriculture contributes 4 per cent to the country's gross domestic product (GDP), with livestock farming, particularly cattle, generating 16.5 per cent (around US\$1.13 million) of this output.⁷ However, livestock farming significantly impacts the environment. Methane from enteric fermentation accounts for 62.3 per cent of the total emissions of the agriculture, forestry and other land use sector, which itself accounts for 20.5 per cent of the country's total GHG emissions.⁸

To address this, Costa Rica launched the **National Low Carbon Livestock Strategy and Livestock Nationally Appropriate Mitigation Actions** (Livestock NAMA). Supported by a Measurement, Reporting and Verification (MRV) system established in 2019, these initiatives monitor GHG emissions and carbon sequestration, guiding investments and enhancing rural community well-being.

⁷ Secretaría Ejecutiva de Planificación Sectorial Agropecuaria (SEPSA). 2023. *Indicadores Macroeconómicos 2019-2023 (actualización con base en información suministrada por el Banco Central de Costa Rica, abril 2023)*. San José: SEPSA, 8, 20.

⁸ *Costa Rica 2021: Inventario Nacional de gases de efecto invernadero y absorción de carbono 1990-2017*. First edition.

Scaling up and impacts



IMPACTS AT A GLANCE

- 2,700 Costa Rican farms adopted Livestock NAMA in 2023, with 356 providing MRV data
- FAO evaluation reviewed the GHG monitoring system, focusing on methane emissions
- Ministry of Agriculture and Livestock implemented recommendations on data quality, training and farmer incentives

In 2023, 2,700 of the 27,000 livestock farms in Costa Rica adopted the Livestock NAMA model, with 356 farms contributing data to the MRV system. The project, supported by FAO, provided an overview of the status of the MRV system for GHG emissions from livestock, with a focus on methane. The evaluation aimed to identify areas for improvement, including data standardization, quality control, improved capacity-building for institutions and the creation of incentive systems to reward farmers who achieve significant emissions reductions. Costa Rica's Ministry of Agriculture and Livestock implemented the key recommendations from this evaluation, including: (i) developing a mandatory manual of procedures on methodologies for data collection and handling; (ii) implementing quality control of the procedures, software and database based on ISO 9001; (iii) establishing an internal and external audit of the MRV system; (iv) increasing the capacity of the national team on livestock activity data collection, handling and estimation of GHG emissions; and (v) providing incentives to livestock farmers involved in the MRV system.⁹ The project highlights how national institutions can drive change, enhance MRV systems and incentivize sustainable practices. By 2026, Costa Rica plans to involve 3,332 farms in Livestock NAMA, with 600 reporting to the MRV system, demonstrating that economic growth and environmental stewardship can go hand in hand.



⁹ FAO. 2024. *Revisión del sistema de medición, notificación y verificación: Apoyar las medidas de mitigación apropiadas para la ganadería en Costa Rica. Resumen técnico*. Rome: FAO. <https://doi.org/10.4060/cd0958es>

CASE STUDY

Sustaining livelihoods, reducing emissions: Dairy and climate in East Africa

US\$348 m
in project financing

UGANDA
KENYA
RWANDA
UNITED REPUBLIC
OF TANZANIA



PROJECT TITLE	Dairy Intervention for Mitigation and Adaptation (DaIMA) supported by the Reducing Agricultural Methane Programme (RAMP)
IMPLEMENTER	International Fund for Agricultural Development
COUNTRIES	Kenya, Rwanda, Uganda and United Republic of Tanzania
TARGET GROUP	590,000 dairy households and value chain actors vulnerable to climate change (110,200 in Kenya, 168,800 in Rwanda, 135,000 in Uganda and 176,200 in the United Republic of Tanzania)
IMPLEMENTATION PERIOD	2023-2025
PARTNERS	Global Methane Hub, US State Department, Green Climate Fund, Food and Agriculture Organization, Global Dairy Platform and United States Agency for International Development
PROJECT FINANCING	US\$348.35 million (total financing GCF and co-finance)

In East Africa, the dairy sector is a lifeline. For millions of smallholders and pastoralists, especially women, dairy farming brings in vital income and nourishes families, playing a crucial role in food security by providing essential proteins and nutrients through milk production.

Climate change, however, makes it increasingly difficult for small-scale dairy farmers to sustain their livelihoods. Frequent droughts are parching the lands, while livestock contributes to GHG emissions, further exacerbating environmental issues.

In response to these challenges, IFAD, through its flagship methane mitigation programme, the **Reducing Agricultural Methane Programme (RAMP)**, funded by GMH and the US State Department, is supporting the development of a regional programme, the **Dairy Intervention for Mitigation and Adaptation (DaIMA)**, in collaboration with GCF and with support from FAO, the Global Dairy Platform and USAID.

This initiative spans four countries: Kenya, Rwanda, Uganda and the United Republic of Tanzania. Its mission is to equip dairy producers with the tools and technologies to adapt to climate change while reducing GHG emissions, particularly methane. By financing sustainable practices, DaIMA aims to boost productivity, invest in green value chain operations, and foster innovative waste and energy solutions. The end goal is to deliver high-quality nutritional products to consumers across the region.

Scaling up and impacts

This initiative aims to increase production across the four targeted countries while reducing emission intensity¹⁰ from dairy farming. This will contribute to growth in agricultural GDP and enhance climate resilience in the region.



