SUSTAINABLE BUSINESS COP30

FOOD SYSTEMS

WORKING GROUP DOCUMENT

CNI Brazilian National Confederation of Industry

SUSTAINABLE BUSINESS COP30

FOOD SYSTEMS

WORKING GROUP DOCUMENT

CNI Brazilian National Confederation of Industry

LEADERSHIP SB COP30

Ricardo Mussa
SB COP Chair

Antonio Ricardo Alvarez Alban
President of the SB COP Business Council
President of the Brazilian National Confederation of Industry

Davi Bomtempo
SB COP Secretariat Leader

SUSTAINABLE
BUSINESS
COP30

FOOD SYSTEMS

WORKING GROUP DOCUMENT

© 2025. SB COP30
© 2025. Confederação Nacional da Indústria
Reproduction of any part of this material is permitted with proper source citation.

SB COP30
CNI
Superintendência de Meio Ambiente e Sustentabilidade - Supemas

CATALOGING IN PUBLICATION

S964f

Susteinable Business COP30
Food systems : working group document. -- Brasília : SB COP, 2025.

104 p. : il.

ISBN 978-85-7957-248-7

1. Food Systems I. Título.

CDU: 502.131.1

SB COP30
Setor Bancário Norte
Quadra 1 – Bloco C
Edifício Roberto Simonsen
70040-903 – Brasília – DF
secretariat@sbcop30.com

TABLE OF CONTENTS

FOREWORD BY THE WORKING GROUP CHAIR

GILBERTO TOMAZONI

CEO, JBS

As one of the world's leading food companies, JBS is deeply committed to advancing food systems that nourish people, protect the planet, and create shared prosperity. Working with the members of Sustainable Business COP Food Systems Working Group, we identify a path to achieve that vision—through coordinated, outcome-driven action that aligns sustainability with scale.

Food systems today face a dual challenge: they must feed a growing population while reducing their environmental footprint. At JBS, we believe this is not a trade-off. Across our operations, we are proving that productivity, profitability, and environmental stewardship can be achieved together—through innovation, efficiency, and productivity investments.

This proposal identifies three priorities to unlock transformation: developing a global framework to guide food system transformation; fostering productivity through technology innovations and agronomic support tailored to local realities; and building breakthrough financing models that reward environmental services and de-risk adoption for producers. These are not abstract goals—they are practical levers to accelerate change.

We invite partners in governments, industry, and civil society to join us in advancing this food system transformation: where trusted outcomes attract capital, adoption accelerates, and food systems become engines of climate resilience, economic growth, and food security. Together, we can shape a future where sustainable food production is not the exception—but the norm.

Gilberto Tomazoni
Chair of the SB COP Food Systems Working Group
CEO, JBS

FOREWORD BY THE WORKING GROUP CO-CHAIRS

LIVIO TEDESCHI

CHAIRMAN, CROPLIFE INTERNATIONAL & PRESIDENT, BASF AGRICULTURAL SOLUTIONS

Driving sustainable productivity through innovation is key to transforming food systems. As co-chair of the SBCOP30 Food Systems Workstream, I'm proud to help shape a roadmap for change. Access to technology and a rules-based trading system empower farmers, diversify incomes, and strengthen food security.

RAMON LAGUARTA

CEO, PEPSICO

PepsiCo aims to spread the adoption of regenerative, restorative, or protective practices across 10 million acres by 2030, with farmers at the center of these efforts. If we continue to move with courage and conviction, I'm confident we can contribute to a world where growth and sustainability go hand in hand. COP30 is the moment to align policy, finance, and practical support so sustainable practices can scale globally.

IDI MUKHTAR MAIHA

MINISTER OF LIVESTOCK DEVELOPMENT, NIGERIA

Nigeria's livestock sector is a vital source of nutrition and employment, yet it faces significant challenges, including environmental degradation, climate vulnerability, and food insecurity. To address these issues, our policy paper recommends adopting sustainable practices, implementing inclusive policies that support smallholder farmers, and acknowledging the cultural significance of livestock. By investing in training and market access for smallholders, we can enhance food security and drive transformative growth in the sector.

MAURICIO RODRIGUES

PRESIDENT OF CROP SCIENCE DIVISION LATIN AMERICA, BAYER

Reinforcing Bayer's strong commitment with regenerative agriculture, our participation in the Food Systems Working Group for SBCOP has been a remarkable experience; an opportunity to shape policy recommendations and build cases that highlight agriculture's role in climate action. Ahead of COP30, this sort of coordination will help build climate resilience, food security, and sustainable growth on a global scale.

JAI SHROFF

CHAIRMAN AND GROUP CEO, UPL

From energy transition and water management to food security and greenhouse gas sequestration, COP30 provides an incredible opportunity to show policymakers how farmers can deliver resilience and security through sustainable agricultural practices, tools, and technologies. We are excited to contribute to this platform and share some of UPL's incredible work delivering these solutions, and to encourage the world to recognize and reward farmers for implementing sustainable practices.

PELERSON PENIDO DALLA VECCHIA

PRESIDENT AND CEO, GRUPO RONCADOR

Humanity built cities and turned the countryside into vast farms. The Green Revolution fed billions but brought dependence, degraded soils, and fragile ecosystems. Today, the Integrated Regenerative System restores balance with simple practices, rediscovered knowledge, and technology—producing more food, storing carbon, and starting the Regenerative Revolution.

GREG HECKMAN

CEO, BUNGE

Sustainable food systems are central to solving global challenges—from climate to nutrition. This paper shows the art of the possible. While obstacles remain, our collective innovation and collaboration can unlock transformation. I applaud the team for the leadership and progress to date.

SHIGEO NAKAMURA

CEO, AJINOMOTO

The purpose of the Ajinomoto Group is contributing to the well-being of all human beings, our society, and our planet with AminoScience. One of AminoScience's approaches is AjiPro™-L technology. By leveraging this innovation, we aim to reduce annual greenhouse gas emissions by 1 million tons by 2030 and create positive impact. We believe that collaboration with both global and local stakeholders is essential to driving the transformation toward more sustainable and resilient agrifood systems.

CHRIS HOGG

GLOBAL HEAD OF PUBLIC AFFAIRS, NESTLÉ

Nestlé is committed to scaling up climate-smart agriculture, sourcing 50% of its key ingredients from farms implementing regenerative agriculture practices by 2030. Climate-smart agriculture integrates biodiversity and circularity and is an imperative to help strengthen the resilience of agricultural supply chains and sustain our business in the future. A collective action is the only way we can achieve solutions to climate change and create a sustainable value for our planet and society.

MICHAEL GELCHIE

CEO, LOUIS DREYFUS COMPANY

Louis Dreyfus Company is engaged in shaping a more resilient food and agriculture system—one that delivers value for producers, consumers, and the planet. It was a privilege to explore key drivers to accelerate the transition to a stronger global food system, alongside industry peers. Collaborations like this help to scale innovation and mobilize capital toward a more sustainable future of food.

EXECUTIVE SUMMARY

Well-functioning food systems generate wide-ranging benefits for people, the economy, and the planet. They support healthy diets and improved nutrition, provide stable and dignified livelihoods for producers, and contribute to overall economic growth. When managed sustainably, they also help societies adapt to and mitigate climate change while protecting ecosystems and biodiversity. Yet today, food systems fall short of this potential: Many communities face the paradox of hunger alongside rising obesity, supply chains remain vulnerable to external shocks, and agriculture continues to contribute to climate and nature loss. Transforming these systems offers a critical opportunity to address some of the world's most pressing challenges—from building resilience to advancing equitable livelihoods and tackling climate change.

COP30 is a unique opportunity to catalyze this shift. As a climate summit hosted by a major agricultural country, it brings food systems into sharper focus and opens the door to integrate them directly into climate strategies and national policies. It is a moment to align priorities, scale investment, and put the regions and producers most exposed to climate risk at the center of the global response.

The Sustainable Business COP (SBCOP) Food Systems Working Group recognizes both the urgency and the complexity of this agenda. Food systems are diverse, but the structural levers of transformation are common: shifting from one-size-fits-all models to adaptable, outcome-based approaches that match local realities to global challenges; sustainably boosting productivity while including least developed countries (LDCs) and smallholders; and scaling finance models that de-risk transitions, crowd in private capital, and channel investments toward measurable environmental benefits. Together, these priorities create a virtuous cycle where trusted results attract more capital, adoption accelerates, and continuous measurement improves practice over time.

This paper conveys to COP negotiators the private sector's view on the priorities that must advance to unlock large-scale action. It highlights

initiatives already proving that productivity, resilience, profitability, and climate impact can be achieved together, and it defines the enabling conditions governments must create to move from scattered pilots to systemic, investable, and farmer-centered transformation.

Recommendations and Policy Actions

Recommendation 1: Converge on a global, science-based, adaptable, and outcome-oriented minimum viable framework (MVF) to guide food systems transformation and mobilize capital for effective and scalable practices

- Policy Action 1.1 – Alignment on global framework: Converge on a global, science-based, adaptable, and outcome-driven MVF to guide the transformation of food systems toward climate-smart food production. This framework must be built on a clear and shared understanding of desired outcomes and key metrics to be monitored and verified, while acknowledging regional, biome-specific, and crop/livestock family differences
- Policy Action 1.2 – Measurement, reporting, and verification (MRV) systems adoption: Promote the development and adoption of MRV systems by integrating desired outcomes and key metrics into national agricultural policy goals and by aligning access to public capital with credible performance measurement systems, while supporting the development of MRV systems tailored to each country's food system maturity and the capacities and realities of its farmers
- Recommendation 2: Foster productivity growth through the development and scaling of advanced, sustainable, and resilient technologies, as well as agronomic technical assistance to producers, that combined tackle the nexus environment, resilience, food security, and affordability/access, securing the inclusion of LDCs
- Policy Action 2.1 – Technology and agronomic development: Foster scalable and science-based innovation, facilitating producers' access to new technologies and agronomic technical assistance to tackle the nexus of climate, environment, resilience, and affordability/access—through investment and cooperation between public and private actors to ensure access to scientific progress and promote its adoption on a global scale, while recognizing regional contexts and country-specific needs
- Policy Action 2.2 – Deployment for inclusion and impact: Promote more equitable and inclusive productivity gains by supporting smallholders and LDCs through sustainable and resilient innovations,

knowledge sharing, technology dissemination, capability building, and international financing schemes—ensuring broader participation in the global food system transformation and improved livelihoods

- Recommendation 3: Build breakthrough models for financing and collaboration to support farmers' transition to resilient and sustainable food systems
- Policy Action 3.1 – Capital transition: Secure sufficient, efficient, and inclusive capital allocation for a rapid, large-scale transition through blended financing mechanisms, improving financial capabilities and offerings—de-risking and incentivizing investments—gradually repurposing agricultural support to accelerate the shift toward resilient, more sustainable, and equitable food systems, while ensuring support for innovation and productivity-enhancing approaches
- Policy Action 3.2 – Ecosystem services: Monetize the value of relevant ecosystem services delivered by regenerative and sustainable agriculture practices—including improved resilience and environmental outcomes—by developing regulatory and operational frameworks to accelerate the creation of high-integrity, interoperable credits for ecosystem services (e.g., carbon sequestration, soil health, biodiversity conservation, water stewardship)

A. INTRODUCTION

A.1 SUSTAINABLE FOOD SYSTEMS

Food systems are at the heart of how countries grow, feed people, and manage natural resources. According to FAO, they "encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded."[1] Today, food systems generate about 35% of global jobs and nearly 10% of GDP, with agriculture producing enough food to feed close to 10 billion people.[2,]

Over the last 50 years, food systems have delivered one of humanity's most remarkable collective achievements. The Green Revolution brought significant increases in productivity. Breakthroughs such as high-yield crop varieties, expanded use of inputs like fertilizers and pesticides, enhanced irrigation infrastructure, and widespread mechanization reshaped how food is produced. These innovations not only generated significant economic value across nations but also contributed meaningfully to improved global food security. Crucially, productivity growth enabled production to expand much faster than agricultural land, avoiding proportionate land conversion and easing pressure on ecosystems. The gains in output also allowed food systems to address adjacent challenges, including energy supply, through the scaling of biofuel production.

However, these advances came with downsides. Today's global food system not only contributes significantly to climate change but is also increasingly exposed to its impacts, leaving it vulnerable to disruptions and misaligned with long-term sustainability goals. Food systems as a whole account for nearly 30% of global greenhouse gas (GHG) emissions, two-thirds of which come from land use change, crop and livestock production, and energy use.3 Food systems also account for approximately 70% of the world's freshwater withdrawals[4] and contributes to biodiversity loss, particularly

1 *Sustainable Food Systems: Concept and Framework* (Food and Agriculture Organization of the United Nations [FAO], 2018).

2 Eric Holt-Giménez et al., "We Already Grow Enough Food for 10 Billion People and Still Can't End Hunger." *Journal of Sustainable Agriculture* 36, no. 6 (2012): 595–598, https://doi.org/10.1080/10440046.2012.695331.

3 "FAOSTAT, Climate Change: Agrifood Systems Emissions – Totals and Indicators – Emissions Totals," FAO, last updated November 14, 2024, https://www.fao.org/faostat/en/#data/GT

4 "AQUASTAT – FAO's Global Information System on Water and Agriculture," FAO, published 2021, https://www.fao.org/aquastat/en/overview/methodology/water-use.

through deforestation.[5, 6] These pressures vary widely across geographies, shaped by ecological conditions and stages of agricultural development. While some countries face water scarcity, others deal with land degradation and deforestation.

Environmental concerns are only part of the challenge. Food systems still fail to provide universal access to nutritious and affordable diets. FAO estimates that 2.4 billion people live with food insecurity,[7] while more than 1 billion people face obesity[8], and nutritional gaps persist. These issues are closely linked to the fragility of rural livelihoods, which remain vulnerable due to poverty, dependence on agriculture, and limited protections. Two-thirds of working adults living in poverty rely on farming to survive[9], frequently in contexts with limited security or formal protections. This fragility is also visible in labor dynamics, with 138 million children in child labor and 28 million people in forced labor, much of it tied to agricultural production. Women face additional barriers, often without access to land, credit, or inclusion in decision-making processes.[10, 11, 12]

Transforming food systems is widely recognized as a key lever to address global challenges related to climate, social development, and food security. Sustainable and climate-smart practices such as regenerative agriculture offer significant potential to make meaningful contribution, with FAO estimating that soils could capture between 9% and 23% of global GHG emissions.[13] A transformed food system could also build more resilient communities; expand opportunity for underserved groups including women, youth, and Indigenous peoples; and deliver healthy diets for a projected 9.7 billion people by 2050.[14]

---

5 "Resource Mobilization," FAO, accessed September 16, 2025, https://www.fao.org/partnerships/resource-partners/get-involved/en.

6 Tim G. Benton et al., *Food System Impacts on Biodiversity Loss* (Chatham House, 2021).

7 FAO et al., *The State of Food Security and Nutrition in the World 2023* (FAO, International Fund for Agricultural Development [IFAD], United Nations Children's Fund [UNICEF], United Nations World Food Programme [WFP], and World Health Organization [WHO], 2023).

8 "One in Eight People Are Now Living with Obesity," World Health Organization, March 1, 2024, accessed September 28, 2025, https://www.who.int/news/item/01-03-2024-one-in-eight-people-are-now-living-with-obesity.

9 FAO, *Recarbonization of Global Soils: A Tool to Support the Implementation of the Koronivia Joint Work on Agriculture* (2019).

10 "Child Labour," International Labour Organization (ILO), accessed September 15, 2025, https://www.ilo.org/topics/child-labour.

11 "Forced Labour, Modern Slavery and Trafficking in Persons," ILO, accessed September 15, 2025, https://www.ilo.org/topics/forced-labour-modern-slavery-and-human-trafficking.

12 "The status of women in agrifood systems", Food and Agriculture Organization of the United Nations, accessed September 23, 2024, https://www.fao.org/interactive/women-in-agrifood-systems/en/

13 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*

14 "World Population Prospects 2024," United Nations Department of Economic and Social Affairs, Population Division, accessed September 15, 2025, https://population.un.org/wpp/.

Why now is the right time to act

Despite growing momentum, food systems are not yet consistently integrated into global climate and development agendas. Many initiatives continue to operate as isolated efforts, which can limit their collective reach. With only five growing seasons remaining until 2030, transforming food systems is gaining greater prominence in global discussions. Without stronger coordination, current efforts are likely to have limited impact, especially in LDCs and among smallholder producers, where support is most needed.

COP30 marks a pivotal moment to anchor food systems at the core of the climate agenda. Unlike previous summits, it will be hosted by a major agricultural economy, creating the conditions to connect global negotiations with on-the-ground realities of producers. This setting provides a unique chance to integrate food systems more firmly into climate strategies and national policies, while elevating the regions and farmers most vulnerable to climate risks into the center of decision-making.

Sustainability and productivity can advance together. Across crops, regions, and production systems, climate-smart pathways offer opportunities that support both farmer profitability and environmental outcomes.

