



Bending the Curve:

A Triple-Win Blueprint for Global Methane Reduction

Executive Summary

Abating methane emissions is critical for the World Bank's impact-focused climate action plan and vision of creating a world free of poverty on a livable planet.

Methane is **80 times** more powerful than carbon dioxide in warming the planet, making it a major driver of climate change. Yet, it is much less understood and prioritized than carbon dioxide. Finance for methane abatement is alarmingly low, accounting for less than 2% of global climate finance.

The World Bank has a track record of projects in rice production, livestock and waste management that have demonstrated **triple wins**—limit global warming in the near term, enhance resilience, and empower livelihoods of the most vulnerable.

Its tested approaches have reduced production costs and increased the income of millions of poor farmers and city dwellers while improving soil and water management, animal feeding and health, manure treatment and diverted organic waste from landfills, to mention a few benefits.

Building on these successful experiences, the World Bank is launching a comprehensive platform for accelerated methane action—the fastest and most cost-effective way of reducing the dangerous rise in global temperatures and supporting millions of people on the front lines of climate change.

This involves strengthening partnerships and mobilizing catalytic financing for:

- Scaling up successful projects into **country-led programs in at least 15 countries** in the next 18 months.* These programs will deploy the tried and tested transformative solutions for rice production, livestock operations, and waste management at national or sub-regional scale.

* Potential list of countries where phased country engagements will be launched includes Brazil, Cambodia, China, Egypt, India, Indonesia, Jordan, Morocco, Nigeria, Tanzania, Viet Nam, Uruguay, Uzbekistan, Kyrgyz Republic, Bosnia and Herzegovina, West Bank and Gaza, amongst others.

- Supporting early interventions in countries where methane emissions are set to rise exponentially. These programs will inform policy making and help unlock finance through public, private, and civil society channels.

Our ambition is to support about **150 million poor people** and reduce up to **10 million tons of methane** (over the lifespan of investments).

Why methane, why now?

Reducing methane emissions is essential for a livable planet. Methane is the second most abundant greenhouse gas after carbon dioxide. It is responsible for a third of global warming.

Methane emissions have a direct impact on millions of people as well as ecosystems. About 60% of global methane emissions come from unsustainable human practices in three major socioeconomic sectors—agriculture, energy, and waste. Within that:

- **Agriculture** accounts for about 42%¹ of all human-driven methane emissions (of which, rice production is 8% and livestock is 32%). Methane emitted from unsustainable agri-food practices—rice cultivation and livestock in particular—is responsible for 26 million tons of crop losses per year. This puts at risk the livelihoods of about 1.5 billion smallholders who rely on rice cultivation, and more than 100 million landless and vulnerable farmers for whom livestock is their first option for asset ownership.
- The **energy** sector contributes about 40% of all human-driven methane emissions, exposure to its heat and super pollutants—including methane and nitrous oxide—will cost an estimated \$260 billion in labor losses by 2050.
- **The food waste** sector’s unsanitary disposal practices and untreated wastewater add up to about 18% of all human-driven methane emissions. Globally, about one third of all food is wasted each year, contributing to 2 billion metric tons of municipal waste. Municipal waste is expected to increase 70% by 2050, due to global population growth and increased consumption. In addition, in the fastest-growing populations across sub-Saharan Africa, South Asia, and the Middle East and North Africa, solid waste is often disposed in unmanaged open dump sites, creating a public health risk to surrounding communities and ecosystems.

The challenges

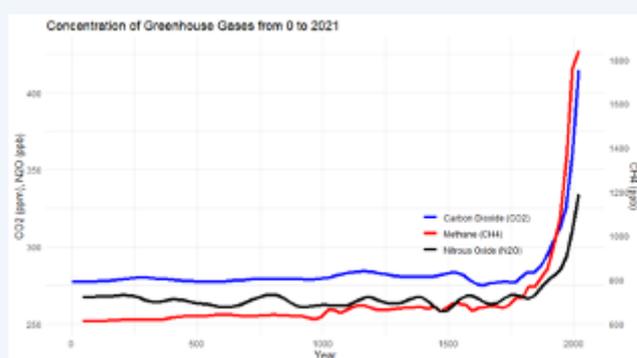
- Despite having a major impact on near-term global warming, methane is less understood, and considered less of a priority, than carbon dioxide.
- Methane abatement is at an early stage and because of this action is fragmented.
- There is an urgent need for immediate development and scaling of affordable technologies, just economic transitions, and behavioral change.
- Finance for methane abatement is alarmingly low, accounting for less than 2% of global climate finance. In 2021-2022, methane investments dropped by 21%, to \$9.1 billion.

¹ Source for statistics quoted throughout: Global Methane Initiative, 2020.

As a result, methane emissions have been rising by record levels since 2020.

This is driven by population growth, rising incomes, urbanization, and demand for methane-intensive commodities, such as rice and meat. Without urgent action, methane emissions will continue to rise.