IMPACTS AT A GLANCE

- The initiative will increase milk production of the targeted dairy farms by 34 per cent and decrease milk emissions intensity by 29 per cent
- Methane emissions are expected to decrease by 12.57 per cent with DaiMA compared to the situation without the project
- A total of 2.7 million dairy cattle will be reached indirectly
- Approximately 178,362 ha of rangelands and natural pastures will be brought under improved management

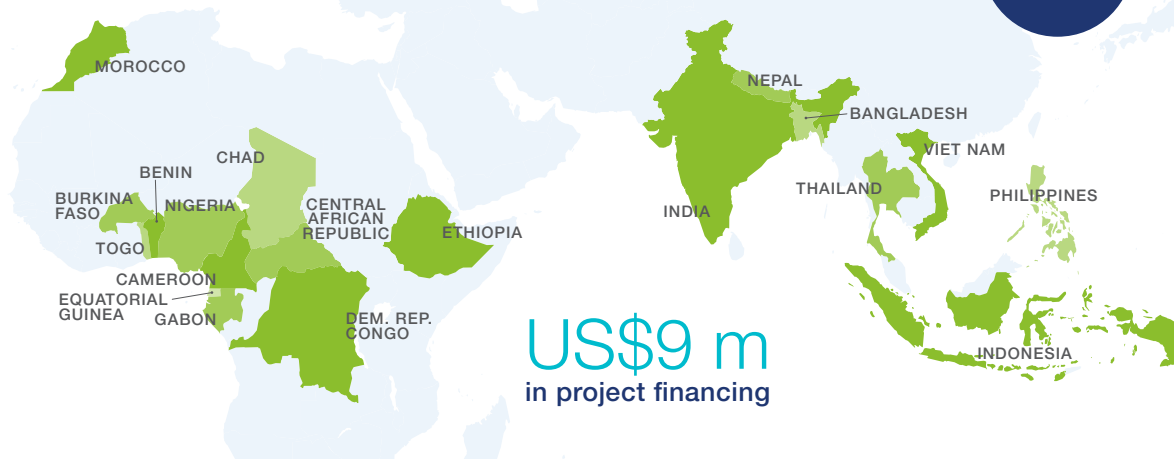


Beyond environmental benefits, DaiMA will deliver significant economic gains. It will create jobs, reduce poverty and attract private investment into the dairy sector. By providing smallholder farmers and local businesses with access to financial services, this regional programme empowers them to transition to low-carbon, climate-resilient practices, which will boost productivity, reduce costs and increase incomes. Climate-smart technologies and capacity-building initiatives will further enhance the resilience and prosperity of smallholder farmers.

¹⁰ Emission intensity refers to emissions produced per unit of product, while total emissions refer to absolute emissions. FAO. 2023. *Pathways towards lower emissions – A global assessment of the greenhouse gas emissions and mitigation options from livestock agri-food systems*. Rome. <https://doi.org/10.4060/cc9029en>

SOLUTION

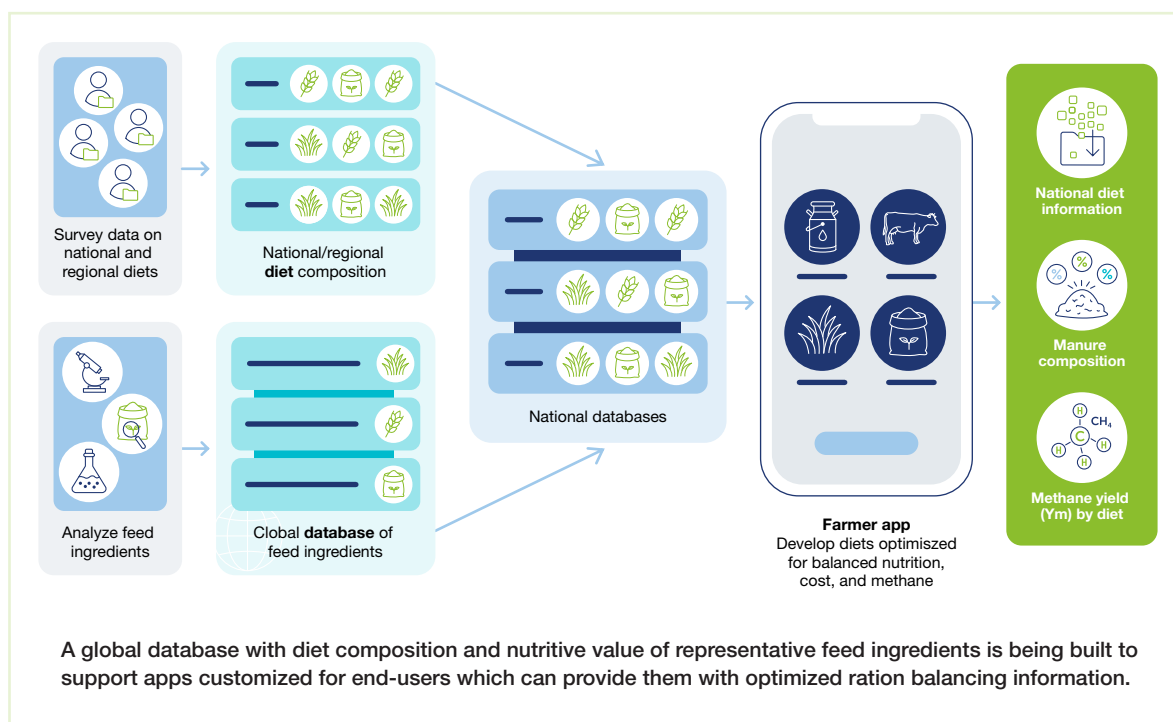
A digital tool for sustainable livestock farming



TOOL	Feed Ration Optimization
IMPLEMENTER	UC Davis
COUNTRIES	Bangladesh, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, Gabon, India, Indonesia, Morocco, Nepal, Nigeria, Philippines, Thailand, Togo and Viet Nam
TARGET GROUP	Smallholder livestock farmers
IMPLEMENTATION PERIOD	2024-2027
PARTNERS	Cornell University (USA), CSIRO (Australia), Digital Green (USA), Haramaya University and Hawassa University (Ethiopia), ILRI (Kenya), BAIF and NDDDB (India), the Institute of Agricultural Research and Development (Cameroon), IPB Bogor University (Indonesia), Khon Kaen University (Thailand), Nong Lam University (Viet Nam), NZAGRC (NZ), the University of Michigan (USA) and the University of the Philippines, Los Banos (Philippines).
PROJECT FINANCING	US\$9 million

Since its launch in 2022, GMH has focused on enhancing methane mitigation through a data-driven approach across the agriculture, waste and energy sectors. The hub is supporting the **Feed Ration Optimization** project, designed to help smallholder livestock farmers in low- and middle-income countries (LMICs) – which emit 80 per cent of global agricultural methane¹¹ – to improve feed quality and reduce methane emissions. This project addresses the challenges in diet quality and feed conversion that are prevalent in LMICs. The project involves data collection, tool design and testing, digital platform development and outreach to support adoption.