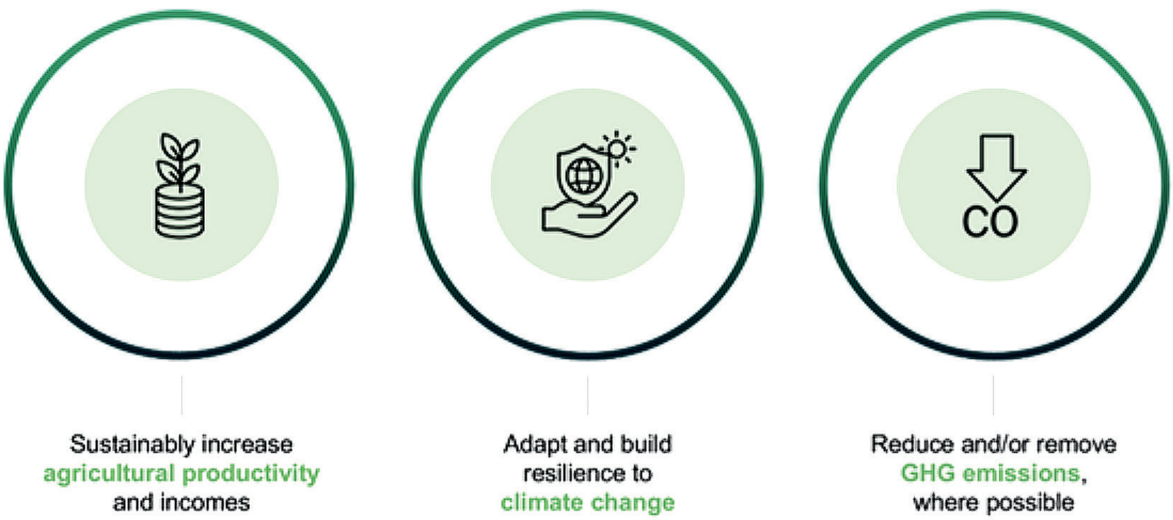
The purpose of this paper is to inform the debate at COP30 by translating private sector experience into actionable insights for governments and negotiators, with a focus on agri-food production where climate footprint is most present and policy action can foster accelerated progress, placing farmers at the center of the transition. It draws on proven initiatives across regions and value chains that show how productivity, resilience, and climate impact can be achieved together. Building on these cases, the paper distills the structural enablers to scale transformation—from outcome alignment and inclusive innovation to financing models that make climate-smart practices investable.

A.2 THE TRANSFORMATION IS UNDERWAY

What was once a long-term ambition is now taking shape through real-world action. Across crops, regions, and production systems, producers and companies are adopting new models that combine productivity with environmental and social outcomes. The challenge now is to coordinate and scale these efforts while acknowledging the differences across food systems around the world and ensuring that progress remains focused on meaningful impact.

To frame this transition, this paper adopts the FAO-recognized concept of **climate-smart agriculture (CSA)**[15]—a broad, cross-sectoral framework that seeks to increase productivity and incomes, build resilience to climate change, and reduce or remove GHG emissions where possible. This makes clear that the focus of this document is not on any single approach, such as regenerative agriculture, sustainable intensification, or sustainable livestock, but on the broader set of climate-smart practices aligned with SBCOP priorities. This framing is deliberately positioned one level above, enabling a broader, cross-sectoral perspective.

EXHIBIT 1 – CSA FRAMEWORK PRINCIPLES

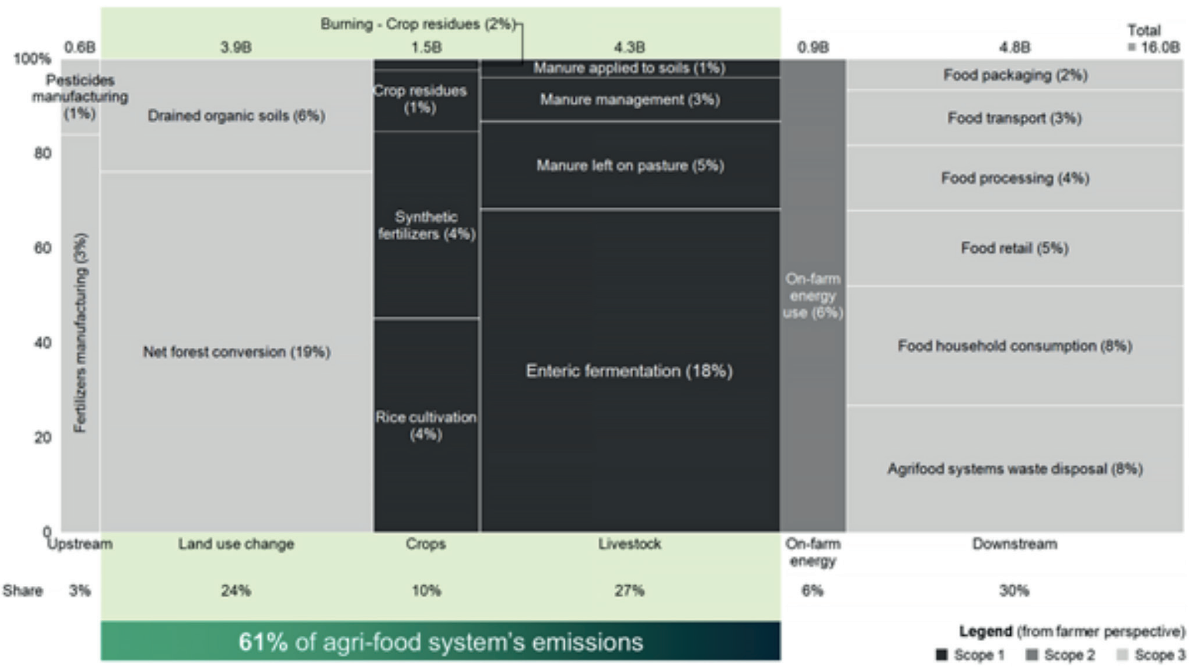


Source: FAO, Climate-Smart Agriculture: Managing Ecosystems for Sustainable Livelihoods (2011)

15 FAO, *Climate-Smart Agriculture: Managing Ecosystems for Sustainable Livelihoods* (2011).

As previously mentioned, food systems are responsible for nearly 30% of global GHG emissions,[16] of which 61% come from activities that happen on the field—including land-use change and the production of crop and livestock[17]—rather than from downstream activities like processing and distribution. Therefore, this paper's focus will be on **agri-food production**,[18] where climate footprint is greatest, and policy action can unlock the largest impact. By focusing on production, farmers are placed at the heart of the transition, ensuring that the transition models identified are built around their needs, a factor consistently recognized as important for achieving effective scale.

Exhibit 2 – GHG emissions distribution along the agri-food chain (tCO2-equivalent, 2022)



Source: "FAOSTAT, Climate Change: Agrifood Systems Emissions – Totals and Indicators – Emissions Totals" (2024)

16 "FAOSTAT, Climate Change: Agrifood Systems Emissions – Totals and Indicators – Emissions Totals," FAO, last updated November 14, 2024, https://www.fao.org/faostat/en/#data/GT

17 "FAOSTAT, Production – Crops and Livestock Products," FAO, last updated June 11, 2025, https://www.fao.org/faostat/en/#data/QCL.

18 This paper's discussion of land use change focuses on levers to sustainably increase agricultural productivity, thereby reducing pressure to expand farmland into forested areas. At the same time, it acknowledges that land use dynamics extend beyond agriculture and are shaped by broader country-specific factors, such as real estate markets and land tenure governance.

Within the food production footprint, **three critical levers emerge: deforestation** (net forest conversion), frequently associated with several factors, such as land tenure regulation and real estate dynamics, command-and-control challenges, and agriculture expansion[19], which alone accounts for 19% of total food system emissions; **livestock methane emissions**, especially from cattle, with enteric fermentation representing 18% of total emissions; and **unsustainable crop management**, such as excessive fertilizer use and poor soil management, among others.[20] Together, these three areas represent more than half of all food system emissions—highlighting where targeted action can deliver the fastest, most scalable results.

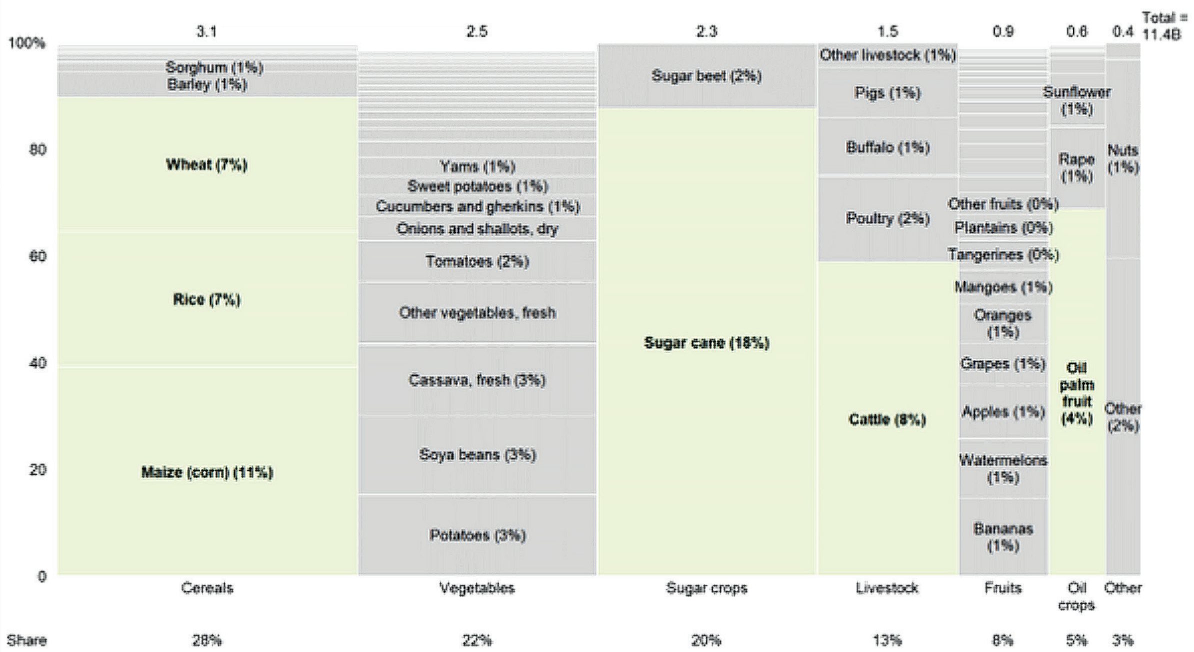
These levers also guide this paper's focus on **terrestrial agriculture**—crops, livestock, and forest-related practices linked to agricultural deforestation. These domains concentrate the three most critical levers of emissions, making them the natural starting point for targeted climate action.

By analyzing **global agricultural production patterns**, it becomes clear which products should be prioritized for climate-smart practices, as they offer the greatest potential impact.

Global agricultural output, including crops and livestock, exceeds 11 billion tons per year, with a small number of commodities dominating total volume. Cereals such as maize, rice, and wheat account for around 25% of global production; sugarcane represents nearly 18%, followed by other high-volume products like beef and oil palm.[21]

19 J.P. Ometto et al., "Cross-Chapter Paper 7: Tropical Forests."
20 World Bank Group, *The Greening of China's Agriculture: A Compendium of Thematic Papers* (World Bank, 2022).
21 "FAOSTAT, Production – Crops and Livestock Products."

Exhibit 3 – Global agricultural production per type of product (in billions of metric tons, 2022)



Source: "FAOSTAT, Production – Crops and Livestock Products" (2024)

Despite over 80% of production being concentrated in five main regions (47% in Eastern, Southern, and Southeast Asia; 17% in Latin America; 9% in North America; and 8% in Sub-Saharan Africa), these products are not evenly distributed. Latin America leads in sugarcane and beef, Southeast Asia concentrates on palm oil and rice, and maize and soy are dominated by North America, China, and Brazil.[22]

These production patterns can be partly explained by climate conditions. In tropical regions, the number of humid months per year defines the length of growing seasons, favoring crops like oil palm, banana, cassava, and rice.[23] In temperate zones, where seasons are more defined, agricultural cycles follow spring and fall planting windows, with crops like maize, wheat, and soy being more predominant.[24] A clear understanding of production patterns helps identify priority geographies where climate-smart models for specific agricultural products can be sourced and scaled, while recognizing that

22 "FAOSTAT, Production – Crops and Livestock Products."

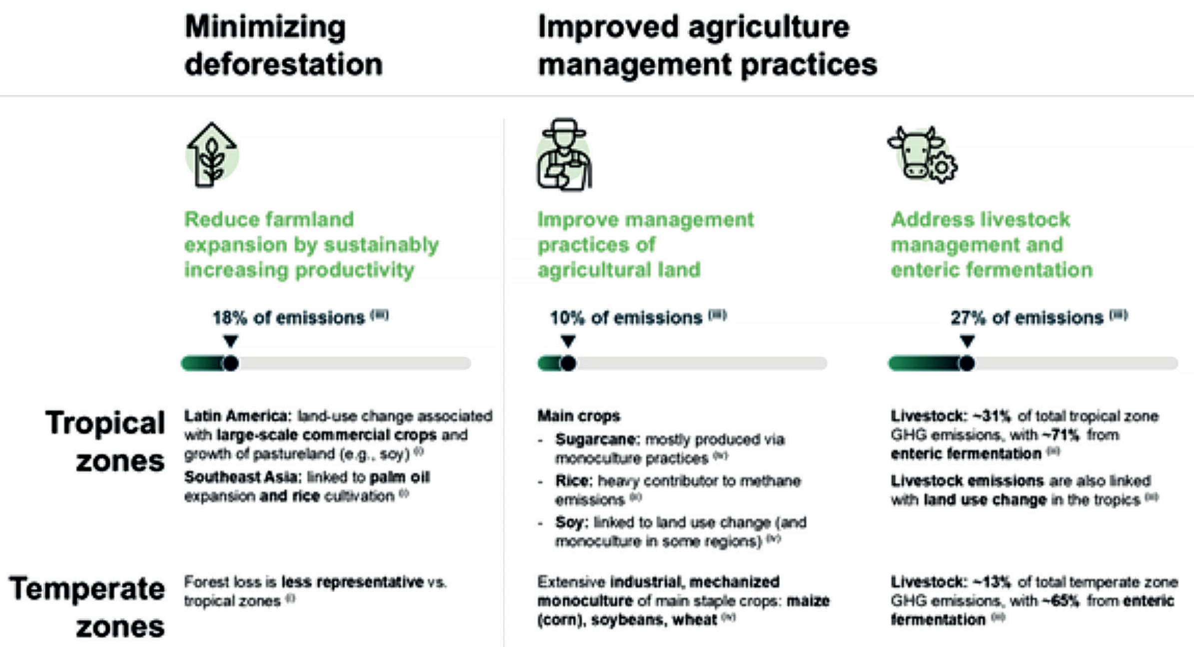
23 Claudio Spadotto and Rafael Mingoti, "Climates, Soils, and Agriculture in the Tropical Region," in *Meio Ambiente: Agricultura, Desenvolvimento e Sustentabilidade 2,* ed. Cleiseano Emanuel da Silva Paniagua (Atena Editora, 2023), 6–23.

24 "The Impact of Temperate Climate on Agriculture: What You Need to Know," Ask.com, accessed April 30, 2025, https://www.ask.com/news/impact-temperate-climate-agriculture-need-know.

although production and emissions are concentrated in certain countries, transforming food systems is a shared responsibility.

However, given the diversity of food systems, these levers cannot be applied in isolation or uniformly. Approaches that are effective in one crop or region may not be suitable for others. To address this complexity, the working group identified which crops and regions are most relevant for each impact lever.

EXHIBIT 4 – FOOD SYSTEMS TRANSITION FRAMEWORK

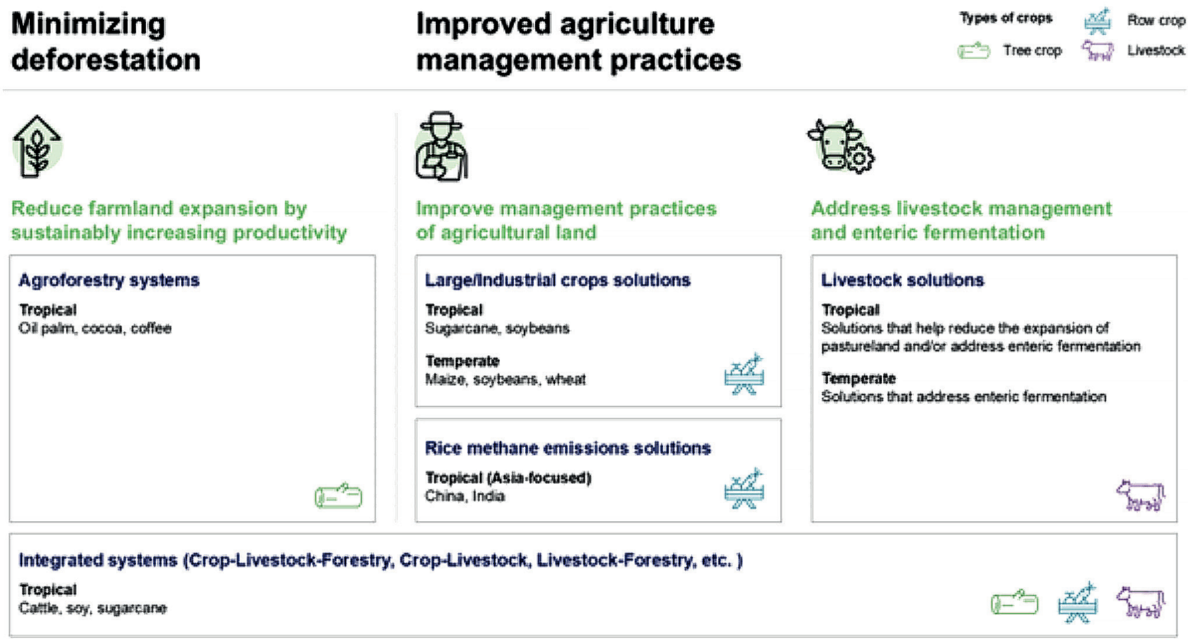


Sources: (i) Elizabeth Goldman and Mikaela Weisse, "Deforestation Linked to Agriculture," World Resources Institute Global Forest Review, last updated April 4, 2024; (ii) "Sustainable Management for Methane Emission Reduction in Rice Cultivation," CCARBON/USP, March 18, 2025, accessed; (iii) "FAOSTAT, Production – Crops and Livestock Products", 2024; (iv) FAO, The State of the World's Biodiversity for Food and Agriculture (FAO Commission on Genetic Resources for Food and Agriculture, 2019).