Figure 1: Concentration of greenhouse gases



Source: EPA's Climate Change Indicators (compilation of 19 underlying data sets) smoothed with local regressions of 5% consecutive observation bins. Original from IPCC (2007), reproduced and updated by WB DIME-CH4D (2023).

Need for faster action at scale

To meet the climate and development challenges methane emissions present, and realize methane triple-win, each key sector must reduce methane emissions as follows.

- From the **agriculture** sector, emissions need to be reduced by minimum 25% below 2020 levels by 2030 and nearly 40% by 2050, in line with the goals of the Paris Agreement.
- From the **energy** sector, emissions can be reduced by at least 60% below 2020 levels by 2030 and nearly 80% by 2050, in line with the goals of the Paris Agreement.
- From the **waste** sector, emissions need to be reduced by at least 35% below 2020 levels by 2030 and nearly 55% by 2050, in line with the goals of the Paris Agreement.

A major driver of climate change, methane is also key to the solution. Methane is about 80 times more powerful than carbon dioxide in trapping heat over a 20-year period. But methane only stays in the atmosphere for about 10 years, whereas carbon dioxide stays in the atmosphere for centuries.

To help bend the methane curve, the World Bank is mainstreaming methane; upstream, in its core analytics and country engagements; and downstream, in its lending portfolio across the high-emitting sectors of agriculture, energy, and waste.

A climate and development priority, the World Bank is supporting the global target of reducing methane by at least 30% by 2030 through a “triple win” approach that:

- 1 Limits global temperature rise to 1.5°C by the end of the century.** Urgent action within this decade will set the world on the correct course to stay within the goals of the Paris Agreement.
- 2 Increases resilience.** Better agriculture and waste management practices will tackle the root causes of widespread pollution, regenerate ecosystems, build more sustainable and circular food systems, increase agricultural productivity, and improve the capacity of cities to adapt to climate change.

- 3 Empowers livelihoods and improves health.** Expanding access to a safe and nutritious diet will improve public health for the billions of vulnerable people directly exposed to the harmful effects of methane.

The World Bank's blueprint to accelerating methane abatement triple wins

The World Bank is using its global footprint and expertise in climate action with major development benefits to build on the momentum for methane abatement:

- **151 countries have committed to voluntarily reduce methane** under the Global Methane Pledge. More than 50 national methane action plans are being developed.
- **About 91% of countries' Nationally Determined Contributions address methane** to some extent, within the scope and coverage of their overall greenhouse gas reduction targets.
- **Advancements in satellite imaging technology are improving our capacity** to track methane emissions, by identifying large point sources and regional scale concentration changes and inform action.
- **Other sectoral technologies are emerging.** All need to be scaled and affordable in developing countries.

To deliver it all further, the World Bank is taking five major steps:

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- 1 Strengthening partnerships** with governments, the international and scientific communities, centers of excellence, private and civil society organizations. Together, we can collaboratively develop and implement at scale innovations, cost-effective technologies, practices, and expertise.

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- 2 Informing countries' decision-making and prioritization of investments.** We will raise awareness, fill knowledge gaps, and support evidence-based policies, regulations, and life cycle/value chain standards. We will do this through (i) the preparation of country methane profiles, regional strategies, and analytical work, and (ii) integration of methane reduction analyses into national strategies and the World Bank's core country engagement products like Country Partnership Frameworks and **Country Climate and Development Reports**. Of the 70 Country Climate and Development Reports (covering 87 countries) completed or under preparation, 45 explicitly analyze methane emissions, covering 45% of global methane emissions. We will:

- Profile and integrate methane analysis into 52 Country Climate and Development Reports, covering 67 countries and 54% of global methane emissions.
- Integrate methane analysis into core country engagement products like Country Partnership Frameworks under development—covering 26 countries and 16% of global methane emissions.

3 Unlocking finance through public, private, and civil society organizations. By combining blended finance with results-based approaches, including tools for the monitoring, reporting and verification of methane reduction, we can build a new finance architecture for methane that also enables developing countries to access other sources of revenues, such as carbon markets. We will strategically mainstream transformative solutions for rice production, livestock operations, and waste management across the World Bank's agriculture and waste portfolios.

4 Supporting early interventions in countries where methane emissions are set to rise exponentially. By catching countries at the start of their methane journey, the World Bank is helping them to get on and stay on the right track. The World Bank is supporting new approaches to livestock and waste management, integrating green growth pathways that curb methane emissions with major development gains. For example:

- **Tanzania's Livestock Resilience and Competitiveness Project**, under preparation, is a first-of-its kind sustainable livestock management initiative in the country. It builds upon a rapid assessment of the sector that showed a potential reduction of 0.5 million tonnes of methane in seven years with enhanced productivity in only 1% of the cattle population. This project is opening the doors to other 15 countries in Eastern and South Africa facing similar challenges and opportunities.