¹¹ FAO. 2023. *Reducing methane emissions in livestock systems in Asia and the Pacific – Enhancing national climate actions through the Global Methane Pledge*. Workshop report. Bangkok, Thailand, 24–26 October 2022. FAO Animal Production and Health Reports, No. 19. Rome. <https://doi.org/10.4060/cc6388en>



Farmers across 16 countries will soon use a mobile app to guide them in formulating high-quality livestock feed. This tool targets regions with over 300 million dairy cattle and buffaloes, primarily in India. The project is in its initial phase and is fully funded by the GMH. The initiative is being constructed as a platform for further expansion to new geographies, and partnerships are being developed in Morocco, Nepal and Bangladesh.





Biogas

SOLUTION

Making biogas adoption happen

US\$400,000
in project financing

Programme title	Making Biogas Happen
IMPLEMENTER	World Biogas Association
DESCRIPTION	In January 2024, the World Biogas Association launched the #MakingBiogasHappen programme to boost anaerobic digestion for converting organic waste into biogas and biofertilizer and capturing greenhouse gases such as methane. Two key projects are under way: the Global Biogas Regulatory Framework and the International Anaerobic Digestion Certification Scheme (ADCS International).
COUNTRY	Global
TARGET GROUP	Policymakers looking to develop or create their country's biogas industry
IMPLEMENTATION PERIOD	January-November 2024
PARTNERS	Global Methane Hub, TotalEnergies, GHD
PROJECT FINANCING	US\$400,000

Waste management systems have not changed for millennia – it is either burnt or buried. Each year, **humans produce over 105 billion tons of organic waste, 98 per cent of which is not recycled**, releasing harmful methane and other GHGs into the atmosphere. As the world grapples with climate change, minimizing, capturing and utilizing this waste has become essential to meeting the Global Methane Pledge.

Anaerobic digestion (AD) emerges as a key technology, preventing methane emissions and converting waste into biogas, biofertilizers and bio- CO_2 . If fully utilized, AD could meet half of the Global Methane Pledge's targets, cutting emissions by 11 per cent by 2030 and preventing nearly 0.1 °C of warming by 2050.¹² However, AD faces challenges such as a lack of consistent policies, standardized regulations and safety standards, leading to inconsistent waste utilization, delays in project development and operational issues, including fugitive emissions.

To address these challenges, the **Global Biogas Regulatory Framework**, developed by the WBA, will create a standardized template covering renewable energy, waste management and environmental standards. The framework will be implemented in two phases. Phase 1 focuses on template development using global best practices, while Phase 2 adapts and implements the framework in specific countries. Concurrently, the International Anaerobic Digestion Certification Scheme (ADCS International) will establish minimum best practices for AD plant management, including biomethane injection and methane monitoring, ensuring safe and efficient operations.

Scaling up and impacts



IMPACTS AT A GLANCE

- Streamline approvals and enhance standards for biogas plants
- Make organic waste recycling more cost-effective and sustainable
- Framework and certification scheme to align biogas with key development goals

The projects will significantly support and positively impact the biogas industry by providing guidance to streamline AD plant approvals, enhancing safety and environmental standards, and promoting best practices. They aim to demonstrate how organic waste recycling can become cost-effective and sustainable, benefiting public health and climate action. Countries will gain access to a best practice framework and certification scheme, learn from other countries on implementation and maintenance – all essential for aligning biogas development with economic, environmental and social goals. Through collaboration, the WBA will support the achievement of these objectives and meeting the Global Methane Pledge.



¹² World Biogas Association. 2019. *Global Potential of Biogas*. London: WBA.



The waste sector
accounts for
20%
of human-caused
methane emissions

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Food loss and waste

Each year, while 735 million people face hunger,¹³ 1.3 billion tons of food – over a third of global production – is lost or wasted. **The waste sector alone accounts for 20 per cent of human-caused methane emissions.**¹⁴ Tackling food loss and waste is crucial for meeting the Paris Agreement's targets and limiting global warming to 1.5°C.

CASE STUDY

Accelerating the fight against food loss and waste in the United Republic of Tanzania

US\$14 m
in project financing

UNITED REPUBLIC
OF TANZANIA



©USAID

¹³ FAO, IFAD, UNICEF, WFP and WHO. 2024. In: *Brief to The State of Food Security and Nutrition in the World 2024 – Financing to end hunger, food insecurity and malnutrition in all its forms*. Rome: Food and Agriculture Organization of the United Nations. <https://doi.org/10.4060/cd1276en>

¹⁴ UNEP and CCAC. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi: United Nations Environment Programme.

PROGRAMME TITLE	Food Loss and Waste Accelerator ¹⁵
IMPLEMENTER	United States Agency for International Development (USAID)
COUNTRIES	Kenya, Nepal, Nigeria and United Republic of Tanzania
PROJECT AREA (CASE STUDY)	United Republic of Tanzania
TARGET GROUP	Private sector to accelerate work towards reducing and/or managing food loss and waste
IMPLEMENTATION PERIOD	2023-2025
PARTNERS	USAID is partnering with two ecological companies: Chanzi ¹⁶ and Okota ¹⁷
PROJECT FINANCING	Total FLW Accelerator programme funds: US\$14 million

In United Republic of Tanzania, daily waste production exceeds 17,000 tons, with Dar es Salaam's output projected to increase from 4,200 tons in 2017 to 12,000 tons by 2025. Of this, 10,000 tons are organic food scraps, which not only overwhelm landfills but also produce harmful GHGs, including methane, as they decompose. Despite the 2004 Environmental Management Act's requirements for waste management, waste segregation is nearly non-existent, leading to increased pollution and climate impacts. In response, **USAID's Feed the Future Food Loss and Waste Accelerator** has partnered with Chanzi, an eco-agricultural company, to implement a circular bioeconomy approach for managing food waste.

