

Global Carbon Field Trial Program 2025

Edition 2: Rice



Rice in Focus: Staple Food, Climate Challenge

Staple food for
3.5 billion
people around
the world

Provides more than
70 %
of **daily calories** in many
developing countries

Responsible for
~10 %
of agricultural
GHG emissions

Accounts for
~30 %
of **freshwater** used
in agriculture

The Role of BASF Agricultural Solutions

We are committed to reducing the greenhouse gas intensity (GHG) of 5 key crops, including rice, by 30% by 2030. Through our Global Carbon Field Trial Program, we are advancing reliable climate-smart solutions for farmers & food systems.

Enablers for Change in Rice Cultivation

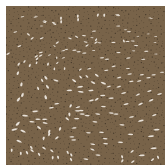
Three important elements for climate-smart rice:

- Improved water use
- Reduced emissions
- Optimized yields

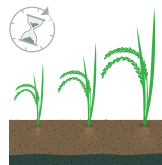
In our trials, we carefully evaluated Direct Seeded Rice (DSR) with:

- Alternative Wetting and Drying (AWD)
- Straw management

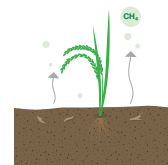
Alternative practices



Direct Seeded Rice (DSR)
Seeds are sown directly into the field (no transplanting).

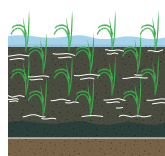


Alternate Wetting and Drying (AWD)
Rice fields are intermittently dried instead of continuously flooded.

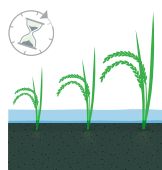


Straw removal
Straw is removed after harvest and before the establishment of the crop in the following season, enabling the reduction of methane (CH₄) production.

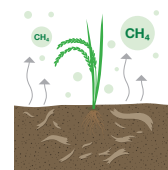
Traditional practices



Rice transplanting
Young plants are transplanted to the paddy.



Continuous flooding
The water level in the paddy is kept constant and above the soil surface.



Straw incorporation
Plant residues are incorporated into the soil after harvest.

Takeaways

30% reduction in GHG in rice production is possible without reducing yield

Ensuring stable yields through climate-smart agricultural practices is essential for global food security.

Optimizing water is essential to balance yield and emissions

AWD in rice cultivation is a well-established approach to reduce methane emissions and freshwater use. However, it should be implemented in a way that does not jeopardize yield.

Providing reliable tools for farmers to track emissions

Our trial confirmed the accuracy of our AgBalance® tool, which enables farmers to track emissions and supports access to new business models like carbon markets.

Scaling with proven practices and local incentives

Through our Global Carbon Farming Program, we partner locally with farmers, value chain players, and internationally recognized certifiers to decarbonize from the ground up.



● report 2025
● report 2024



View the
full report

Summary Of Results

1

Alternate Wetting and Drying (AWD) was an effective approach to reduce methane emissions—achieving up to 60% reduction in greenhouse gas intensity (GHGI) compared to continuous flooding, without compromising yields.

2

Removing straw after harvest reduced cumulative methane emissions during the subsequent fallow period by more than 90%. When AWD was implemented in combination with straw removal, the reduction in GHGI reached 85%.

3

AWD and straw removal treatments had yield gains up to 1.2 ton-ha⁻¹. Importantly, this trend was consistent across both wet and dry seasons trials in the Philippines.

4

The alignment of the AgBalance® Life Cycle Assessment (LCA) model with the empirical data from the gas flux measurements demonstrates that it is a credible and resource efficient tool for assessing carbon reduction potential in rice.

5

Direct Seeded Rice (DSR) coupled with appropriate water management techniques can reduce freshwater use, greenhouse gas emissions, and labor requirements, while also simplifying field operations.

6

Although weather challenges are not new to farmers in the Philippines, our trials confirm the importance of resilience and yield protecting strategies for delivering reliable climate-smart solutions and reaching our climate-smart emissions target.

Field-Tested Innovation: Bridging Research and Practical Climate Action in Rice

Optima Rice Philippines project - overview



International Rice Research Institute (IRRI)



January 2024



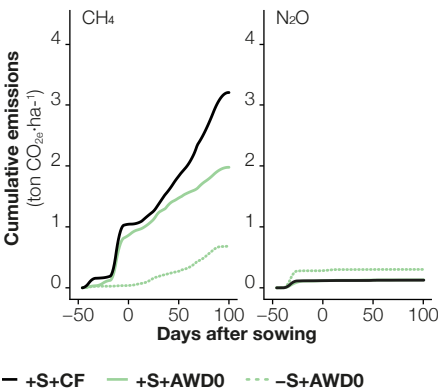
Multi-year scientific field trial



Laguna, Philippines

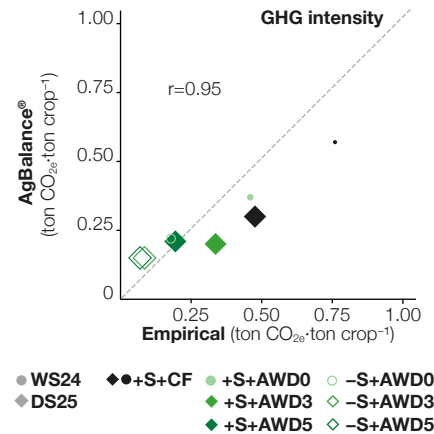
The following figures summarize key learnings from these early trials and highlight the potential for systems-based, evidence-led solutions to scale impact across the rice value chain.

Methane drives the emissions intensity in rice fields



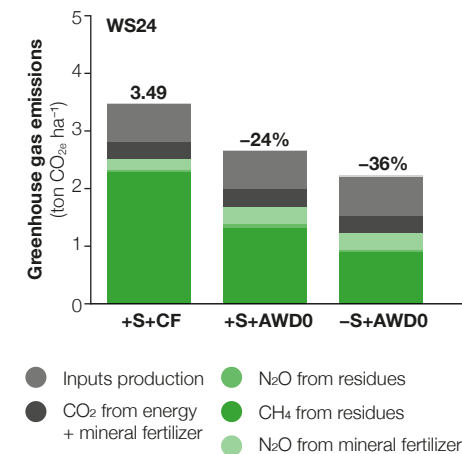
Emissions of methane (CH₄) and nitrous oxide (N₂O) estimated from gas flux measurements in the monsoon season 2024. Emissions of CH₄ are considerably higher than those of N₂O, indicating the need for mitigation of emissions via water and straw management. See * for description of treatments.

AgBalance® accurately predicts field emissions



The strong positive correlation between empirical measurements of emissions in the field and emissions estimated with AgBalance® model demonstrates that AgBalance® accurately predicts field emissions. See * for description of treatments.

Field emissions drive the carbon footprint analyzed from cradle-to-gate



Cradle-to-gate analysis of AgBalance® shows that field emissions are the main contributor for GHGI. In addition, the implementation of AWD practices show a considerable reduction in GHGI relative to the standard +S+CF. See * for description of treatments.

*Description of treatments: Continuous flooding (CF), Alternate Wetting and Drying of 0, 3, or 5 days (AWD0, AWD3, or AWD5), Straw incorporation (+S), Straw removal (-S). Symbols ● and ◆ represent the monsoon season of 2024 (WS24) and the dry season of 2025 (DS25)

Scaling Climate-Smart Agriculture Takes All of Us

Reducing emissions in rice is possible—and profitable—when farmers have proven practices, real-world data, and systems that reward sustainable choices. But impact doesn't scale alone. It takes a whole value chain working together to turn field-level change into global progress.