This framework prioritizes climate-smart interventions by linking key emission drivers with region- and crop-specific transition strategies, ensuring models address both mitigation and productivity.

Applied to today's emissions and production landscape, five transition archetypes emerge as priority areas—each with a concentrated footprint, strong climate impact, and real potential for scale. These archetypes, while not an exhaustive roadmap for food systems transformation, should help to focus attention on where change can be most catalytic, both in terms of emissions and productivity.

EXHIBIT 5 – FOOD SYSTEMS TRANSITION ARCHETYPES



Source: SBCOP Food Systems Working Group

(1) AGROFORESTRY SYSTEMS

Agroforestry systems integrate trees with crops and/or livestock in spatial or temporal arrangements, aiming to enhance both productivity and ecological resilience. These systems are prevalent in tropical regions and are especially common with perennial crops such as coffee, cacao, and oil palm.[25] Because production of these tree crops often expand near or within forested areas, they are frequently associated with deforestation dynamics, especially in the tropics, where over 90% of global forest loss takes place.[26]

Agroforestry contributes to both local and global value chains. It supports the production of fuelwood, fruit, fodder, and timber at the subsistence level, while also supplying key global commodities like coffee, cocoa, rubber, and coconut.[27] Beyond its economic role, agroforestry is increasingly recognized as a strategic instrument to help countries advance national priorities related to poverty reduction, food security, and environmental sustainability.[28]

25 G. Buttoud, *Advancing Agroforestry on the Policy Agenda: A Guide for Decision-Makers* (FAO, 2013).
26 J.P. Ometto et al., "Cross-Chapter Paper 7: Tropical Forests," in *Climate Change 2022: Impacts, Adaptation and Vulnerability,* eds. H.O. Pörtner et al. (Cambridge University Press, 2022).
27 G. Buttoud, *Advancing Agroforestry on the Policy Agenda* (FAO, 2013).
28 J.P. Ometto et al., "Cross-Chapter Paper 7: Tropical Forests."

In practice, some models are already being implemented and generating results. One example is **Nestlé's Regenerative Coffee initiative in Brazil**, which supports the transition of more than 2,000 supplier farms in Espírito Santo and Bahia toward regenerative agriculture as part of Nestlé's global Nescafé Plan 2030 to scale regenerative coffee and cut GHG emissions by 50% by 2030. Embedded in the company's responsible sourcing system, the program goes beyond certification by classifying farms into regenerative maturity levels while offering technical assistance, tailored action plans, and price premiums linked to the adoption of regenerative practices. Emissions and sustainability indicators are tracked using digital tools, such as Cool Farm Tool and satellite monitoring with third-party verification conducted by EY and results reported in Nestlé's Scope 3 GHG inventory.[29]

The model is already showing early signs of scalable impact. In Brazil, reported outcomes include yield increases of 18%, GHG emissions reductions of around 30%, and profitability gains of approximately 10%. Since 2021, Nestlé has invested over $5.5 million USD in training, technical support, and incentive mechanisms and plans to accelerate adoption at scale over the next five years by tracking key performance indicators, such as soil health, carbon, and biodiversity. By combining traceability, agronomic coaching, and economic incentives into one delivery model, the initiative offers a replicable path to transform smallholder coffee systems into low-carbon, climate-resilient supply chains.[30]

Scaling this model demands broad deployment and adoption of MRV tools, access to technical assistance, and financing models that allow smallholders to capture benefits for the positive outcomes they generate.

(2) Integrated systems

Integrated systems combine crop, livestock, and forestry components over time or space, aiming to improve land-use efficiency while delivering environmental benefits. According to Balbino et al. (2011), these systems can be categorized into four configurations, each suited to specific land, crop, and livestock profiles: agropastoral (crop-livestock), silvopastoral (forestry-livestock), silviagriculture (crop-forestry), and agrosilvopastoral (crop-livestock-forestry).[31] These models are particularly relevant for grain, fiber,

29 Data provided by Nestlé (2025).
30 Ibid.
31 D BALBINO, L. C.; BARCELLOS, A. de O.; STONE, L. F. (Ed.) Marco referencial em integração lavoura-pecuária-floresta. Brasília, DF: Embrapa Informação Tecnológica, 130p. 2011.

meat, and dairy production and are often used in the recovery of degraded pastures or to diversify production across climates and input levels.[32]

In Brazil, integrated systems have been used to restore productivity on degraded lands while maintaining ecological balance, with applications across both high- and low-input settings and different operational scales.[33] These models allow for synchronized rotation of crops and animals, enabling year-round land use while reducing the need for expansion.[34] They deliver multiple agronomic and environmental benefits, including carbon sequestration, erosion control, improved soil structure and organic matter, and better animal welfare through microclimate regulation, while also enhancing farmers' resilience to climate shocks and market fluctuations.[35]

The "**Sistema Regenerativo Integrado Roncador**" **from Grupo Roncador** illustrates the potential of integrated systems to combine productivity with environmental restoration. Operating since 2008, the project started with the recovery of a large, degraded area in the transition biome between the Cerrado and the Amazon rainforest. It progressively implemented crop-livestock integration and added regenerative practices over time, including the use of rock dust, native microbial inoculants, composted manure from a 12,000-head feedlot, and other biologically active soil inputs to regenerate soil and boost fertility. Today, it rotates soy, corn, forage crops, and beef cattle across more than 53,000 hectares (ha), restoring fertility and enabling year-round land use without expanding the production footprint.[36]

Results from the last three harvests show a 10% increase in soybean productivity, 8% cost reduction per hectare, and 21% reduction in the average slaughter age for beef cattle. Between 2007 and 2020, the farm's GHG balance shifted from more than 17,471 tCO_2e/year to 231,595 tCO_2e/year, verified by Embrapa, KPMG, Pangea, and IBS. The site has also become a reference for research and innovation, with studies from more than 15 universities advancing soil carbon science in tropical systems and informing field-level GHG measurement protocols. The initiative also has a notable social footprint, employing around 350 staff and hosting 1,000 on-farm residents with 100% school attendance for children living on-site.[37]

32 Ibid.
33 Ibid.
34 Ibid.
35 Ibid.
36 Data provided by Grupo Roncador (2025).
37 Ibid.

Scaling this model requires deployment of tools for data tracking and monitoring, access to technical expertise and technology, and long-term investment capacity.

(3) Large/industrial crop solutions

Large-scale annual crops, such as wheat, soy, palm oil, maize, sugarcane, barley and rice dominate global production systems across both tropical and temperate regions, forming the backbone of food, feed, and biofuel supply chains and accounting for over half of global caloric intake.[38] While essential for food security and economic output, these systems are often linked to high environmental impacts due to monoculture[39], intensive input use[40], and soil degradation.[41] To mitigate this footprint, regenerative practices are increasingly being adopted, including crop rotation, cover cropping, organic amendments, no-till farming, nutrient management, and precision fertilization, helping restore soil health, enhance biodiversity, and reduce emissions such as nitrous oxide.[42]

One example of a large-scale regenerative effort is the **Soil and Water Outcomes Fund (SWOF)**, a multi-stakeholder platform in the US that pays farmers for verified environmental outcomes. The initiative enables producers to adopt regenerative practices such as cover cropping and reduced tillage by combining outcome-based incentives with technical assistance and MRV support. Its hybrid payment model de-risks adoption by providing 25% of payments upfront and 75% after post-season outcome verification. Outcomes are modeled using COMET-Farm, IPCC data, and additional tools and verified through field visits aligned with Tier 3 standards, covering metrics like carbon sequestration, nitrous oxide mitigation, and water quality. The program has strong farmer engagement, with high re-enrollment rates and demand secured by buyers such as PepsiCo and other supply chain actors.[43]

As of 2024, SWOF partnerships with PepsiCo cover 464,906 acres across seven US states, with participating farmers reporting strong agronomic and economic results. Average payments reach $33 USD per acre, while 94% of participants report yield parity or gains and 97.5% see stable or improved profitability. By integrating Scope 3 carbon accounting and water MRV into a single outcome-

38 Paulo D'Odorico et al., "Feeding Humanity through Global Food Trade, *Earth's Future* 2, no. 9 (2014): 458-469.
39 Tim G. Benton et al., *Food System Impacts on Biodiversity Loss* (Chatham House, 2021).
40 Ibid.
41 Davi José Bungenstab et. al, (Ed.). *Integrated Crop-Livestock-Forestry Systems: A Brazilian Experience for Sustainable Farming*. Brasília, DF: Embrapa, 2014.
42 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
43 Data provided by PepsiCo (2025).

based model, the initiative offers a replicable pathway to scale regenerative agriculture across major commodity crops and diverse supply chains.[44]

Another mature initiative is **Bayer's PRO Carbono program**, which helps Latin American farmers adopt regenerative practices to enhance soil carbon and reduce emissions in major crops such as soy, corn, and cotton. Developed in partnership with research institutions, including Embrapa; Luiz de Queiroz College of Agriculture, Universidade de São Paulo; and Universidade Federal de Minas Gerais, the program combines scientific protocols with personalized management plans, farmer training, socio-environmental compliance checks, and full-stack MRV infrastructure. A key differentiator is the use of region-specific parameters and tropical soil data, generated in partnership with academic institutions, to strengthen the accuracy of carbon models and unlock reliable baselines for certification. Monitoring is done through two sampling cycles, with technical assessments funded by Bayer and farmers contributing to field-level interventions.[45]

The initiative currently covers more than 220,000 hectares and involves over 1,900 farmers across 16 Brazilian states, with reported yield gains of 11%, profitability increases of 7%, and a 16% rise in carbon sequestration. The program has also expanded to Argentina, where it includes 165 wheat growers, bringing total participation to more than 2,000 farmers across Latin America. Implementation is supported by a digital MRV platform tailored to local conditions, combining carbon modeling with field-level insights to reduce both costs and complexity. All tools used in the program are third-party verified by Bureau Veritas and Control Union.[46]

Scaling these models require broad deployment and adoption of MRV systems, access to agronomic support and technologies, and flexible financing models that provide demand signals to de-risk the transition and reward outcomes.

(4) Rice methane emissions solutions

Rice is the staple food for over half of the global population, with 90% of its production and consumption concentrated in Asia.[47] Most paddy rice systems rely on continuous flooding, which creates anaerobic soil conditions

44 Ibid.
45 Data provided by Bayer (2025).
46 Ibid.
47 "Asia-RiCE," Asian Rice Crop Estimation & Monitoring (Asia-RiCE), accessed May 30, 2025, https://asia-rice.org/.

that generate high levels of methane. In Southeast Asia, rice cultivation alone can account for up to one-third of national methane emissions.[48]

To address this challenge, new techniques are being introduced to reduce emissions without compromising yields. One of the most widely adopted is Alternate Wetting and Drying (AWD), which intermittently drains rice fields to break anaerobic cycles and curb methane production. Studies indicate that rice is responsible for 10% of global methane emissions[49], and AWD can reduce methane emissions with minimal impact on productivity, while complementary practices like mid-season drainage, composting of rice residues, and direct-seeded rice are also being tested to enhance mitigation outcomes.[50]

A promising example of this transition is **UPL's Low Methane Rice project in India**, which supports smallholder farmers in adopting AWD combined with climate-smart practices and agronomic support. Fully funded by UPL and implemented in partnership with public research institutes in Andhra Pradesh and Uttar Pradesh, the program engages local scientists and agronomists in farmer training and field-level validation. It also addresses key implementation bottlenecks by combining geofencing, app-based compliance tracking, and a private gas chromatography lab for emissions measurement.[51]

The program already reaches 10,400 hectares and 6,000 farmers, with targets to scale tenfold by 2029–30. Reported results show 23% GHG reduction, 40% improvement in water use efficiency, and agronomic gains, including 5% increases in both yield and profitability. Aligned with Verra methodologies and third-party verified by Regional Agricultural Research Station (RARS), the initiative offers a replicable model to reduce emissions in one of the world's most critical staple crops, unlocking potential for Scope 3 reductions and national climate strategies.[52]

Scaling low-emission rice practices such as AWD depends on reliable, controllable irrigation and pricing incentives that reward water saving, simple monitoring tools (e.g., affordable field water tubes), and effective extension and participatory approaches that engage farmers to support adoption.[53]

48 Dina Umali-Deininger, "Greening the Rice We Eat," *World Bank Blogs*, March 15, 2022, https://blogs.worldbank.org/en/eastasiapacific/greening-rice-we-eat.
49 Ibid.
50 Ibid.
51 Data provided by UPL (2025).
52 Ibid.
53 Katharine R. Howell et al., "Alternate Wetting and Drying Irrigation Maintained Rice Yields Despite Half the Irrigation Volume, but Is Currently Unlikely to be Adopted by Smallholder Lowland Rice Farmers in Nepal," *Food*

(5) Livestock solutions

Cattle are the largest source of methane in global agriculture, with enteric fermentation in the rumen accounting for approximately 75% of global enteric methane. Emissions are particularly high in extensive grazing systems with low productivity.[54]

Methane mitigation from cattle can follow two main paths. Direct approaches act on rumen fermentation through additives, vaccines, or inhibitors, while indirect strategies focus on boosting animal productivity via improved feeding, genetics, and pasture management to reduce emissions per unit of output. In practice, adoption reflects regional realities, with developed countries investing in emerging technologies and countries with extensive grazing systems prioritizing efficiency gains through low-cost intensification and technical support.[55]

A representative example of indirect mitigation is **Green Offices 2.0**, an evolution of JBS's original farm regularization program launched in 2021 to support environmental compliance among cattle suppliers in the Amazon and Cerrado. The updated model focuses on low-cost intensification through structured technical assistance, combining legal, agronomic, and business support to accelerate productivity gains and reduce emissions across extensive grazing systems. Producers receive tailored action plans focused on environmental regularization through CAR (Brazil's Rural Environmental Registry), pasture recovery, herd management, and farm benchmarking, delivered through mobile teams, digital tools, and satellite monitoring.[56]

Since 2021, the initiative has formalized over 15,000 farms, assisted more than 800 producers under the 2.0 model, and reached 73,000 hectares with technical support. Independent analysis shows a 27% increase in stocking rates, 29% growth in gross revenue, and a 23% reduction in GHG emissions intensity (CO2e/ton of carcass weight). The program demonstrates how compliance, productivity, and climate performance can be addressed simultaneously, with strong potential for replication across supply chains.[57]

Scaling low-emission cattle systems requires deployment of tools to monitor emissions in extensive systems, access to technical assistance and

and Energy Security 4, no. 2 (2015): 144–157, https://doi.org/10.1002/fes3.58

54 Henning Steinfield et al., *Reducing Enteric Methane for Improving Food Security and Livelihoods.* (FAO, 2016)

55 FAO, *Climate-Smart Agriculture Sourcebook* (2013)

56 Data provided by JBS (2025).

57 Ibid.

technologies, and policies that connect smallholder producers to input support and market access.

These examples illustrate that a low-carbon transformation of food systems is already underway. Across regions, crops, and production models, real-world initiatives are delivering measurable outcomes, while reducing emissions, improving soil health, increasing productivity, and strengthening resilience. There is clear evidence that with the right conditions in place, it is possible to combine environmental and economic goals.

Scaling these results, however, will require removing key barriers that still hold back progress in many regions. It is essential to align on what success looks like and measure it, ensure producers can access the technologies and agronomic support they need, and unlock the capital required to make transition viable for all farm profiles.

These priorities were defined by the SBCOP Food Systems Task Force and are outlined in Exhibit 6, which summarizes the key actions to accelerate adoption of climate-smart practices at scale.