Founded in 2019, Chanzi operates in Arusha, Dar es Salaam, Zanzibar and Nairobi, using **Black Soldier Fly larvae** to convert organic waste into high-protein animal feed and organic fertilizer. This approach reduces waste and provides a sustainable protein alternative to traditional animal feeds. Chanzi processes over 14 tons of organic food waste daily from businesses and schools in Arusha, although the reliable availability of organic waste remains a significant challenge, limiting the company's potential for growth across the cities where it operates.

The United Republic of Tanzania produces
10,000
tons of organic food scraps daily which emit harmful GHGs



Scaling up and impacts

Chanzi and Okota Waste Management have partnered to tackle waste issues in Arusha, launching a pilot programme that collects over 4 tons of organic and 21 tons of total waste daily. They plan to expand to 15 wards by 2025, aiming to collect 60 per cent of Arusha's food waste and extend landfill lifespans by up to 100 years. Chanzi's model, now also extended to Kenya's Greater Nairobi, shows its scalability and significant environmental and economic benefits. This circular bioeconomy approach proves the value of investing in food waste reduction for climate action, economic growth and social inclusion. Adopting such innovations could lead to a sustainable, prosperous future for the United Republic of Tanzania and beyond – one Black Soldier Fly at a time.



¹⁵ Market Systems and Partnerships. <https://www.mspgrants.com/flw/>

¹⁶ Chanzi. <https://www.chanzi.co/>

¹⁷ Okota Waste Management. <https://okota.co/>

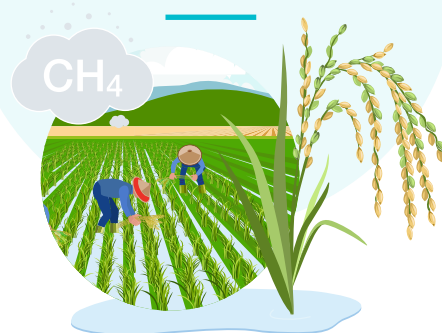


Rice cultivation

Emissions from rice cultivation, accounting for 8 per cent of global methane emissions,¹⁸ represent a significant yet underfunded opportunity for climate mitigation. Despite the proven feasibility of large-scale mitigation projects, less than 1 per cent of global methane abatement funding is directed towards rice agriculture,¹⁹ highlighting a substantial financing gap. Methane in rice paddies is produced through anaerobic decomposition, but **switching from continuous flooding to intermittent drainage (alternate wetting and drying) can reduce emissions by 30-70 per cent without affecting yields.**²⁰ Given rice's role as a staple food for half the world's population,²¹ addressing these emissions is crucial, especially as climate change and extreme weather events increasingly threaten global food security.²²

8%

of global methane
emissions are from
rice cultivation



¹⁸ UNEP and CCAC. 2021. *Global Methane Assessment: Benefits and costs of mitigating methane emissions*. Nairobi: United Nations Environment Programme.

¹⁹ Climate Policy Initiative. 2023. *Landscape of Methane Abatement Finance 2023*. <https://www.climatepolicyinitiative.org/publication/landscape-of-methane-abatement-finance-2023/>

²⁰ GHG Mitigation in Rice. <https://ghgmitigation.irri.org/mitigation-technologies/alternate-wetting-and-drying>

²¹ National Geographic Education. Food Staple. <https://education.nationalgeographic.org/resource/food-staple/>

²² <https://www.nytimes.com/interactive/2023/05/20/climate/rice-farming-climate-change.html#:~:text=Rice%20is%20in%20trouble%20as,nights%20warm%2C%20yields%20go%20down>

CASE STUDY

'White gold' for a sustainable future

US\$76 m
in project financing

VIET NAM



RICE CULTIVATION

©Tran Thi Hoa/
World Bank

PROJECT TITLE	Viet Nam Agriculture Transformation Project (VnSAT)
IMPLEMENTER	The World Bank Group
COUNTRY	Viet Nam
PROJECT AREA	150,000 ha in the Mekong Delta (MKD)
TARGET GROUP	1 million smallholder rice farmers
IMPLEMENTATION PERIOD	2015-2022
PARTNERS	International Rice Research Institute (IRRI)
PROJECT FINANCING	US\$238 million (World Bank)
PROJECT CO-FINANCING	US\$76 million (Government of Viet Nam)

In Viet Nam, rice is a staple food and a strategic crop for national food security. It is vital to the country's economy and livelihoods, accounting for 30 per cent of its GDP and almost 70 per cent of total employment. About 50 per cent of Viet Nam's rice is produced in the Mekong Delta, involving about 80 per cent of the region's population.

Viet Nam's rice sector made enormous progress in the late 1990s, turning the country from a status of famine into the world's third largest exporter. However, by the early 2000s, despite its importance, the rice sector faced major inefficiencies, declining quality and environmental issues such as water depletion and methane emissions. Smallholder farmers struggled with low incomes, post-harvest losses and stagnant productivity.

Recognizing the need for structural changes, in 2015 the Vietnamese government launched an ambitious long-term national programme to raise the economic value, social benefits and environmental sustainability of the rice sector. Its vision called for major policy repurposing along with institutional and behavioural changes. **The World Bank support through the Vietnam Sustainable Agriculture Transformation Project (VnSAT)** was the foundation for the implementation of this comprehensive and long-term vision.

VnSAT focused on transforming rice farming in Viet Nam by scaling two nationally approved good practices in the Mekong Area: ‘Three Reductions, Three Gains (3R3G)’ and ‘One Must Do, Five Reductions (1M5R)’. Targeting smallholder farmers who traditionally overused seeds, water, fertilizers and pesticides, VnSAT supported about 1 million smallholder farmers in adopting more sustainable and efficient farming methods. Farmers cut the use of harmful synthetic inputs and production costs while boosting yields. Through techniques such as alternate wetting and drying, they also saved water, and reduced post-harvest losses by adopting combined harvest technologies.