5 Scaling up investments. We will support scalable projects that can be mainstreamed into transformative country-led programs in developing countries with current and projected high emissions of methane due to population growth, urbanization and change in lifestyles.

Rice Cultivation

The World Bank's experience in smart rice cultivation practices have directly contributed to cut methane and nitrous oxide emissions, save water resources, decrease the use of pesticides and improve income of poor farmers.

Such success has been achieved through investments in not only infrastructure and access to markets, but also in institutional strengthening and behavioral change.

*The vast majority of rice farmers in **Viet Nam** are smallholders often averse to take risks. To convince them to switch to alternative drying schedules for their crops—as an effective way of reducing methane emissions, while conserving water and improving yields, required ensuring predictable access to water for them. This, in turn, required investments in affordable irrigation and energy systems. To make it all work, the World Bank also supported community driven development training and awareness building activities in pilot farms for demonstration purposes.*

In **Viet Nam**, we are supporting the government to scale the approaches and technologies tested under the Sustainable Agriculture Transformation Project in one million hectares of the Mekong Delta area. The project introduced climate-smart farming practices to more than a million poor

farmers in a 185,000-ha area. It introduced improved rice farming practices, including the use of certified seeds, reductions in fertilizers and pesticides, and alternate drying of rice fields. Altogether these practices not only abated methane emissions but also reduced production costs by about 22%, increased profits by approximately 40%, reduced the use of pesticides by 30%, and reduced water pumping by 40%.

Similarly in **Indonesia**, the World Bank is engaging with the government for the scaling up of the Climate-resilient and Low-carbon Agriculture Development Project, which has introduced a series of effective solutions that have transformed the rice production and livestock management for 33.5 million small-scale farmers, about 30% of which women-led rice producers.

Livestock Management

The World Bank support to sustainable livestock and manure management practices has focused on small producers whose livelihoods depend on a few buffalos or cows. Any sickness or loss has extensive impacts on the family and communities.

*For many pastoral communities in **East Africa** and small landholders across **India**, whose livelihoods depend on a few heads of cattle, the aversion to abandoning traditional livestock practices is also quite high. To build their confidence and create the necessary conditions for the adoption of climate-smart rearing practices, the World Bank has developed a comprehensive approach focused on enhancing access and competitiveness, fostering inclusion, improving resilience, and reducing greenhouse gas footprint of milk value chains. The results are better nutrition for herds, improved breed management and manure handling that have increased milk processing capacity and thus income with a reduction in methane emissions per liter of milk.*

In **India**, the *National Dairy Support Project* piloted animal breed improvement and animal nutrition for value-added dairy products that enhance food quality and safety. This supported links between small producers, particularly women, markets, and certification programs. The project benefited more than 3 million smallholders who averaged a 20% increase in milk production and a 14% reduction in methane emissions.

In **Uzbekistan**, where livestock is responsible for most of the agriculture sector's methane emissions, the World Bank is supporting the development of a productive, market-oriented, sustainable, and inclusive livestock sector.

We aim to strengthen engagements in **Brazil** and in **Uruguay**, which have some of the highest targets to abate methane.

Waste Management

The World Bank support to client countries in the waste sector focuses on tailor-made approaches to the specific challenges faced by low- and middle-income countries as collection and prioritization, respectively. Countries have adopted system-wide solutions by, for instance, financing modalities of landfill gas management that mitigate methane emissions and increase the overall safety of landfill operations while generating better and safer jobs and income to waste pickers.

In **Brazil**, the *Integrated Solid Waste Management and Carbon Finance Program* supported a public-private partnership with the second largest public bank in Brazil to test a new approach to integrating organic waste management into three landfills. Over 150 million cubic meters of methane was collected and diverted from the atmosphere and instead used to produce electricity for more than 200,000 households. The initiative informed new environmental and social standards for landfills across Brazil.

In **Cambodia**, the *Solid Waste and Plastic Management Improvement Project* has benefited more than 750,000 people with improved solid waste collection, treatment and disposal while reducing methane.

In **Nepal**, to improve waste collection, the World Bank invested in transportation infrastructure and awareness campaigns. It also supported municipalities to establish and enforce a fee collection and provide incentives for the city dwellers to adopt environment-friendly practices, such as waste separation and recycling at the source.

Key Targets

The World Bank expects to:

- ✓ Launch **15 country-led programs** in the next 18 months that mainstream the adoption of sustainable farming, livestock, waste management, and energy supply practices.
- ✓ Slash up to **10 million tons** of methane (over the investment life spans).
- ✓ Benefit about **150 million poor people** by improving incomes and reducing production costs for poor farmers and workers, especially women. See healthier communities and regenerated ecosystems.

The World Bank is launching two partnership platforms for accelerated methane action: *The Global Methane Reduction Platform for Development (CH4D), a hub for methane abatement in agriculture and waste, and the Global Flaring and Methane Reduction Partnership (GFMR) focuses on reducing methane leaks in the oil and gas sector.*