Exhibit 6 – SBCOP Food Systems Working Group priorities

Recommendations	Policy actions
1 Converge on a global, science-based, adaptable, and outcome-oriented minimum viable framework to guide food systems transformation and mobilize capital for effective and scalable practices	**1.1 Alignment on global framework:** Converge on a global, science-based, adaptable, and outcome-driven MVF to guide the transformation of food systems toward climate-smart food production. This framework must be built on a clear and shared understanding of desired outcomes and key metrics to be monitored and verified, while acknowledging regional, biome-specific, and crop/livestock family differences **1.2 MRV systems adoption:** Promote the development and adoption of MRV systems by integrating desired outcomes and key metrics into national agricultural policy goals and by aligning access to public capital with credible performance measurement systems, while supporting the development of MRV systems tailored to each country's food system maturity and the capacities and realities of its farmers
2 Foster productivity growth through the development and scaling of advanced, sustainable and resilient technologies as well as agronomic technical assistance to producers that combined tackle the nexus environment, resilience, food security, and affordability/access, securing the inclusion of least developed countries	**2.1 Technology and agronomic development:** Foster scalable and science-based innovation, facilitating producers' access to new technologies and agronomic technical assistance to tackle the nexus of climate, environment, resilience, and affordability/access—through investment and cooperation between public and private actors to ensure access to scientific progress and promote its adoption on a global scale, while recognizing regional contexts and country-specific needs **2.2 Deployment for inclusion and impact:** Promote more equitable and inclusive productivity gains by supporting smallholders and LDCs through sustainable and resilient innovations, knowledge sharing, technology dissemination, capability building, and international financing schemes—ensuring broader participation in the global food system transformation and improved livelihoods
3 Build breakthrough models for financing and collaboration to support farmers' transition to resilient and sustainable food systems	**3.1 Capital transition:** Secure sufficient, efficient, and inclusive capital allocation for a rapid, large-scale transition through blended financing mechanisms, improving financial capabilities and offerings—de-risking and incentivizing investments—gradually repurposing agricultural support to accelerate the shift towards resilient, more sustainable, and equitable food systems, while ensuring support for innovation and productivity-enhancing approaches **3.2 Ecosystem services:** Monetize the value of relevant ecosystem services delivered by regenerative and sustainable agriculture practices—including improved resilience and environmental outcomes—by developing regulatory and operational frameworks to accelerate the creation of high-integrity, interoperable credits for ecosystem services (e.g., carbon sequestration, soil health, biodiversity conservation, water stewardship)

Source: SBCOP Food Systems Working Group

The following chapters will explore each of these priorities in depth, presenting the rationale behind them and discussing how to translate them into effective and coordinated policy actions.

B. MINIMUM VIABLE OUTCOME-BASED FRAMEWORK

B.1 MINIMUM VIABLE OUTCOME-BASED FRAMEWORK

GROWING GLOBAL TRACTION

As these cases demonstrate, momentum is building in both public and private sectors to accelerate the shift toward climate-smart food systems.

More than 150 frameworks have been developed in recent years to guide sustainable agriculture transitions,[58] highlighting the increasing attention being given by institutions and stakeholders to this agenda. Most of these frameworks serve as voluntary guides to help farmers and agribusinesses transition to practices like cover cropping, crop diversification, and agroforestry, all geared toward measurable outcomes such as increased soil carbon and biodiversity. Increasingly, initiatives such as the World Business Council for Sustainable Development (WBCSD), Regen10, SAI Platform, and Textile Exchange are collaborating to harmonize definitions and metrics so outcomes can be tracked consistently at scale.

Policy momentum is also accelerating. Governments are embedding CSA principles into public strategies, from direct subsidies and tax incentives to broader agricultural reforms. Many of these strategies were highlighted in the COP26 Policy Action Agenda, where 26 nations committed to shift agriculture subsidies and invest in sustainable production.[59]

In Brazil, the **ABC+ Plan** targets 72 million hectares under low-carbon practices by 2030, aiming to avoid over 1 Gt CO_2e while boosting productivity.[60] In parallel, **India's Natural Farming Mission** focuses on scaling climate-smart methods for millions of smallholders, improving resilience and reducing input costs.[61] China is also advancing this agenda through the **Black Soil Law**, which links local performance targets to soil health outcomes and enforces them through a mix of subsidies and penalties.[62]

58 Regen10, *Progress Report: Zero Draft Outcomes-Based Framework* (December 2023), https://regen10.org/wp-content/uploads/2023/12/Regen10-FrameworkReport-Final.pdf

59 "Nations and Businesses Commit to Create Sustainable Agriculture and Land Use," United Nations Climate Change, November 6, 2021, https://unfccc.int/news/nations-and-businesses-commit-to-create-sustainable-agriculture-and-land-use.

60 José Nilton De Souza Vieira, "Subsidies and Environmental Sustainability of Brazilian Agriculture – Some Drivers, Indicators and Results," presented at the Trade and Environmental Sustainability Structured Discussions (TESSD), Ministério da Agricultura e Pecuária, March 16–17, 2023.

61 PIB Delhi, Government of India, "Launch of National Mission on Natural Farming," press release, November 25, 2024, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2077094.

62 Lea Siebert, "New Law on Black Soil Protection," Deutsch-Chinesisches Agrarzentrum, accessed September 16, 2025, https://www.dcz-china.org/2022/07/22/new-law-on-black-soil-protection.

In the EU, policy reform has shifted 25% of **Common Agricultural Policy (CAP)** direct payments toward eco-schemes such as agroforestry and cover cropping.[63] The **US** is following suit, having earmarked $1.5 billion USD in 2024 for CSA.[64]

Corporate sustainability reporting is undergoing a similar transformation. The Taskforce on Nature-related Financial Disclosures (TNFD), launched to develop a risk management and disclosure framework for nature, is witnessing rapid uptake by financial institutions and corporations worldwide. As of July 2024, more than 400 organizations across 49 countries or areas, covering 62 of the 77 sectors defined in the Sustainable Industry Classification System (SICS), had committed to implementing TNFD's recommendations in their reporting, marking a shift from voluntary uptake toward growing regulatory alignment with environmental, social, and governance (ESG) disclosure requirements, as some jurisdictions consider embedding TNFD guidance into reporting rules.[65] This represents a 30% rise in adoption in the first half of 2024 alone.[66] These early adopters span banks, insurers, asset managers, and real-sector companies.

However, despite the growing momentum, **food systems remain deeply underfunded and underserved by climate finance. Global agrifood systems require an estimated USD 1.1 trillion per year** over the next five years to align with the climate finance needs identified for keeping global temperature rise within 1.5°C by 2050 under the Paris Agreement.[67] This includes the agriculture, forestry, and other land use (AFOLU) sector expanded to encompass the entire process of agricultural and food production, from farm to table to waste.[68] Considering only crop and livestock systems, the number amounts to over $300 billion USD per

---

63 David Baldock et al., "Realigning Selected CAP Payment Schemes," Institute for European Environmental Policy, June 12, 2025

64 U.S. Department of Agriculture, "USDA Makes $1.5 Billion Available to Help Farmers Advance Conservation and Climate-Smart Agriculture as Part of President Biden's Investing in America Agenda," press release, April 3, 2024, https://www.usda.gov/about-usda/news/press-releases/2024/04/03/usda-makes-15-billion-available-help-farmers-advance-conservation-and-climate-smart-agriculture-part.

65 "TNFD adoption now over 400 organizations and new sector guidance released," Climate Action, accessed September 16, 2025, https://www.climateaction.org/news/tnfd-adoption-now-over-400-organisations-and-new-sector-guidance-released.

66 Jack Gray, "TNFD Adoption Rises by 30% in Six Months; Additional Guidance Launched," European Pension, June 28, 2024, https://www.europeanpensions.net/ep/TNFD-adoption-rises-by-30-in-six-months-additional-guidance-launched.php.

67 Climate Policy Initiative (CPI) and FAO, *The Triple Gap in Finance for Agrifood Systems* (revised ed.) (ClimateShot Investor Coalition, CPI, and FAO, 2025), https://doi.org/10.4060/cd3611en.

68 Ibid.

year.[4869] **Yet current climate flows reach less than 5% of that need**.[70] Public funding alone cannot cover the gap, and mobilizing private capital will require building confidence that investments are deployed effectively and deliver measurable climate-mitigation outcomes.

Without a shared definition of success and a common backbone of core outcomes, this momentum toward CSA will struggle to scale. Such alignment is essential to guide more than **500 million smallholder farming households**,[71] numerous governments and the private sector to mobilize capital at the scale needed for effective climate mitigation while sustaining agricultural productivity.

Barriers to Scale and Alignment

One of the main barriers to scaling CSA is the absence of a shared framework logic.[72] While existing models may differ in governance—with some being public-led, others private-led, and others driven by multi-stakeholder coalitions—the main differences lie in what they measure and how they define progress, with three main approaches prevailing: **principle-based, practice-based, and outcome-based**.

Exhibit 7 – Different framework logics (not exhaustive)

Principle-based	Practice-based	Outcome-based
Agroecology Coalition	Rainforest Alliance	op2b Optimization to Business
GACSA Global Alliance for Climate-Smart Agriculture	RoC	Regen10
	Climate-smart practices (e.g., no/low till, cover crops)	SAI Platform

Source: SBCOP Food Systems Working Group

69 Ibid.
70 Ibid.
71 "A Year in the Lives of Smallholder Farmers," World Bank Group, February 25, 2016, https://www.worldbank.org/en/news/feature/2016/02/25/a-year-in-the-lives-of-smallholder-farming-families.
72 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).

Principle-based frameworks define sustainability through values and system transformation goals rather than prescriptive actions or metrics. They are usually broad and highly adaptable and offer guiding principles to help practitioners, policymakers, and other stakeholders plan, manage, and evaluate transitions, without imposing fixed rules or practice lists.[73] A prominent example is the FAO-hosted Global Alliance for Climate-Smart Agriculture (GACSA), which brings together governments, farmers' organizations, research institutions, civil society, and the private sector around broad principles for productivity, resilience, and sustainability.[74] The Agroecology Coalition, guided by 13 high-level principles—including input reduction, soil health, and animal health—and aligned with FAO's 10 Elements of Agroecology, further illustrates principle-based frameworks. These principles shape national and territorial strategies and influence public investment design and cross-sectoral coordination, with an emphasis on political and participatory processes over technical standardization.[75,76] The challenge in scaling such frameworks is frequently noted to be the broad nature of their principles, which can make it difficult to translate them into concrete plans and roadmaps.

This limitation is well illustrated by the EU's CAP. Researchers analyzing €59.4 billion in CAP payments from 2015 concluded that, although the CAP had strong potential to drive sustainability, in practice it was vague, unbalanced, and difficult to translate into measurable outcomes. Large shares of funding flowed to already profitable farming regions or even urban areas, while climate- and biodiversity-friendly farmland remained underfunded. Regions with the highest GHG emissions received 1.5 times more support than the lowest emitters, and high-nature-value farmland was left behind. These gaps reinforced income inequality and weakened the CAP's contribution to the Sustainable Development Goals (SDGs). In 2023, the EU revised the CAP to incorporate a performance-based framework, adding clearer environmental indicators and result-based payments in response to these critiques.[77]

---

73 "Definition and Principles," Biovision, accessed June 10, 2025, https://www.biovision.ch/infopool/definitions-and-principles/.

74 FAO. *International Alliance for Climate Smart Agriculture*, project page, start date April 1, 2014, end date December 31, 2024, https://www.fao.org/climate-change/projects-and-programmes/project-detail/international-alliance-for-climate-smart-agriculture/en. (Accessed September 23, 2025)

75 Agroecology Coalition, *The Agroecology Assessment Framework* (2023).

76 Agroecology Coalition, *Strategy 2024-2030: Accelerating Food Systems Transformation through Agroecology* (2024).

77 Murray W. Scown et al., "Billions in Misspent EU Agricultural Subsidies Could Support the Sustainable Development Goals," *One Earth* 3, no. 2 (2020): 237-250.

Practice-based frameworks define sustainability through a checklist of recommended techniques or interventions, such as cover cropping or rotational grazing. As Textile Exchange explains, these models "define best practices that need to be implemented to meet the intent of the standard."[78] The **Regenerative Organic Certified®** program is one example, structuring certification around specific practices in three pillars—soil health and land management, animal welfare, and farmer and worker fairness—with Bronze, Silver, and Gold levels awarded based on compliance with required practices.[79] **SAI Platform's Farm Sustainability Assessment** is another widely used industry program that defines on-farm sustainability through a standardized set of practice and management requirements covering social, environmental, economic, and general farm management for crop production.[80] As with other practice-based models, the challenge is that adoption may not always guarantee the desired outcomes. Although often easier to implement and verify at scale, such approaches may not consistently capture results, as they can fail to reflect actual impact across varying local contexts.

A recent global meta-analysis shows that cover crops can either increase, decrease, or have no effect on nitrous oxide emissions depending on soil and climate conditions.[81] In some cases, emissions even rose during the cover crop phase because root activity stimulated denitrification.[82] The same review found that diversified crop rotations, often promoted as sustainable, sometimes increased emissions by adding more carbon inputs to the soil. These findings highlight that even widely recommended practices can lead to very different outcomes, reinforcing the need to measure real performance rather than assume impact.[83]

Outcome-based frameworks define sustainability through measurable impacts, such as improvements in soil health or biodiversity, and require actors to monitor and track progress over time. As described by Textile Exchange, they "define outcomes based on desired impacts, then monitor,

78 "What Is the Difference between Practice and Outcome-based Criteria Being Looked at for the Unified Standard?," Textile Exchange, accessed June 10, 2015, https://textileexchange.org/faq/what-is-the-difference-between-practice-and-outcome-based-criteria-being-looked-at-for-the-unified-standard/.
79 Regenerative Organic Certified (ROC), *Framework for Regenerative Organic Certified* (2023).
80 SAI Platform, *Farm Sustainability Assessment (FSA) Implementation Framework, Version 2a* (2019).
81 Yue Li et al., "The Role of Conservation Agriculture Practices in Mitigating N_2O Emissions: A Meta-Analysis," *Agronomy for Sustainable Development* 43, no. 63 (2023): https://doi.org/10.1007/s13593-023-00911-x.
82 Yue Li et al., "The Role of Conservation Agriculture Practices in Mitigating N_2O Emissions: A Meta-Analysis"
83 Ibid.

evaluate, and record progress on these outcomes over time."[84] Examples include **World Business Council for Sustainable Development (WBCSD)**, in collaboration with **One Planet Business for Biodiversity (OP2B)**, which structures regenerative agriculture metrics around five dimensions: soil, climate, biodiversity, water and socioeconomics to enable transparent impact reporting;[85] the **SAI Platform**, which offers a modular, farm-level guide built around locally relevant outcomes and continuous improvement cycles;[86] and **Regen10**, a coalition of 13 partner organizations such as the Food and Land Use Coalition (FOLU) and WBCSD that is developing a farmer-driven, outcomes-based framework grounded in primary data and informed by over 150 existing frameworks.[87] While outcome-based frameworks can accommodate multiple pathways, from digital tools to improved agronomy and biotechnology, and should be more effective in guiding meaningful action given their focus on measurable impact, they struggle to scale due to the wide variety of existing metrics and limited outcome verification, which undermines trust and comparability across initiatives.

A recent survey of OP2B member companies illustrates this challenge. While most have introduced monitoring and evaluation systems, the indicators used vary widely, and nearly 46% rely exclusively on manual on-farm assessments, such as self-reported scorecards or field audits. These methods can provide useful detail, but they are labor-intensive, costly, and non-standardized, making it difficult to generate comparable data or scale outcome verification effectively.[88]

On top of that, many frameworks are designed without sufficient farmer input, leading to systems that often fail to reflect real-world conditions.[89] As a result, producers face overlapping and duplicative reporting requests across programs, increasing administrative burden without clear benefit.[90] In some countries, a single farm may be audited separately by

84 Textile Exchange, "What is the Difference?"
85 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).
86 Regenerating Together Programme, *A Global Framework for Regenerative Agriculture* (SAI Platform, 2024).
87 Regen10, *Progress Report: Zero Draft Outcomes-Based Framework* (December 2023), https://regen10.org/wp-content/uploads/2023/12/Regen10-FrameworkReport-Final.pdf
88 WBCSD and OP2B, *Business Guidance for Deeper Regeneration: Soil Chapter — Executive Summary* (August 2024), https://www.wbcsd.org/wp-content/uploads/2024/05/Business-guidance-for-deeper-regeneration_soil--chapter_executive-summary.pdf
89 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).
90 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).

a corporate buyer, a certification body, and a government agency—each using different formats and requirements. Without a farmer-centered approach, frameworks risk feeling abstract, one-sided, and disconnected from producers' realities, which ultimately limits adoption.

In this context, a shared, science-based, outcome-oriented, and farmer-centered framework is the backbone to measure, verify, finance, and scale food systems transformation. Building such a common language is essential to unlock greater flows of both public and private capital by building trust and guiding investment toward meaningful climate action.

Priority 1 seeks to address the two key barriers currently holding back the scale-up of outcome-based frameworks: first, the absence of a shared backbone of desired outcomes that is robust enough to guide action yet flexible enough for regional realities; and second, the lack of scalable, inclusive MRV systems that can link metrics into national policies, tie public funding to verified outcomes, and support models adapted to each country's capacity.