Scaling up and impacts

At the project’s conclusion in 2022, the results were transformative. The areas adopting 3R3G and 1M5R practices covered 184,463 hectares and 121,508 hectares, respectively, with significant improvements.



IMPACTS AT A GLANCE

- A 30 per cent average increase in net profits and an 11 per cent decrease in production costs
- A 30-40 per cent reduction in seed costs and a 35 per cent reduction in inorganic fertilizer use
- A 45 per cent reduction in pesticide use across the project area
- A 30 per cent reduction in water pumping
- A 30 per cent decrease in post-harvest losses
- A reduction of about 200,000 tons/year in methane emissions, surpassing the project’s target

VnSAT enhanced smallholder farmers’ livelihoods and advanced Viet Nam’s climate strategies by improving fiscal performance, policymaking and public services.

Building on its success, in 2023, the government launched its **One Million Hectares High Quality and Low-Carbon Rice Program** to scale VnSAT’s impacts across half of the Mekong Delta. VnSAT’s achievements showcase how sustainable practices can transform agriculture, boost food security and elevate ambition, as deployed by the Vietnamese government as a global leader in sustainability.



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The VnSAT project resulted in a reduction of **±200,000** tons of methane emissions per year

CASE STUDY

Climate-smart rice cultivation in Thailand

THAILAND

€118 m
in project financing



RICE CULTIVATION

PROJECT TITLE	GCF Thai Rice: Strengthening Climate-Smart Rice Farming
IMPLEMENTER	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
COUNTRY	Thailand
PROJECT AREA	21 provinces in Thailand
TARGET GROUP	250,000 rice farmers
IMPLEMENTATION PERIOD	2024-2029
PARTNERS	The GCF Thai Rice: Strengthening Climate-Smart Rice Farming project is led by Ebro Foods, Mars Food & Nutrition, Olam Agri and PepsiCo, in collaboration with GIZ. It is implemented by GIZ through the develoPPP programme of the German Federal Ministry for Economic Cooperation and Development (BMZ) and co-financed by the GCF. The project also involves the International Rice Research Institute (IRRI), the Bank for Agriculture and Agricultural Cooperatives, the Rice Department of the Thai Ministry of Agriculture and Cooperatives, and the Office of Natural Resources and Environmental Policy and Planning, to drive a paradigm shift in Thailand's rice sector.
PROJECT FINANCING	Total volume of around €118 million

In Thailand, rice cultivation is vital to the economy and culture, but traditional methods contribute significantly to methane emissions due to continuous flooding of rice paddies. **GIZ's GCF Thai Rice: Strengthening Climate-Smart Rice Farming** project addresses these issues by introducing climate-smart technologies that reduce GHG emissions and help farmers adapt to climate change. The project follows a bottom-up approach, where change begins at the farm level. Farmers are encouraged to adopt new practices and technologies, supported by technical and financial assistance provided by the project.

Central to the project is the “4+1” approach, which includes:

1. **Alternate Wetting and Drying:** This method reduces water consumption by 30 per cent and methane emissions by 30-70 per cent by intermittently draining rice fields.
2. **Site-Specific Nutrient Management:** This strategy optimizes fertilizer use based on local conditions, reducing emissions from nitrous oxide and improving long-term soil health.
3. **Laser Land-Levelling:** Precision technology that levels fields to increase yields and decrease GHG emissions by improving input-use efficiency.
4. **Straw and Stubble Management:** This approach provides alternatives to open burning, which is common in rice farming, thereby reducing air pollution and creating new income opportunities for farmers.
5. **Integrated Pest Management:** An environmentally sensitive approach to pest control that reduces the need for harmful agrochemicals.

The Thai Rice Project is more than just a collection of technologies – it is a movement that involves education, financial support and collaboration across sectors. The climate-smart technologies effectively cut GHG emissions, especially methane, while helping farmers to sustain or boost yields despite climate challenges. The project offers smallholder farmers hands-on training and demonstrations of climate-smart practices through agricultural extension services.

Financially, it includes a climate-smart loan scheme, incentive payments and grants to subprojects. Additionally, it works with agriculture sector leaders to strengthen institutional frameworks and market structures that support sustainable farming. The project also promotes Good Agricultural Practices, including crop rotation, farm-level water management and access to agrometeorological advisory services.

Private sector partners help farmers to meet international market standards, while GIZ ensures success through its technical expertise and networks. The Thai government, including the Ministry of Agriculture and Agricultural Cooperatives and the Ministry of Natural Resources and Environment, supports the project, with additional backing from the Bank for Agriculture and Agricultural Cooperatives and the International Rice Research Institute (IRRI). The project is implemented through an innovative public partnership with Ebro Foods, Mars Food & Nutrition, Olam Agri and PepsiCo.

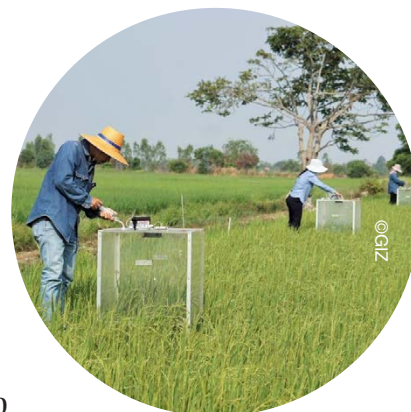


Alternate Wetting
and Drying rice fields
reduces methane
emissions by
30-70%

Scaling up and impacts

This project is not a just a single initiative. It continues building on a broad range of experiences, technical expertise and partnerships developed through various initiatives in the Thai rice sector, which GIZ implemented in cooperation with private and public partners over several years. Achievements from these initiatives include:

- “Thai Rice NAMA” (Nationally Appropriate Mitigation Action) project, which was implemented in cooperation with the Thai Rice Department, has achieved an overall reduction of over **1 million tons of carbon dioxide equivalent (CO₂eq)** (equivalent to approximately 47,000 tons of methane) from the rice sector by directly training **4,600 lead farmers** and reaching **96,000 households**, implementing low-emission practices on over 320,000 hectares.
- The “Market Oriented Smallholder Value Chains” project implemented in partnership with Olam Agri under the develoPPP programme has benefited over **19,000 Thai farmers**, who were able to increase their **income by 20 per cent** on average and could **reduce GHG emissions by more than 21 per cent**. Over the coming five years, the Thai Rice Project aims to reach **250,000 farmers across 21 provinces in Thailand**, reducing methane and overall GHG emissions by at least **2.4 million tons of CO₂ equivalent**. The project’s objectives include improving access to finance and technologies, **increasing crop yields and income by at least 10 per cent**, and strengthening market linkages for sustainable rice cultivation.



IMPACTS AT A GLANCE

- **Higher income:** At least 10 per cent more income for around 150,000 farmers
- **Methane and GHG reduction** of at least 2.4 million tons (CO₂ equivalent), equivalent to approximately 71,000 reduced tons of CH₄²³
- **Efficiency:** More than 85,000 farmers are to increase their rice yields in line with reduced water consumption
- **Secure supply chains:** Secure long-term supply of high-quality rice
- **Sustainability objectives:** More sustainable supply chains with reduced GHG emissions help to fulfil the private partners’ strategic goals

The Thai Rice Project advances sustainability by engaging the private sector and fostering public-private partnerships. Supported by international organizations, research institutions and Thai government ministries, it leverages significant co-financing. The project uses a science-based approach to reduce methane emissions from smallholder rice farmers, combining economic and environmental benefits. With investments in sustainable finance, credit lines and carbon markets, it tackles rice cultivation challenges and builds a foundation for a climate-smart future.

²³ Roughly 80 per cent of this figure is from methane mitigation, hence the total mitigation in CH₄ would be roughly 71,000 reduced tons of CH₄ at a conversion factor of 27. The remaining 20 per cent mitigation impact is from reduced nitrous oxide emissions etc. Please note this is an estimate.

CH₄

Policy support

Launched at COP26 by the European Union and the United States, the Global Methane Pledge (GMP) seeks a 30 per cent reduction in global methane emissions from 2020 levels by 2030. With over 150 countries involved, covering over 50 per cent of emissions, the pledge supports limiting warming to 1.5°C and provides benefits for health, ecosystems, food security and economies. Many signatories require tailored support to address unique challenges and develop effective methane reduction strategies.

The Global Methane Pledge seeks a

30%

reduction in global methane emissions from 2020 levels by 2030

Global Methane Pledge



CASE STUDY

Building ambition for methane mitigation



URUGUAY

KENYA

VIET NAM

PROJECT TITLE	– Developing low-cost strategies to reduce enteric methane emissions in Uruguay – Kenya's greenhouse gas inventory for livestock emissions – Supporting MRV systems for Viet Nam's rice sector
IMPLEMENTER	Climate and Clean Air Coalition (CCAC)
COUNTRIES	Kenya, Uruguay and Viet Nam
TARGET GROUP	Smallholder farmers (livestock and rice cultivation) and policymakers
IMPLEMENTATION PERIOD	2016-present
PARTNERS	Kenya Uruguay Viet Nam New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC) CGIAR Research Program on Climate Change, Agriculture and Food Security Global Research Alliance on Agricultural Greenhouse Gases (GRA) Food and Agriculture Organization of the United Nations (FAO) International Rice Research Institute (IRRI)

Founded in 2012 and hosted by the United Nations Environment Programme (UNEP), the CCAC supports policy development across the world to tackle short-lived climate pollutants, in particular methane, from the agriculture sector. This policy supports and strengthens GHG inventories for national reporting, outlines locally adapted methane mitigation measures, and sets government priorities for mitigation action. Projects in Kenya, Uruguay and Viet Nam highlight the range of policy support CCAC offers and how it implements national commitments under the Paris Agreement.

Turning results into more ambitious climate policies across Kenya, Uruguay and Viet Nam

In Kenya, the CCAC collaborated with the Ministry of Agriculture and Livestock, the FAO and the New Zealand Agricultural Greenhouse Gas Research Centre to develop a Tier 2 inventory for the dairy sector. This effort showed that Kenya's dairy industry could reduce emissions by 36 per cent and increase milk productivity by 35 per cent. These insights were critical in shaping Kenya's National Action Plan to Reduce Short-Lived Climate Pollutants and its Nationally Appropriate Mitigation Action (NAMA) on dairy, aiming for an 8.8 million-ton reduction in CO₂ equivalent²⁴ emissions over a decade.

In Uruguay, the CCAC partnered with the Global Environment Facility, the FAO, and Uruguay's Ministry of Livestock, Agriculture and Fisheries on the 'Ganadería y Clima' (Livestock and Climate) project. This initiative reduced methane emissions from cattle and sheep by over 16 per cent per kilogram of meat, increased meat production by 9 per cent, and boosted farmer incomes by 32 per cent, even during severe drought. The project also strengthened Uruguay's MRV system, integrating emissions data into the country's climate commitments under the Paris Agreement.

Since 2014, Viet Nam has been a key CCAC partner, committed to net-zero emissions by 2050. The CCAC funded research by IRRI and CGIAR to address challenges including fragmented farming and low investment in low-carbon practices. This collaboration has shaped Viet Nam's national policies, promoting financial and technological support for low-methane agriculture, boosting farmer incomes and strengthening the agriculture sector's resilience.

These projects showcase how targeted, science-driven actions and global collaboration can drive significant change. By promoting low-methane agricultural practices, CCAC is addressing climate change, improving livelihoods and advancing sustainable development worldwide.



In Uruguay,
methane emissions
from cattle and sheep
were reduced by
16%
per kilogram of meat

©Shutterstock/Olaf Speier

²⁴ The NAMA anticipates an 8.08 Mt CO₂e reduction in GHG emissions by increasing dairy productivity (4.14 Mt CO₂e), improved energy efficiency in processing (2.96 Mt CO₂e), and household biogas adoption (0.98 Mt CO₂e).