B.2 PRIORITIES

Priority 1: Converge on a global, science-based, adaptable, and outcome-oriented framework to guide food systems transformation and mobilize capital for effective and scalable practices

Policy Action 1.1: Alignment on global framework: Converge on a global, science-based, adaptable, and outcome-driven framework to guide the transformation of food systems toward more sustainable agricultural and livestock production. This framework must be built on a clear and shared understanding of desired outcomes and key metrics to be monitored and verified, while acknowledging regional, biome-specific, and crop/livestock family differences

Policy Action 1.2: MRV systems adoption: Promote the development and adoption of MRV systems by integrating desired outcomes and key metrics into national agricultural policy goals and by aligning access to public capital with credible performance measurement systems, while supporting the development of MRV systems tailored to each country's food system maturity and the capacities and realities of its farmers

Policy action 1.1

Alignment on global framework: Converge on a global, science-based, adaptable, and outcome-driven framework to guide the transformation of food systems toward more sustainable agricultural and livestock production. This framework must be built on a clear and shared understanding of desired outcomes and key metrics to be monitored and verified, while acknowledging regional, biome-specific, and crop/livestock family differences

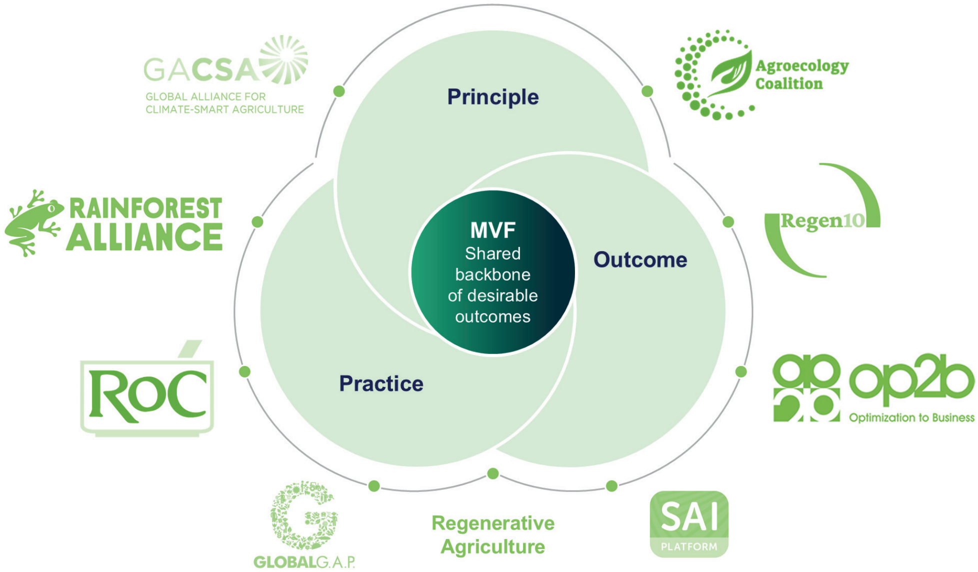
Background and context

Addressing the structural fragmentation of today's landscape requires a shared backbone of outcomes that can guide both public and private sector action. This backbone must be farmer-centric, context-adaptable, and outcome-based with flexibility, ensuring it drives alignment and adoption without becoming a barrier in practice.

Leveraging existing frameworks

The shared backbone of outcomes should not be built from scratch, but by converging existing frameworks. Developing MVF guidelines means engaging coalitions and leveraging the work of current initiatives, studies, and agreed-upon principles and metrics. Existing international references such as SDG Indicator 2.4.1 ("Proportion of agricultural area under productive and sustainable agriculture") provide a holistic starting point, with dimensions covering productivity, resilience, environment, and socioeconomic aspects, despite lacking an indicator on GHG emissions, which is fundamental for food systems transformation.[91] This approach accelerates design and increases the likelihood of broad adoption. Focusing on points of convergence ensures greater comparability and coordination, while acknowledging differences allows for necessary adaptation to local and sector-specific realities.

Exhibit 8 – MVF schematic



Source: SBCOP Food Systems Working Group

Today, most leading frameworks converge around a core set of environmental outcomes—notably **soil health, biodiversity, climate** (GHGs and carbon sequestration), and **water**. For example, the SAI Platform's Regenerating Together framework centers on "soil health, water, biodiversity, and climate, along with the socio-economic area of farmer livelihoods" as universally relevant impact areas.[92] Similarly, OP2B and partners define regenerative agriculture as a holistic, outcome-based

---

91 FAO, *Proportion of Agricultural Area Under Productive and Sustainable Agriculture (SDG Indicator 2.4.1): Methodological Note (Revision 11),* (2023).

92 Regenerating Together Programme, *A Global Framework for Regenerative Agriculture.*

approach that measurably improves soil, biodiversity, climate, and water resources while supporting farming livelihoods.[93]

Convergence is also evident in the **specific outcomes and metrics being tracked**. A comparative review by OP2B mapped a dozen common outcomes cited across 10 major CSA frameworks.[94] Most of these focus on environmental goals—including reducing GHG emissions, sequestering soil carbon, improving soil health, enhancing biodiversity, and protecting water resources, typically measured through a recurring toolkit of indicators. For instance, nearly all frameworks use some form of GHG emissions per area or yield and soil organic carbon (SOC) as a key metric of soil health. OP2B's analysis found SOC to be one of the most widely used metric, being a relevant indicator across a range of contexts and required in many frameworks.[95]

Exhibit 9 – Shared outcome categories and converging metrics (non-exhaustive)

Category	Outcome	Converging metric(s)	Frameworks where metric is cited
Climate	Reduced GHG emissions	Total GHG emissions (tCO_2e/ha), carbon footprint per yield	Regen10, CFT, op2b, RoC
	Increased carbon sequestration	% SOC	Regen10, CFT, op2b, RoC
Soil	Improved soil health	Soil compaction, % SOC, aggregate soil health index	Regen10, op2b, RoC
Water	Improved water availability and quality	Water use (m^3/ha), nutrient runoff, buffer zones	Regen10, CFT, op2b
Biodiversity	Enhanced habitat & diversity	Crop diversity/km^2, % Natural and Semi-Natural Habitats	Regen10, CFT, op2b, RoC

Source: Adapted from the World Business Council for Sustainable Development (WBSCD) and OP2B, OP2B Five-Year Report: Demonstrating Progress on Regenerative Agriculture (2024)

93 WBSCD and OP2B, *OP2B Five-Year Report*.
94 Ibid.
95 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).

However, it is important to acknowledge their **main divergences** in order to determine how best to address them.

While most frameworks align on environmental outcomes, they diverge in whether and how they address social and economic dimensions. Some initiatives focus narrowly on biophysical impact—soil carbon, emissions, water—while others include broader targets, such as farmer livelihoods, gender equity, or governance systems.

OP2B states that there remains no consensus on outcome measurement for social benefits, well-being, or financial resilience across companies' regenerative programs. Regen10's analysis similarly found a "distinct lack of socio-cultural outcomes" in the more than 150 frameworks it reviewed. FAO's agroecology framework, for example, explicitly includes cultural and governance factors—such as co-creation of knowledge or inclusion of traditional practices[96,97]—which are not generally considered by CSA advocates focused on farming practices and ecology.

Another key challenge is the limited metric adaptability of most frameworks. Agricultural outcomes are highly context-dependent—varying by soil type, crop or livestock system, climate, and local constraints—yet many frameworks adopt rigid indicators that are hard to translate across settings. As Regen10 noted, even a seemingly simple outcome like soil health lacks a globally consistent metric: One framework might use microbial biomass, another might use organic matter or bulk density, each suited to different realities. This lack of consistency makes comparison and aggregation difficult.[98]

Key MVF elements

For the MVF to succeed, guidelines must be built around three essential design principles: **farmer-centric, context-adaptable, and outcome-based with flexibility**.

Farmer-centric design is critical to ensure adoption. Producers, especially smallholders and Indigenous communities, are often excluded from the design of frameworks they are expected to implement.[99] Many current models impose

96 Agroecology Coalition, *The Agroecology Assessment Framework* (2023).
97 Agroecology Coalition, *Strategy 2024-2030: Accelerating Food Systems Transformation through Agroecology* (2024).
98 Regen10, *Progress Report: Zero Draft Outcomes-Based Framework* (December 2023), https://regen10.org/wp-content/uploads/2023/12/Regen10-FrameworkReport-Final.pdf
99 Ibid.

indicators that are misaligned with farm-level realities and create excessive reporting burdens.[100] In some cases, a single farm may be audited multiple times with conflicting protocols, providing little value to the producer.[101]

To work in practice, frameworks must be co-developed with farmers, grounded in their realities and embedded with tangible incentives. This includes simplifying data collection, ensuring that indicators support decision-making, and offering timely feedback on performance. Regen10 and its partners have begun piloting farmer-facing tools and engaging Indigenous Peoples and Local Communities (IPLCs) to shape usability. OP2B and WBCSD are also field-testing metrics to improve their fit with producer needs.[102]

Context-adaptable outcomes and methods are equally essential. Outcomes like "soil health" cannot be measured the same way everywhere. A maize producer in sub-Saharan Africa may track SOC, while a dairy operation in northern Europe may focus on biological activity. The framework must provide structure for outcome alignment, while supporting localized interpretation and measurement.

This approach is already being embedded in initiatives like SAI Platform and Regen10. SAI's "Regenerating Together" uses modular outcome areas with built-in flexibility for regional tailoring. Regen10 explicitly designed its framework for use across diverse production systems and landscapes. Local adaptation not only improves feasibility but also builds legitimacy, allowing countries and companies to localize their implementation without losing alignment on high-level goals.[69, 103]

Finally, the MVF must be **outcome-based with flexibility**. Outcome orientation is the north star, but rigid reliance on outcomes risks excluding farmers in transition. Frameworks should recognize the importance of **blended financing models that combine practice-based and outcome-based payments**. This dual structure is critical for farmers adopting climate-smart practices but facing outcome variability due to external factors beyond their control. Programs like the **SWOF** show how early-stage support tied to verified post-season results can lower risk and increase adoption. Embedding this logic ensures that indicators are not only measurable, but also financeable.[104]

100 Ibid.
101 Ibid.
102 WBSCD and OP2B, *OP2B Five-Year Report.*
103 Regenerating Together Programme, *A Global Framework for Regenerative Agriculture.*
104 Data provided by PepsiCo (2025).

A shared, science-based, outcome-oriented, and farmer-centered framework is the backbone to attract large-scale finance to meaningfully transform food systems. It underpins all other actions needed to deliver on climate, nature, and food goals, providing the common foundation on which policies, investments, and innovations can align. By leveraging existing efforts and defining a small number of core outcomes and adaptable metrics, such a framework offers the comparability, transparency, and accountability needed to build trust, direct capital, and design incentives that reward measurable improvements, while still allowing for local adaptability in terms of practices and additional relevant indicators. When co-developed with farmers and tailored to local contexts, it becomes both credible and practical, enabling stakeholders across public, private, and civil society to move from fragmented initiatives to systemic, scalable change.

Policy action 1.1 – Call to action – Governments should:

1. **Co-lead**, along with international organizations, **the development of MVF guidelines** around core outcomes, ensuring they are science-based, farmer-centered, context-adaptable, and outcome-oriented with flexibility to serve as a common reference across agricultural, climate, and biodiversity strategies
2. **Integrate these MVF guidelines into national public policies**—including subsidy allocation, credit lines, and public procurement—embedding outcome-based logic into policy instruments to drive alignment, accelerate adoption, and send clear signals to public and private investors
3. **Facilitate inclusive dialogue** across farmers, civil society, and private sector stakeholders to **align efforts**, support regional adaptation, and ensure implementation reflects local realities while maintaining consistency with global outcomes

Policy action 1.2

MRV systems adoption: Promote the development and adoption of MRV systems by integrating desired outcomes and key metrics into national agricultural policy goals, and by aligning access to public capital with credible performance measurement systems, while supporting the development of MRV systems tailored to each country's food system maturity and the capacities and realities of its farmers

Background and context

Inclusive and scalable MRV systems are essential to build trust and ensure impact-aligned action. Without them, the MVF risks remaining a statement of intent rather than a driver of change. Yet tracking outcomes today remains challenging due to three recurring barriers: **lack of actionable metrics, measurement and reporting inconsistency, and the cost and complexity of MRV systems**.

First, there is a lack of actionable metrics. Most CSA strategies still lack the actionable metrics needed to verify progress and guide investment. Governments often adopt high-level principles, such as resilience, circularity, or equity, but do not define how success should be measured. While directionally valuable, broad principles alone do not translate into implementation. Ministries and delivery agencies are often left without the tools to convert these goals into operational systems that support accountability and results.

The absence of actionable metrics is not limited to government strategies but extends to international frameworks as well. Some frameworks, such as the Agroecology Coalition's, emphasize broad principles (e.g., input reduction, diversity, co-creation of knowledge) without providing farm-level indicators or monitoring protocols.[105]

This lack of actionable, standardized metrics is the issue that policy action 1.1 aims to address.

Second, there is also measurement and reporting inconsistency and fragmentation. Many frameworks still rely on internal reporting or self-declared progress updates, often lacking third-party validation or standardized metrics. There is also a heavy reliance on proxies or modeled estimates—such as reported practice adoption or satellite-derived assumptions—instead of direct, on-farm outcome data. According to Regen10's review of over 150 initiatives, only a small minority (~10%) collect primary outcome data, such as soil measurements, biodiversity counts, or water quality samples.[106]

105 Agroecology Coalition, *Strategy 2024-2030.*
106 Regen10, *Progress Report: Zero Draft Outcomes-Based Framework* (December 2023), https://regen10.org/

When outcomes are measured, monitoring often still relies on manual processes that are difficult to scale or compare. As previously mentioned, a recent survey by the OP2B coalition of its member companies found that 84% have implemented some form of monitoring and evaluation system, reflecting the importance of tracking progress, but only 37% have established baselines for outcomes beyond carbon.[107] Even among those tracking carbon and practice adoption, nearly half (46%) rely exclusively on on-farm manual assessments, such as self-reported scorecards or in-person field audits, while only 23% use large-scale technology-based tools, such as remote sensing or Internet of Things sensors.[72] Manual methods can provide valuable context detail but are labor-intensive, non-standardized, and costly to repeat frequently.[108]

Indicators, baselines, and units also differ significantly across frameworks. For example, one program may report GHG intensity per hectare, while another uses per unit of output, making it difficult to compare or aggregate results. OP2B highlights that current MRV efforts often apply inconsistent standards and are poorly aligned with reporting frameworks commonly used in policy or finance.[72]

Additionally, data is often fragmented across internal ESG systems, third-party certifications, and national inventories, without common formats or interoperability. Reporting cycles and methodologies vary widely, and farms are frequently required to submit similar metrics to multiple systems in different formats and timelines. This redundancy can increase reporting costs, create consistency, and discourage farmer engagement.[72]

Finally, the cost and complexity of MRV remain key barriers to farmer participation in the transition to sustainable food and agricultural production. For producers facing a full transition to advanced systems, the administrative and technical demand s of comprehensive MRV can be daunting. For smallholders in particular, the financial capacity to cover these costs is often non-existent, making compliance an additional burden rather than a pathway to opportunity.

Combined, these challenges not only discourage farmers from adopting CSA practices but also limit the ability of investors to channel capital toward verified outcomes and hinder policymakers from embedding them

wp-content/uploads/2023/12/Regen10-FrameworkReport-Final.pdf
107 WBSCD and OP2B, *OP2B Five-Year Report.*
108 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).

effectively into national strategies. Without credible, comparable, and scalable MRV, both public and private actors face uncertainty, slowing the pace and scale of food systems transformation.

What's needed to scale

For MRV to enable rather than hinder climate-smart adoption, it must be designed as a catalyst for change, not a barrier. To achieve this, public and private actors must work together to address **three critical levers** that unlock wider adoption of MRV systems.

First, incentives should be in alignment with desired outcomes. Farmers and project developers will invest in monitoring if there is a reward for positive results (or a requirement to show results). This can happen through both public and private mechanisms.

On the public side, governments can gradually restructure subsidies, grants, or crop insurance to reward verified climate-smart outcomes—for example, provide payments for measured increases in soil carbon or for certified biodiversity-friendly practices. There is precedent in programs like "payments for ecosystem services," which pay landowners for outcomes like clean water or carbon storage. Costa Rica pioneered payment-for-ecosystem-services,[109] and in China, policies introduced between 2015 and 2019 to curb agricultural pollution achieved the first recorded decline in manufactured fertilizer use in 2016. [110] However, it is important to recognize that not all agricultural incentives can or should be redirected exclusively to environmental outcomes—governments should balance this shift with the need to ensure food security and affordability.[111] Even so, redirecting even a portion of the enormous global agricultural subsidy budget toward outcome-based payments would be transformative.

On the private side, companies can offer price premiums or bonuses to farmers who meet climate-smart criteria[112] (e.g., a grain buyer paying extra per ton for wheat grown with improved soil health metrics). Financial institutions could lower loan rates for farms with verified sustainability metrics (since they are contributing to climate goals).