SOLUTION

NDC 3.0 Navigator: Charting routes to ambitious climate action



POLICY SUPPORT

PROGRAMME TITLE	NDC 3.0 Navigator
IMPLEMENTER	NDC Partnership, Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC)
COUNTRIES	Global
TARGET GROUP	Policymakers
IMPLEMENTATION PERIOD	2024-ongoing
PARTNERS	United Nations Development Programme (UNDP), World Resources Institute (WRI) and more than 30 additional partners
PROJECT FINANCING	N/A

The NDC 3.0 Navigator²⁵ is an interactive online tool developed by the NDC Partnership in collaboration with the UNFCCC Secretariat, and with technical inputs from UNDP, WRI and more than 30 additional partners, that supports the development of NDCs to be submitted in 2025 (NDCs 3.0). Intended to help countries identify opportunities to raise ambition in their NDCs 3.0, the Navigator provides examples of impactful opportunities for countries to consider, anchored in national sustainable development priorities, Paris Agreement goals and the first Global Stocktake outcome.

The Navigator seeks to support and inspire country NDC teams, their experts and partners, by bringing together knowledge and support in a series of routes to ambitious and implementable NDCs,²⁶ which include examples of opportunities to consider when developing NDCs 3.0, strategies that could enable these opportunities, country case studies and links to further resources. These examples help ensure that climate change responses are leaving no one behind, and help enhance processes that will accelerate implementation, including engaging all-of-government and society, and unlocking finance. The Navigator also provides topic- and sector-specific strategies and resources for countries to consider in their NDC 3.0 development. For example, the Setting Targets, Including Economy-Wide NDC Targets²⁷ opportunity highlights considerations for inclusion of methane and other GHGs.

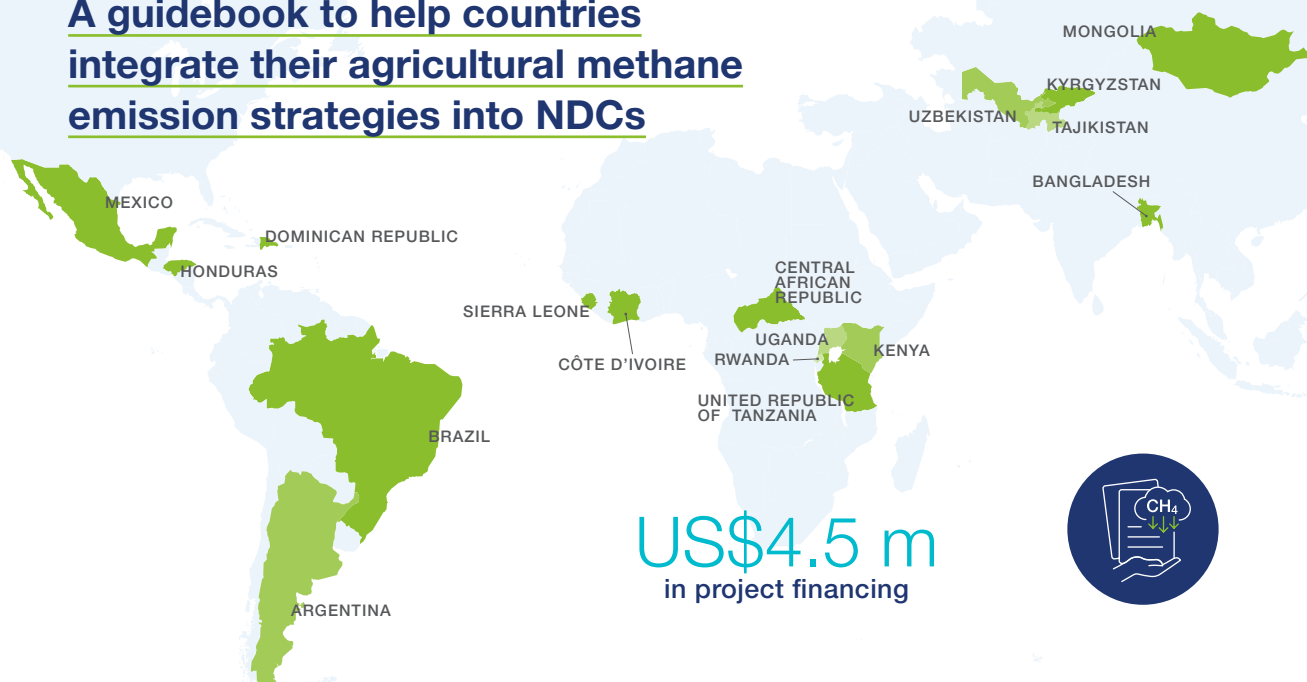
²⁵ NDC 3.0 Navigator. <https://ndcnavigator.org/>

²⁶ NDC 3.0 Navigator. Explore Routes to Ambitious and Implementable NDCs. <https://ndcnavigator.org/routes/>

²⁷ NDC 3.0 Navigator. Setting Targets, Including Economy-Wide NDC Targets. <https://ndcnavigator.org/routes/temperature-goal/setting-targets/>

SOLUTION

A guidebook to help countries integrate their agricultural methane emission strategies into NDCs



PROGRAMME TITLE	Reducing Agricultural Methane Programme (RAMP)
IMPLEMENTER	International Fund for Agricultural Development
COUNTRIES	17 countries: Argentina, Bangladesh, Brazil, Central African Republic, Côte d'Ivoire, Dominican Republic, Honduras, Kenya, Kyrgyzstan, Mexico, Mongolia, Rwanda, Sierra Leone, Tajikistan, Uganda, United Republic of Tanzania and Uzbekistan
TARGET GROUP	Smallholder farmers (livestock and rice cultivation) and policymakers
IMPLEMENTATION PERIOD	2023-2025
PARTNERS	Global Methane Hub and the US State Department
PROJECT FINANCING	Total RAMP funds: US\$4.5 million





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At COP28, IFAD launched the **Reducing Agricultural Methane Programme (RAMP)** to tackle methane emissions from agriculture and boost climate resilience for smallholder farmers. Despite agriculture's major role in methane emissions, many countries struggle to integrate methane mitigation into their Nationally Determined Contributions (NDCs) for the Paris Agreement. Funded by the Global Methane Hub (GMH) and the US State Department, RAMP will provide guidebooks and technical assistance to help these countries incorporate methane reduction strategies, focusing on rice and livestock sectors.

The guidebook will be developed in two phases. Initially, it will provide a methodology for aligning NDCs with Global Methane Pledge goals, along with a template for alignment checks, monitoring and evaluation. It will also include standardized Key Performance Indicators and a summary of lessons learned and best practices. The second phase will be through the deployment of technical assistance: using the guidebook as a reference, technical assistance will be provided to 17 countries tailored to the governments' different needs and contexts.

The IFAD RAMP guidebook will complement the CCAC's recently published *Guidance on Including Non-CO₂ Pollutants in Nationally Determined Contributions (NDCs)*.²⁸ CCAC's Guidance includes a chapter on including methane in NDCs, with a focus on practical and strategic recommendations for experts and teams involved in preparing NDC 3.0 on how to set goals and identify specific measures suitable to the national context. The Guidance includes methane mitigation measures for each sector, including agriculture.



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²⁸ CCAC. 2024. *Guidance on Including Non-CO₂ Pollutants in Nationally Determined Contributions (NDCs)*. <https://www.ccacoalition.org/resources/including-non-co2-pollutants-nationally-determined-contributions-ndc-30>

Transformational potential of the projects

The projects collectively demonstrate a transformative approach to mitigating methane emissions from agrifood systems. By reducing methane emissions, these initiatives can significantly contribute to global climate action while driving other co-benefits:



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1 LIVESTOCK MANAGEMENT AND INNOVATION

Projects like the Feed Ration Optimization Tool and The Nature Conservancy's dairy intervention in the United States focus on improving livestock productivity through dietary changes and better manure management. These innovations not only reduce methane from enteric fermentation but also enhance farm efficiency and increase farmer incomes, showcasing how sustainable practices in food production can boost both economic growth and environmental outcomes.



© The Nature Conservancy

2 CIRCULAR ECONOMY

The Food Loss and Waste Accelerator in the United Republic of Tanzania and Chanzi's use of Black Soldier Fly larvae to convert food waste into animal feed exemplify how organic waste can be repurposed into valuable resources. These circular economy models help reduce methane emissions from decaying waste while creating new economic opportunities and addressing food loss, waste management and environmental degradation.



3 CLIMATE-SMART RICE CULTIVATION

Projects like the GCF Thai Rice and Viet Nam's VnSAT initiatives focus on reducing methane emissions from rice paddies through practices such as Alternate Wetting and Drying. These methods reduce emissions by 30-70 per cent without compromising yields, offering a climate-smart solution to feed the world while combating methane. Additionally, the VnSAT project in Viet Nam showed the potential for large-scale transformation, with significant reductions in methane emissions and increases in farmer incomes, demonstrating that sustainability and productivity can go hand in hand.



4 BIOGAS AND ANAEROBIC DIGESTION

The World Biogas Association's initiative to scale up AD highlights the critical role of waste management in methane reduction. By converting organic waste into biogas, these projects prevent methane from entering the atmosphere while creating renewable energy sources. The development of regulatory frameworks and certifications will ensure safe, effective adoption of AD globally, making this a pivotal solution for meeting methane reduction targets.



5 POLICY SUPPORT AND CAPACITY-BUILDING

Projects like Costa Rica's Low Carbon Livestock Strategy, CCAC's interventions in Kenya, Uruguay and Viet Nam, and IFAD's the Reducing Agricultural Methane Programme (RAMP) emphasize the importance of integrating methane reduction strategies into national policies. By enhancing institutional capacity, promoting MRV systems and aligning policies with climate goals, these projects create an enabling environment for sustainable practices to flourish, ensuring long-term impact.



Call to action: Keeping the momentum going

As the world converges on COP29, the need for urgent and coordinated action on methane reduction in agrifood systems has never been clearer. These projects demonstrate that we have the solutions and strategies in place – but we must act swiftly and scale up efforts to meet the Global Methane Pledge.

Here's how we can keep the momentum:



1 SCALE PROVEN SOLUTIONS GLOBALLY

The successes in countries such as Costa Rica, Thailand, the United States and Viet Nam need to be expanded and replicated across other methane-intensive regions. Proven practices such as optimized feed strategies, climate-smart rice farming and biogas production must be rolled out widely to maximize their impact.



2 STRENGTHEN POLICY AND FINANCING

Governments must integrate methane reduction into their NDCs and climate strategies to give a stronger signal to help unlock finance. Financial mechanisms such as carbon markets, climate-smart loans and public-private partnerships are essential to incentivize farmers, businesses and policymakers to adopt these innovations.



3 ENHANCE COLLABORATION AND KNOWLEDGE-SHARING

The formation of the Reducing Agrifood Systems Methane Emissions Informal Coordination Group marks a step in the right direction. We need to enhance global collaboration by sharing best practices, technologies and lessons learned, creating synergies that can accelerate methane mitigation across borders.



4 INVEST IN RESEARCH AND INNOVATION

Continued research and development of new technologies, such as feed additives and waste recycling methods, will be crucial to further reduce methane emissions. Investments in scientific accuracy and innovative solutions will also help convince stakeholders who may be cautious about adopting new practices.



5 EMPOWER FARMERS AND STAKEHOLDERS

Training programmes and technical assistance are critical to empowering smallholder farmers and other agricultural stakeholders. By building their capacity to implement sustainable practices, we ensure that the transformation is equitable, inclusive and scalable.

We must accelerate the transition to a low-methane, sustainable future. By turning proven solutions into widespread action, scaling investment and strengthening policies, we can make significant strides in reducing agricultural methane emissions. The time to act is now – COP29 will be a critical milestone in ensuring we stay on track for the Global Methane Pledge and beyond.

Together, we can **walk the walk** towards a more sustainable and resilient future.



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