---

109 J.M. Rodríguez Zúñiga, "Paying for Forest Environmental Services: The Costa Rican Experience," *Unasylva* 212, no. 54 (2003): 31–33.
110 World Bank Group, *The Greening of China's Agriculture: A Compendium of Thematic Papers* (World Bank, 2022).
111 *Sustainable Food Systems: Concept and Framework* (Food and Agriculture Organization of the United Nations [FAO], 2018).
112 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*

Second, governments should embed MVF guidelines including indicators and metrics into mainstream policy[113], from national agriculture plans and extension programs to climate action plans (Nationally Determined Contributions [NDCs]) and rural development schemes. Doing so indicates that CSA outcomes are a priority and ensure that all programs are working toward the same goals.[114] For example, if soil carbon sequestration (measured in tCO_2/ha) and water quality (measured by nutrient runoff levels) are part of a country's NDC or climate finance framework, then monitoring those metrics on farms becomes not just a private initiative but a national mandate. This alignment means that a farmer reporting data on soil health could simultaneously meet a supply chain requirement and contribute to national climate reporting.[115]

Embedding common metrics also facilitates capacity-building and investment, since governments can justify funding for MRV infrastructure (like soil testing labs or remote-sensing tools) as it serves national targets.116 Additionally, including climate-smart indicators in public monitoring (e.g., annual agricultural surveys) can help to make the concept mainstream.

Finally, it is important to ensure tailored and inclusive MRV deployment. One possible pathway is a tiered MRV architecture that allows for broad coverage without sacrificing rigor. According to the World Bank's Soil Organic Carbon MRV Sourcebook, programs should match method to purpose and resources and progress from basic, low-cost options to intermediate approaches that replace IPCC defaults with site-specific factors and occasional field surveys, and, where feasible, to high-end, process-based models and more intensive monitoring to achieve lower uncertainty. The Sourcebook also underscores that approaches can be combined over time — blending non-field and field methods to calibrate models and validate estimates — and that cost-effective options and use of existing advisory systems enable participation by smallholders and LDC contexts rather than exclude.[117]

113 Ibid.
114 Ibid.
115 Ibid.
116 WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).
117 World Bank, *Soil Organic Carbon MRV Sourcebook for Agricultural Landscapes* (Washington, DC: World Bank, 2021)

Ensuring inclusivity also means recognizing the transition period from practice-based to outcome-based incentives. The SWOF in the US illustrates this hybrid model: blending early pay-for-practice with verified post-season pay-for-outcome. By combining technical assistance, MRV support, and payments for verified results such as carbon sequestration and nutrient runoff reduction, **SWOF** reduces adoption risk, improves farmer liquidity, and demonstrates how demand signals from corporate and government buyers can unlock scalable ecosystem service monetization.[118]

By scaling this type of infrastructure, CSA becomes measurable at scale, and therefore investable.

Policy action 1.2 – Call to action – Governments should:

1. **Gradually repurpose subsidies and public budgets** to support sustainable food systems, while ensuring food affordability and security and **providing affordable capital to LDCs and subject matter experts (SMEs)**, so that outcome-based incentives accelerate adoption without excluding vulnerable populations

2. **Establish partnerships with development finance institutions (DFIs) and the private sector to design and scale blended finance structures** that de-risk transitions, crowd in private capital, and link financing to verified outcomes, ensuring that CSA is both investable for financiers and accessible for farmers

118 Data provided by PepsiCo (2025).

C. PRODUCTIVITY INCREASE

C.1 PRODUCTIVITY INCREASE

Food systems have undergone major productivity gains over the past decades, enabled by advances in innovation and technology, such as high-yield crop varieties, improved irrigation, fertilizers, crop protection, and mechanization.[119] Between 1961 and 2009, global agricultural output grew by 150%, while cropland area increased by only 12%, reflecting a significant decoupling of production from land expansion.[120]

As previously mentioned, these gains allowed food supply to keep pace with global population growth but also led to persistent challenges, including soil degradation, rising greenhouse gas emissions, food insecurity, and extreme poverty, especially in LDCs.[121]

With the global population projected to reach 9.7 billion by 2050 and climate shocks intensifying,[122] food systems will face even greater strain. Transformation will only take hold if it delivers tangible gains in productivity and profitability for farmers.[123] Reducing GHG emissions can feel abstract and disconnected from farmers' daily realities, especially in countries where food security remains the overriding concern.[124] As a result, mitigation alone is rarely a meaningful incentive.[125] Instead, adoption depends on practices that deliver sustainable productivity growth, including improvements in yields, incomes, and resilience. Evidence shows this is achievable, but only if farmers gain reliable access to technology, inputs, and agronomic support.[126] The challenge, therefore, is not farmers' unwillingness to adopt change, but the many barriers they face in doing so.

Barriers to technology and innovation adoption

Economic barriers come first, including affordability constraints, delayed returns, and limited access to finance, especially for smaller producers who often carry the greatest risk (addressed in Priority 3). **Technical**

119 FAO, *The State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk* (Earthscan, 2011).
120 FAO, *The State of the World's Land and Water Resources for Food and Agriculture*
121 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*
122 UN Department of Economic and Social Affairs, *World Population Prospects 2022* (2022), https://population.un.org/wpp/.
123 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*
124 Ibid.
125 Ibid.
126 Ibid.

and operational limitations also play a role, with many farmers lacking agronomic support, consistent input supply, and localized data to guide decisions in real time. **Social barriers** add another layer, as unfamiliar practices can face hesitation or resistance when they disrupt established routines or demand trust in systems not yet fully proven.[127]

Exhibit 10 – Barriers to farmer adoption of CSA

Economic barriers	**Affordability** Adoption may require Investments and/or result in temporary losses for growers	**Timing of value** Investments and cash losses occur in the near term, benefits are commonly not realized until later	**Risk and uncertainty** Unpredictability of costs and, particularly, benefits of adoption
Technical and operational barriers	**Access** Lack of access to needed agronomic advice, training, services, inputs, equipment, labor and/or market infrastructure	**Farm data and metrics** Lack of clarity over what to measure and optimize for and how to measure or track progress	**Autonomy** Programs and regulations allow too little flexibility for growers to choose the most relevant practices and support
Social barriers	**Trust** Lack of farming community trust in programs that require major changes to how they farm	**Social dynamics** Hesitance over unconventional practices and fragile leasing relationships between landowners and renter-operators	

Source: Adapted from CNI and B20 Brazil Secretariat, Sustainable Food Systems & Agriculture Policy Paper

Overcoming the technical, operational, and social barriers will require more than access to innovation itself.[128] Farmers need inclusive technical and agronomic support that translates new technologies into workable solutions on the ground.[129] This means equipping producers with the knowledge, training, and confidence to adopt new practices, while ensuring they have the tools to sustain productivity through the transition. [130] For smallholders and producers in LDCs, such support is especially critical to avoid widening inequality.[131] Making innovation accessible, practical, and inclusive is therefore essential to ensure that productivity growth is not only environmentally sustainable but also socially equitable.

---

127 World Economic Forum and Bain & Company, *100 Million Farmers: Breakthrough Models for Financing a Sustainability Transition (Insight Report)* (2024).
128 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
129 Ibid.
130 Ibid.
131 Ibid.

C.2 PRIORITIES

Priority 2: Foster productivity growth through the development and scaling of advanced, sustainable, and resilient technologies, as well as agronomic technical assistance to producers, that combined tackle the nexus environment, resilience, food security, and affordability/access, securing the inclusion of LDCs

Policy Action 2.1 – Technology and agronomic development: Foster scalable and science-based innovation, facilitating producers' access to new technologies and agronomic technical assistance to tackle the nexus of climate, environment, resilience, and affordability/access—through investment and cooperation between public and private actors to ensure access to scientific progress and promote its adoption on a global scale, while recognizing regional contexts and country-specific needs

Policy Action 2.2 – Deployment for inclusion and impact: Promote more equitable and inclusive productivity gains by supporting smallholders and LDCs through sustainable and resilient innovations, knowledge sharing, technology dissemination, capability building, and international financing schemes—ensuring broader participation in the global food system transformation and improved livelihoods

POLICY ACTION 2.1

Technology and agronomic development: Foster scalable and science-based innovation, facilitating producers' access to new technologies and agronomic technical assistance to tackle the nexus of climate, environment, resilience, and affordability/access—through investment and cooperation between public and private actors to ensure access to scientific progress and promote its adoption on a global scale, while recognizing regional contexts and country-specific needs

BACKGROUND AND CONTEXT

Main innovation pathways

The path forward is already being shaped by three core areas of innovation driven by the private sector: **biotechnologies, digital tools, and climate-smart agronomic practices**.[132]

132 World Economic Forum and Bain & Company, *100 Million Farmers*.

Biotechnologies, such as improved seeds, microbial fertilizers, biological pest control, and nutritional supplements, are helping farmers increase the efficiency of crop and livestock varieties, ensuring higher productivity with less environmental impact.[133] One example is **AjiPro-L**, a lysine-based supplement developed by Ajinomoto to improve amino acid balance in feed during the finishing phase of beef cattle. By increasing daily weight gain and reducing days to slaughter, the solution improves feed efficiency, lowers production costs, and cuts GHG emissions by up to 10% through reduced methane, nitrous oxide, and feed-related CO_2.[134]

Digital tools are also making supply chains more precise and efficient through data-driven irrigation, smart input application, real-time weather and soil analytics, and improved logistics.[135] One example is O**ne Smart Spray**, a precision spraying system developed by BASF in partnership with Bosch that uses real-time camera sensors and AI to identify weeds and optimize herbicide application. During the EU-based project, the system reduced herbicide volumes by an average of 36%, lowering both costs and environmental impact without compromising yields.[136]

Beyond technology, **climate-smart practices** such as crop rotations, cover cropping, and reduced tillage are also gaining traction as pathways to restore soil function, retain water, and sustain productivity over time.[137] For instance, **PepsiCo is leading a cross-brand pilot in Poland** to scale regenerative agriculture across its potato supply chain. In its first year, the initiative reduced GHG emissions per acre by 11.7%, with a five-year target of 20%, while also improving soil structure and farmer profitability through co-investments with Mars. A key factor to drive this success has been the close technical and agronomic support provided by PepsiCo, as well as the deployment of monitoring and verification technologies, reinforcing the importance of supporting farmers through the transition.[138]

Looking ahead, roughly 85% of global crop production growth over the next decade is expected to come from increases in yield and cropping intensity,

133 Wilhelm Klümper and Martin Qaim, "A Meta-Analysis of the Impacts of Genetically Modified Crops," *PLoS ONE* 9, no. 11 (2014): e111629.
134 Data provided by Ajinomoto (2025).
135 Arushi Goel and Sowmya Komaravolu, "How Is Agritech Helping to Optimize the Farming Sector?," World Economic Forum, October 31, 2023, https://www.weforum.org/stories/2023/10/artificial-intelligence-agriculture-innovation-agritech-india/.
136 Data provided by BASF (2025).
137 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
138 Data provided by PepsiCo (2025).

rather than land expansion.[139] According to the Organisation for Economic Co-operation and Development (OECD) and FAO estimates, this growth will be driven by better-adapted seeds and improved crop management in low and middle-income countries, while high-income regions are expected to rely more on nitrogen-fixing crops and related investments.[89] Regardless of geography, however, it is paramount that these increases in yield come alongside better environmental outcomes.

Strengthening innovation ecosystems

While these advances in biotechnologies, digital tools, and climate-smart practices demonstrate what is possible, technology alone is not enough. Sustained productivity growth requires innovation ecosystems that make solutions scalable, investable, and practical for farmers. To achieve this, ecosystems must be **farmer-centered, aligned with government priorities, connected to farmer-allied enterprises, and guided by clear and consistent metrics**.

Putting farmers at the center means designing solutions that are relevant, trusted, and actionable within the realities of daily production. Multiple stakeholders should align and contribute to deliver on the "4 As" of farmer adoption—awareness, advantage, access, and affordability—ensuring that farmers know which climate-smart practices work, believe they offer value, be able to access them at the right time, and afford adoption within their production and cash flow cycles.[140] **Nestlé's Income Accelerator program** responds to these needs by combining pruning brigades, agroforestry support, savings groups, and household incentives to strengthen cocoa productivity and resilience. In Côte d'Ivoire, the initiative reached 30,000 families by 2024, with independent evaluation reporting 34,039 hectares pruned; 556,220 seedlings planted; and 20,450 households in savings groups. Participating families saw cocoa yields rise by 18% and cocoa net income increase by 21% in the same year.[141] Similarly, Danone's Jornada Flora program in Brazil shows how combining access to finance, technical, and managerial assistance and regenerative practices can drive both farmer

139 OECD and FAO, *OECD-FAO Agricultural Outlook 2023-2032* (OECD Publishing, 2023).
140 World Economic Forum and Bain & Company, *Food, Nature and Health Transitions: Repeatable Country Models (Insight Report)* (2023).
141 Nestlé, *Nestlé Income Accelerator Program Progress Report Summary, June, 2025.*

profitability and resilience. By mobilizing more than R$100 million in subsidized credit; offering training and guaranteed purchase contracts; and supporting practices such as no-till planting, pasture restoration, manure management, and animal welfare best practices, the initiative achieved a 48% reduction in CO_2 emissions, a 42% cut in methane, and a 37% increase in farmer net income from 2021 to 2024.[142]

Aligning innovation with public sector priorities also improves the conditions for scale by reducing costs, lowering risk, embedding innovation in national policies, and supporting a predictable regulatory environment. Governments can enable this by sharing the financing burden through smart subsidies, tax incentives, or concessional lending and by supporting science-based and transparent regulation. In Thailand, for example, **PepsiCo, CropLife International, and their partners are working with the Thai Rice Department, GIZ, and the Green Climate Fund** to transition smallholder rice systems to low-emission models using practices like AWD, site-specific nutrient management, and improved seed systems. Embedded in national climate policy and scaled through public extension services, the program has reached over 250,000 farmers, increased incomes, reduced irrigation needs by 30% to 40%, and delivered methane emission cuts of up to 50% in pilot areas.[143]

Farmer-allied enterprises can play an important role in unlocking productivity and value by connecting fragmented production to inputs, services, and stable markets, especially in developing markets or remote areas.[144] By guiding crop choices, supporting sustainable intensification, and enabling long-term procurement and downstream participation, they strengthen the farmer's role across the value chain and unlock economic and environmental gains.[145] A promising example is **Tetra Pak's Dairy Hubs model**, which connects smallholders to training, infrastructure and centralized collection systems to improve profitability and secure offtake. In Kenya, the program has reached over 11,000 milk suppliers, increasing production by 17%, profitability by 26%, and reducing rejection rates by 71% through embedded advisory support and quality-based incentives.[146]

---

142 Data provided by Danone (2025).
143 Data provided by PepsiCo (2025).
144 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
145 Vikki Tam and Chris Mitchell, "How Farmer-Allied Intermediaries Can Transform Africa's Food Systems," webinar, Bain & Company, November 10, 2020.
146 Tetra Pak, *Dairy Hub Handbook* (2025), https://www.tetrapak.com/content/dam/tetrapak/publicweb/gb/en/sustainability/Tetra-Pak-Dairy-Hub-Handbook.pdf.

Broad adoption of sustainable practices also depends on the **ability to measure impact with consistency, precision, and credibility**. Many systems still face institutional gaps in defining what to measure and how to coordinate metrics across actors, which this paper aims to address with Priority 1. Technical challenges add further complexity, as diverse farming conditions and regional variability make it difficult to apply consistent indicators, while limited data infrastructure and fragmented reporting continue to hinder transparency and shared understanding.[147] **Bayer's PRO Carbono** directly addresses these challenges through a robust measurement system adapted to tropical agriculture. The initiative integrates a digital platform for field data, carbon footprint calculator, and predictive model for soil carbon, helping farmers track progress, enable third-party verification, and reduce the cost and complexity of implementation across more than 2 million hectares.[148] **BASF's Global Carbon Farming Program** provides another example. Partnering with barley farms in Ireland, the program adopted practices such as cover cropping and no-till, while using digital tools like xarvio® FIELD MANAGER and Regrow for monitoring. Emissions reductions were measured and third-party verified by SustainCERT under the Verra VM0042 methodology, illustrating how robust MRV systems can be embedded into climate-smart farming models.[149]

By strengthening innovation ecosystems, breakthroughs have the potential to move beyond pilots, aligning productivity, resilience, and climate goals while enabling inclusive, farmer-led transformation.

Policy action 2.1 – Call to action – Governments should:

1. **Co-invest in farmer-centered innovation ecosystems** alongside the private sector and research institutions, reducing costs and risks **while fostering collaboration among countries** to promote knowledge sharing, access to innovation, and technology deployment

2. **Embed innovation within national strategies and extension systems**, using tools such as smart subsidies, tax incentives, concessional lending, and transparent regulation to lower adoption risk and enable scale

147 Camila Genaro Estevam et al., *Quantificação das Emissões de GEE no Setor Agropecuário: Fatores de Emissão, Métricas e Metodologias* (Observatório de Bioeconomia and FGV, 2023).
148 Data provided by Bayer (2025).
149 Data provided by BASF (2025).

3. **Foster cross-border public–private partnerships** among agrifood industries, farmers, governments, and research bodies through international agreements, with the goal of defining roadmaps for country development and for innovation and technology development and adaptation

Policy action 2.2

Deployment for inclusion and impact: Promote more equitable and inclusive productivity gains by supporting smallholders and LDCs through sustainable and resilient innovations, knowledge sharing, technology dissemination, capability building, and international financing schemes—ensuring broader participation in the global food system transformation and improved livelihoods

Background and context

According to recent OECD and FAO analyses, meeting global food security and climate goals will require a 28% increase in average agricultural productivity by 2030.[150] This target is particularly challenging in LDCs, where structural barriers such as limited access to finance and credit, insufficient infrastructure, and fragmented supply chains continue to suppress productivity, exacerbate food insecurity, and hinder resilience.[151]

In economies classified as "Rural and Traditional" or "Informal and Expanding", mostly concentrated in Africa and Asia—for example, Mali, Niger, and Ethiopia in the first group and India, Bangladesh, and Pakistan in the second—food systems are dominated by smallholder farmers working plots no larger than two hectares.[152] In these countries, median agricultural productivity is just 40% of that observed in more advanced systems, with over 90% of the population living on less than USD 5.50 per day and facing high levels of food insecurity and vulnerability to shocks.[153]

Agriculture plays an outsized role in these economies, contributing on average 4.5 times more to GDP than in high-income countries, making productivity growth not just a food security imperative but a catalyst for

150 OECD and FAO, *OECD-FAO Agricultural Outlook 2023-2032.*
151 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
152 Ibid.
153 Ibid.

rural economic transformation.[154] As farmers begin to produce surpluses, downstream markets emerge, demand for services expands, and new activity flows into processing, distribution, and input supply, enabling the food economy to generate employment, raise incomes, and reduce poverty beyond the farm gate.[155] To maximize this potential, productivity growth in LDCs must be guided from the start by sustainable and climate-smart practices; otherwise, countries risk following the same unsustainable path taken elsewhere and later facing the cost of correcting it.[156]

Unlocking this potential requires stronger market infrastructure and delivery systems that connect sustainable farm-level productivity to value creation. Small and medium-sized enterprises, including input suppliers, cooperatives, processors, aggregators, and logistics firms, play a central role in this process.[157] Often overlooked in public planning and investment flows, they form the hidden middle of food systems by translating farm output into real economic opportunity.[158] When supported, they help reduce risk for producers, improve access to markets and finance, and expand rural employment through sourcing models that align smallholder supply with growing demand.[159]

Governance and strategic planning are equally critical to translating potential into progress. Governments in LDCs should lead with clear national strategies that align food systems transformation with climate goals and development priorities.[160] These plans should define clear mid- and long-term targets; coordinate across ministries like agriculture, trade, finance, and environment; and align public and private investment behind scalable models.161 When this alignment is in place, it improves deployment, accelerates institutional coordination, and increases the effectiveness of available resources.[162]

154 Ibid.
155 Ibid.
156 UNECA, *Transition to Renewable Resources for Energy and Food Security in North and West Africa: Concept Note for Expert Group Meeting, 1 November 2023*. Accra, Gahana: UNECA, 2023
157 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
158 Ibid.
159 Ibid.
160 Ibid.
161 Ibid.
162 Ibid.

These transformation efforts require stable, long-term public investment. In Africa, for example, the Comprehensive Africa Agriculture Development Programme (CAADP) recommends allocating at least 10% of national budgets to agriculture, a target reaffirmed in the Malabo Declaration and already adopted by several countries.[163] Where public funding has been sustained, countries have seen steady gains in productivity and rural development.[164]

However, public resources alone will not suffice.[165] LDCs should actively pursue **private and international financing**, including access to climate finance aligned with their NDCs under the Paris Agreement.[166] This could also involve coordinated sovereign debt restructuring linked to food system investment plans, as suggested by the Loss and Damage Fund created at COP27 to support the most vulnerable countries.[167]

To maximize impact, international cooperation should focus on channeling climate finance where it can make the greatest difference, while investments evolve to support the broader scope of food system transformation—environmentally sound infrastructure, accessible digital tools and data systems, and the human capital needed to deploy technologies and build local capabilities.[168] Shared knowledge and cross-border partnerships can serve as critical levers to accelerate this transition, strengthen livelihoods, and combat food insecurity.[169]

Policy action 2.2 – Call to action – Governments should:

1. **Lead with clear national strategies that align productivity growth with climate and development goals**, define measurable targets, and coordinate ministries, budgets, and private investment toward scalable models, while **facilitating adoption through investments across the value chain**—from market infrastructure and extension services to digital platforms and farmer advisory networks—with a particular focus on **LDCs**

163 CAADP and New Partnership for Africa's Development (NEPAD), *Guidelines: CAADP Country Implementation under the Malabo Declaration* (2016).
164 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
165 Ibid.
166 Ibid.
167 Ibid.
168 Ibid.
169 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*

D. FINANCING MODELS

D.1 FINANCING MODELS

Transforming food systems at scale will not happen without capital. No matter how clear the goals are (Priority 1) or how advanced the technologies become (Priority 2), financing remains the decisive barrier. What is needed are financial models that make sustainable production economically viable and accessible, turning climate-smart transitions into investable opportunities. Yet, this transformation requires mobilizing way more financing than has been achieved so far.

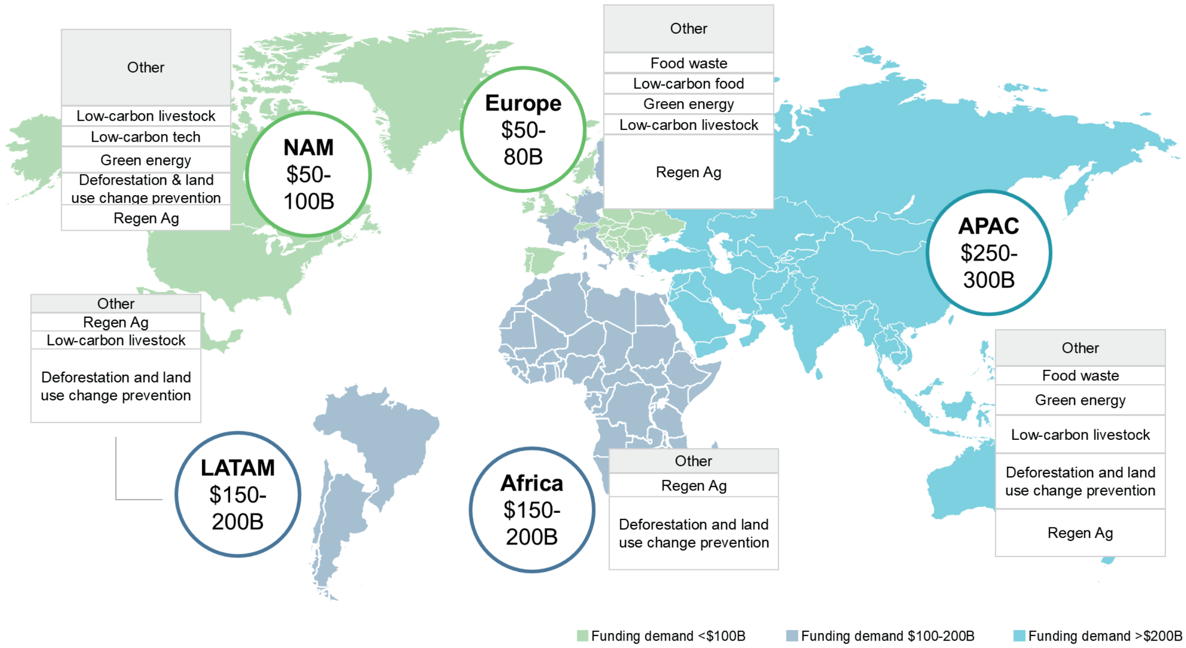
FUNDING CHALLENGE

As previously mentioned, **food systems remain deeply underfunded and underserved by climate finance**, receiving less than 5% of the approximately $300 billion USD per year needed to decarbonize crop and livestock production.[170] However, there are also important challenges to overcome beyond capital volume.[171]

First, the distribution of funding remains narrow and imbalanced. In 2019/20, 85 percent of climate finance for food systems still came from public institutions,[172] while private investment remains limited in scale and concentrated in downstream or export-oriented segments in Europe and North America. Lower-income regions remain underrepresented in concessional flows and transition-aligned finance, limiting their ability to implement long-term strategies and scale resilient food systems.[173]

170 CPI and FAO, *The Triple Gap in Finance for Agrifood Systems*.
171 Ometto et al., "Cross-Chapter Paper 7: Tropical Forests."
172 Barbara Buchner et al., *Global Landscape of Climate Finance 2023* (Climate Policy Initiative, 2023), https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/.
173 World Economic Forum and Bain & Company, *Putting Food on the Balance Sheet: Financing Strategies to Scale Investment in Food Systems Transformation (Briefing Paper)* (2025).

Exhibit 11 – Funding need per solution applied to FOLU 19[174] relative need per region per solution; includes both mitigation and adaption (in USD)



Source: Adapted from World Economic Forum and Bain & Company, Putting Food on the Balance Sheet: Financing Strategies to Scale Investment in Food Systems Transformation

Development finance,[175] which is essential for enabling transitions in low- and middle-income countries, has also declined in relative terms, with agriculture's share of official development assistance falling from 4.5% to 3.8% over the past decade, its lowest point in recent history.[176] Persistent barriers, including weak project pipelines, limited bankability, and high transaction costs, help explain this scenario, which matters especially for low-income countries.[177] According to B20, these countries will need to invest around 2% of their GDP annually to transform their food systems, a much heavier lift than the 0.03% required in high-income economies.[178] In this context, better distributing investments across the entire value chain must also be priority.

174 Food, Oceans, Land Use, 19 priority solutions identified in the global FOLU agenda
175 Development resource flows include measuring the inflow of resources to recipient countries through bilateral official development assistance (ODA); grants; concessional and non-concessional development lend by multi-lateral financial institutions; and other official flows, including refinancing loans, which are meant for development purposes, but which have too low a grant element to qualify as ODA.
176 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
177 Ibid.
178 Ibid.

The quality of capital allocation is also a key obstacle to systemic transformation, as large portions of agricultural support continue to reinforce short-term productivity at the expense of long-term sustainability. While subsidies play an important role in ensuring affordable food and stabilizing farmers' incomes, particularly in regions where food security remains a primary concern, their design can sometimes generate market distortions. According to the World Bank, over 60% of agricultural subsidies remain market-distorting, incentivizing volume over environmental or social outcomes, while payments linked to the delivery of public goods like ecosystem services remain underdeveloped, with only 0.6% of budgetary payments to producers in OECD countries between 2019 and 2021 tied to such outcomes.[179, 180]

Additionally, the transformation of the food system requires not only increased resources from multiple sources allocated adequately, but also distributed inclusively, with efficient channeling of those resources to farmers.[181] Public funders, philanthropies, and international organizations must find ways to mobilize private sector investment more effectively.

Public capital should be directed toward enabling investments such as infrastructure, innovation, R&D and technical services, which are essential for driving sustainable productivity gains.[182] Studies by the World Bank and IFPRI show that allocating public expenditure toward green innovation could reduce emissions from agriculture and land use by more than 40%.[183]

Economic barriers to adoption on the ground

Even if the structural funding gaps related to volume, distribution, and quality are addressed, **significant inclusion challenges remain**. On the ground, farmers and other actors across the value chain face systemic barriers that limit their ability to participate in and benefit from the transformation of food systems.[184]

From a farmer's perspective, transitioning to CSA frequently demands high upfront investments in new technologies, practices, and services,

179 OECD, *Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change* (2023).
180 Madhur Gautam et al., *Repurposing Agricultural Policies and Support to Transform Food Systems* (World Bank Group, 2022).
181 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
182 Ibid.
183 Madhur Gautam et al., *Repurposing Agricultural Policies.*
184 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*

while benefits tend to materialize only over the medium to long term.[185] The transition also brings exposure to operational risks, income volatility, and learning costs, which are often amplified by weak market incentives and underdeveloped financial instruments.[186]

In terms of affordability, the cost of transition often exceeds the financial capacity of producers, particularly small- and medium-scale farmers with limited margins and restricted access to credit.[187] A model developed by Bain & Company and the World Economic Forum shows that implementing no-till and cover cropping on a 500-acre farm in the US could consume up to 112% of EBITDA in the first year, before any return is realized.[188] In many emerging markets, the cost pressure is even greater due to weaker financial infrastructure[189] and lower baseline productivity,[190] which can make transitions more difficult to sustain without mechanisms that help reduce upfront exposure.

Timing is another critical constraint. While the benefits of climate-smart practices tend to accumulate gradually over multiple seasons, most of the costs are incurred upfront. Improvements in yield, input efficiency, and resilience often take time to materialize, which makes the transition difficult to finance within short credit cycles or annual planning horizons. Conventional financial instruments rarely accommodate this return profile, and few producers can absorb the lag between investment and value realization without facing liquidity pressure.[191] Programs like the **SWOF** help bridge this gap by combining early practice-based support with verified outcome payments, reducing liquidity pressure during the transition.

Risk and uncertainty also limit adoption, as producers face variability in soil conditions, climate patterns, and market dynamics that affect both the magnitude and timing of returns. Transitions often involve unfamiliar practices and context-specific responses that increase exposure and make outcomes harder to predict, while key public goods such as carbon sequestration, water regulation, and biodiversity remain uncompensated, weakening the economic rationale for change.[192] This unpredictability

185 Ibid.
186 Ibid.
187 Ibid.
188 World Economic Forum and Bain & Company, *100 Million Farmers*.
189 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper*.
190 World Economic Forum and Bain & Company, *Food, Nature and Health Transitions*.
191 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper*.
192 Ibid.

limits the willingness of financial institutions to lend, restricts access to affordable capital, and reinforces a cycle of exclusion.[116]

The hidden middle, made up of agricultural SMEs, aggregators, processors, distributors, and other intermediaries, plays a critical role in connecting farmers to markets, inputs, and services. Yet they are often excluded from formal financing channels, despite their central role in enabling scale, aggregation, and risk management across the value chain.[193] In sub-Saharan Africa alone, the financing gap for agricultural SMEs is estimated at $90 billion USD.[194] Where capital is available, costs are frequently prohibitive, with interest rates between 15% and 30%, far above the margins that most can sustain.[195] Addressing this gap can involve models that help connect smallholders and SMEs more directly to formal markets and finance. **Tetra Pak's Dairy Hub model** illustrates this approach, showing how integrating smallholders into processing chains can expand access to finance, infrastructure, and stable offtake, while improving productivity and resilience.[196]

Moving forward, unlocking food system transformation will require aligned actors, clear incentives, and financial mechanisms that direct capital across the value chain—rewarding outcomes, not just outputs.

---

193 "Farm to Fork: Transforming the Hidden Middle," Tetra Pak, December 18, 2024, https://www.tetrapak.com/about-tetra-pak/stories/unlocking-hidden-middle.
194 Adrien Covo, "Financial Inclusion of Agricultural Cooperatives & SMEs in Africa: Market Status," KSAPA, June 18, 2025, https://ksapa.org/financial-inclusion-of-agricultural-cooperatives-smes-in-africa/.
195 Tam and Mitchell, "How Farmer-Allied Intermediaries Can Transform Africa's Food Systems."
196 Tetra Pak, *Dairy Hub Handbook* (2025), https://www.tetrapak.com/content/dam/tetrapak/publicweb/gb/en/sustainability/Tetra-Pak-Dairy-Hub-Handbook.pdf.

D.2 PRIORITIES

Priority 3: Build breakthrough models for financing and collaboration to support farmers' transition to resilient and sustainable food systems

Policy Action 3.1 – Capital transition: Secure sufficient, efficient, and inclusive capital allocation for a rapid, large-scale transition through blended financing mechanisms, improving financial capabilities and offerings—de-risking and incentivizing investments—and gradually repurposing agricultural support to accelerate the shift toward resilient, more sustainable, and equitable food systems, while ensuring support for innovation and productivity-enhancing approaches

Policy Action 3.2 – Ecosystem services: Monetize the value of relevant ecosystem services delivered by regenerative and sustainable agriculture practices—including improved resilience and environmental outcomes—by developing regulatory and operational frameworks to accelerate the creation of high-integrity, interoperable credits for ecosystem services (e.g., carbon sequestration, soil health, biodiversity conservation, water stewardship)

POLICY ACTION 3.1

Capital transition: Secure sufficient, efficient, and inclusive capital allocation for a rapid, large-scale transition through blended financing mechanisms, improving financial capabilities and offerings—de-risking and incentivizing investments—and gradually repurposing agricultural support to accelerate the shift toward resilient, more sustainable, and equitable food systems, while ensuring support for innovation and productivity-enhancing approaches

BACKGROUND AND CONTEXT

Government alignment is a foundational enabler for sustainable food systems. As highlighted in prior policy areas, innovations scale more effectively when supported by targeted public incentives, such as tax relief, smart subsidies, or preferential credit mechanisms. Redirecting a share of public spending toward general services, including emission-reducing technologies and sustainable production methods, can yield compound benefits, such as improving farm-level margins, advancing mitigation, and increasing sector-wide efficiency.[197]

197 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).

Nevertheless, closing the persistent financing gap for food systems will require more than additional public capital.[198] It will demand **structured financial mechanisms** that combine public, philanthropic, and commercial resources, tailored to the specific risk-return dynamics of food and agriculture. While a wide range of instruments may play a role, this paper focus mostly on lending as a lever to scale capital deployment across diverse geographies and production systems.[199]

A growing set of financial mechanisms is already being used to reduce investment risk and bring commercial capital into food systems.[123] These include corporate-led lending arrangements, blended facilities, offtake-backed credit structures, and working capital models that leverage food companies' balance sheets to reach producers. Many of these solutions combine direct risk mitigation through instruments like guarantees, subordinated capital, or concessional tranches with indirect enablers, such as demand commitments, preferential pricing, or monetization of ecosystem outcomes.[123]

The World Economic Forum has identified **six archetypes** that illustrate how financiers can engage across the value chain based on their strategic priorities, portfolio exposure, and risk appetite.[123]

Exhibit 12 – Possible roles for financiers to support the food production transformation

	1 Discounted loans provided to corporates to finance their value chains	2 Working capital financing at improved rates by leveraging food corporates	3 Direct farmer lending, facilitated by catalytic capital from corporate offtakers	4 Scaled and de-risked financing by leveraging a corporate's value chain	5 Direct farmer lending, de-risked by catalytic capital	6 Indirect farmer lending through a blended finance facility
Role of financier	Issuer of sustainable debt	Capital contributor in working capital finance model	Capital contributor with support from corporate offtakers	Capital contributor in Filiere model	Capital contributor with support from catalytic players	Capital contributor to blended financing facility
Examples	COFCO INTL	Walmart X HSBC	McCain X Rabobank	INTESA SANPAOLO	ACELI AFRICA	Acorn Rabobank

Source: Adapted from World Economic Forum and Bain & Company, Putting Food on the Balance Sheet.

198 Ibid.
199 World Economic Forum and Bain & Company, *Putting Food on the Balance Sheet.*

Given the risk profile of direct farm lending, most commercial investors prefer to engage through lower-risk entry points. One approach is to lend to food corporates that reallocate capital across their supply chains, using offtake structures or procurement-linked financing to indirectly support producers (models 1–4). Where capacity allows, commercial banks can also lend directly to farmers and agribusinesses, especially when supported by guarantees, subordinated tranches, or first-loss mechanisms that improve the risk-adjusted return profile (model 5). When direct lending is not feasible, investors can still participate indirectly by channeling capital through blended finance structures managed by development actors, where concessional layers de-risk commercial capital and enable more favorable terms (model 6).[200]

Box 1 – Indirect farmer lending through a blended finance facility (model 6)

Blended finance facilities offer a pathway for financiers who do not have direct relationships with farmers to invest in food production. By combining commercial and catalytic capital, these facilities provide loans to farmers while meeting the risk-return requirements of commercial investors. This model is highly scalable, enabling capital providers with different mandates to participate in agricultural transitions. Designing such facilities, however, can be complex, as it requires aligning stakeholders with varying objectives, expectations, and levels of risk tolerance.[124]

Exhibit 13 – Illustration of indirect farmer lending through a blended finance facility

Source: Adapted from World Economic Forum and Bain & Company, *Putting Food on the Balance Sheet.*

All of these models rely on **de-risking strategies** in different combinations to improve the attractiveness of food system investments. These strategies typically work in two ways: either by directly **reducing the exposure for capital providers** or by **indirectly strengthening the economics for farmers**, improving their ability to repay. DFIs and multilateral banks play a key role in the first case by offering instruments such as first-loss capital, guarantees, and subordinated tranches. In parallel, value chain actors contribute by covering specific costs, stabilizing market dynamics, or anchoring demand through offtake agreements and price

200 World Economic Forum and Bain & Company, *Putting Food on the Balance Sheet.*

premiums. By enhancing cash flow predictability and aligning incentives across stakeholders, these mechanisms create the conditions for commercial capital to engage at scale.[124]

Ensuring that these financial models deliver impact at scale requires intentional design choices that prioritize inclusion.[201] **LDCs, smallholders, and agri-SMEs must be at the center of capital strategies**, given their disproportionate exposure to financing gaps and climate risk. DFIs should adapt mandates, tools, and performance metrics to reflect this priority, scaling risk-sharing mechanisms and co-investing with private capital in underserved markets. Governments, in turn, play a critical role in aligning national strategies, supporting pipeline development, and enabling blended structures through regulation, incentives, and institutional coordination.[202]

Local financial institutions will also be essential to operationalize transition finance. With the right support, these actors can develop tailored credit products, integrate sustainability metrics into lending decisions, and act as capital aggregators across fragmented rural markets. Where capacity is limited, public investment and DFI leadership can help strengthen internal systems, improve data, and enable the emergence of sustainable financial services that are viable at the farm level. Strengthening local ecosystems will be fundamental to ensure that climate-aligned finance reaches producers efficiently and equitably.[125]

Policy action 3.1 – Call to action – Governments should:

1. **Gradually repurpose subsidies and public budgets** toward high-impact services and climate-smart technologies, ensuring food affordability and security while **expanding affordable capital** access to LDCs and agri-SMEs through concessional credit, smart subsidies, and targeted de-risking instruments

2. **Establish partnerships with DFIs and the private sector to co-design and scale blended finance structures** that combine public, philanthropic, and commercial capital, using guarantees, first-loss capital, and subordinated tranches to de-risk investment, channel resources to underserved regions and actors, and crowd in private finance at scale

201 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).
202 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).

Policy action 3.2

Ecosystem services: Monetize the value of relevant ecosystem services delivered by regenerative and sustainable agriculture practices—including improved resilience and environmental outcomes—by developing regulatory and operational frameworks to accelerate the creation of high-integrity, interoperable credits for ecosystem services (e.g., carbon sequestration, soil health, biodiversity conservation, water stewardship)

Background and context

A major barrier to the business case for CSA is that many of its core benefits remain uncompensated.[203] Practices that restore soil, store carbon, protect biodiversity, and retain water often deliver public goods without generating revenue for farmers, particularly smallholders and agri-SMEs.[204] This gap limits the ability of financial institutions to justify investment at scale.

Unlocking investable ecosystem services requires public sector leadership through **clear demand signals and aligned incentives and rules**.

Coordinated demand signals are essential to reduce risk and create predictable revenue streams for sustainable production. When formalized through long-term procurement agreements, price premiums, or sustainability performance requirements, these signals act as upstream enablers of investment.[205] They aggregate market intent, strengthen the business case, and create the conditions for capital to flow toward verified outcomes.[206] While demand alone cannot resolve structural barriers, it reinforces the economic rationale for ecosystem service delivery and supports broader capital mobilization.

The First Movers Coalition for Food, led by the World Economic Forum, demonstrates how coordinated buyer action can accelerate this agenda. Launched in 2023%at COP28, the initiative brings together over 50 companies, financiers, governments, nongovernmental organizations, and farmer organizations to aggregate demand signals for low-carbon, resilient, and affordable commodities across beef, dairy, rice, and row crops. The coalition, in full compliance with all competition and antitrust laws and

203 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*
204 Ibid.
205 Ibid.
206 Ibid.

regulations, aims to unlock between USD 10 billion and USD 20 billion in procurement signals, aligned with clear sustainability outcomes. These signals are matched with technical partners and financial mechanisms to support producer transitions, improve affordability, and reduce upstream investment risk.[207]

Beyond strengthening demand signals, the coalition is actively fostering the creation of enabling environments to advance supply-side readiness and favorable policy conditions. Examples include beef and soy in Brazil; row crops (wheat, corn, and soy) in North America; rice in Southeast and South Asia; and dairy in Europe, the Middle East, and North America. The coalition also supports financing structures that link demand with farmer support, verification systems, and blended capital. By positioning demand as a core element of the transition architecture—not merely a downstream preference—this model leverages demand as a strategic driver to unlock scale, enhance bankability, and translate ecosystem outcomes into investable opportunities.[208]

Nevertheless, demand signals alone are not sufficient. Unlocking scale also requires **aligning incentives and rules** that make ecosystem services truly investable.

Governments must work in close partnership with private sector actors to build the infrastructure required to make these services investable.[209] This includes developing or endorsing MRV systems that are both scientifically robust and practical for farmers. These systems must reflect local production realities while maintaining consistency across regions and jurisdictions.[210] Guardrails are essential to ensure benefit sharing, data integrity, and inclusivity across regions and farmer profiles.

To support capital flows, governments must also ensure regulatory alignment.[211] Harmonized taxonomies and outcome-based classifications, aligned with frameworks that translate into operational tools that reach producers[212], reduce transaction complexity and support credible monetization.

207 Data provided by FMC for Food (2025).
208 Data provided by FMC for Food (2025).
209 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*
210 Ibid.
211 Ibid.
212 Ibid.

Examples such as **Brazil's Embrapa lifecycle-based emissions calculator for soy** or **Canada's open-source Holos tool** illustrate how regionally grounded science can improve the accuracy and fairness of crediting.[213] **New Zealand's public–private approach to pricing agricultural emissions** demonstrates how policy innovation can balance competitiveness, emissions reduction, and administrative feasibility.[214]

Box 2 – Embrapa's Lifecycle-Based Emissions Calculator (Brazil)

Developed by Brazil's agricultural research agency (Embrapa), this tool provides lifecycle-based emissions estimates tailored for soybeans grown in the Cerrado and Amazon regions. By using region-specific data, it showed that emission intensity in these systems can be up to two-thirds lower than global database values.[215] This approach reinforces the importance of locally grounded science to ensure accurate and fair crediting, improving both market integrity and farmer inclusion in CSA finance.

Box 3 – Holos Tool (Canada)

Developed by Agriculture and Agri-Food Canada, Holos is an open-source, peer-reviewed tool that provides farm-level estimates of GHGs and soil carbon. Aligned with Canada's national inventory methods, it enables producers to assess the climate impact of their operations and supports the development of credible carbon and ecosystem service credits. Its accessibility and transparency make it a model for MRV systems that are scientifically robust yet practical for farmers.[216]

Box 4 – Agricultural Emissions Pricing Mechanism (New Zealand)

New Zealand is preparing to become the first country to price agricultural emissions outside of a standard carbon market. Its public–private mechanism aims to balance competitiveness, emissions reduction, and administrative feasibility. This policy innovation demonstrates how pricing systems can be tailored to national contexts, while incentivizing CSA transitions.[217]

---

213 Ibid.
214 "New Zealand's Plans for Agricultural Emissions Pricing," OECD, November 7, 2022, https://www.oecd.org/en/publications/ipac-policies-in-practice_22632907-en/new-zealand-s-plans-for-agricultural-emissions-pricing_d4f4245c-en.html.
215 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*
216 OECD, *Report of the 32nd Meeting of the OECD's Farm-Level Analysis Network* (2023).
217 CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper.*

Policy action 3.2 – Call to action – Governments should:

1. **Aggregate and formalize demand commitments** with corporate buyers and public procurement—using tools such as long-term offtakes, price premia, and Scope 3 targets—to send clear market signals that reduce risk, create predictable revenue streams, and unlock private investment at scale

2. **Embed guardrails into market design** and collaborate with private sector and research institutions to **develop standardized accounting methodologies**, ensuring data integrity, fair benefit sharing, and inclusivity for smallholders and agri-SMEs

3. **Stand up and scale high-integrity ecosystem-service markets**, starting with carbon as the most advanced metric today and progressively expanding to water, biodiversity, and other services, supported by harmonized rules and interoperable MRV systems

E. CLOSING REMARKS

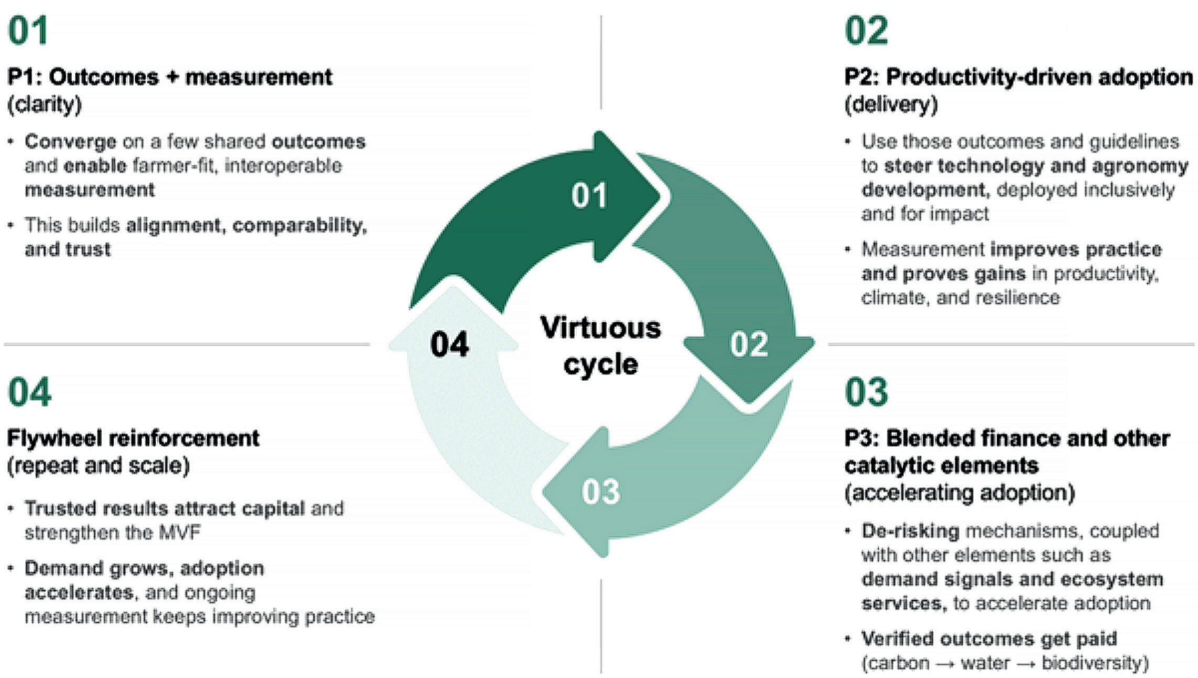
CLOSING – VIRTUOUS CYCLE OF TRANSFORMATION

The priorities defined by the SBCOP Food Systems Working group are not meant to be a static checklist. They should become a reinforcing cycle that can accelerate and sustain food systems transformation if the right elements align.

It begins with clarity (Priority 1) by converging on a few shared outcomes and enabling farmer-fit, interoperable measurement that builds trust, alignment, and comparability. That clarity then powers delivery (Priority 2), steering technology and agronomy development in ways that are inclusive and impactful, while measurement itself improves practice and proves gains in productivity, climate, and resilience. With these foundations, blended finance, demand signals, and ecosystem services (Priority 3) accelerate adoption by tying capital to verified outcomes, ensuring that results are rewarded and scale is unlocked.

These elements should help to create a flywheel effect: Trusted outcomes attract capital and demand grows, adoption accelerates further, and ongoing measurement keeps improving practice. That can become a path to shift from scattered efforts to a system that continuously reinforces itself and push the system toward lasting transformation.

EXHIBIT 14 – FOOD SYSTEMS VIRTUOUS CYCLE



Source: SBCOP Food Systems Working Group

F. PRIVATE SECTOR CASES

GRUPO RONCADOR

Sistema Regenerativo Integrado Roncador

Transition archetype
Integrated systems

Soy, corn, and beef cattle

Brazil

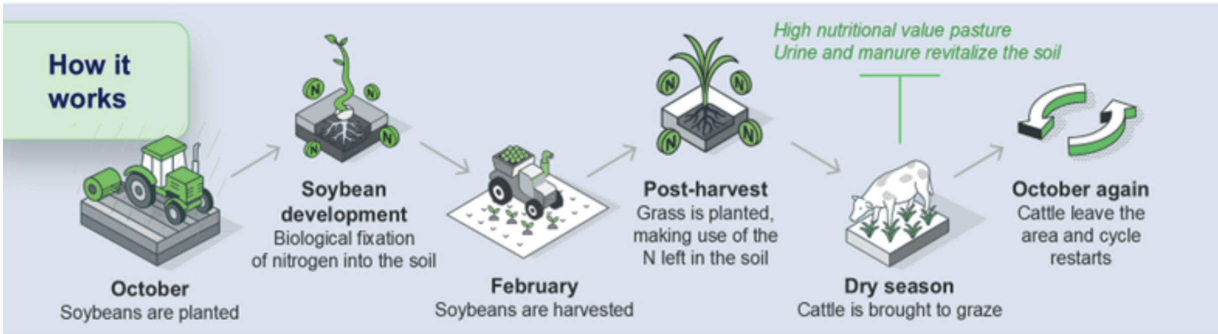
Overview

The Sistema Regenerativo Integrado Roncador is a fully integrated regenerative agriculture model that combines soy, corn, forage, and rotational beef cattle across over 53,000 hectares in the transition biome between the Cerrado and Amazon forest.

The system replaces **agrochemical packages with biological soil activation**, native microbiota, and circular nutrient flows—including full composting of manure from a 12,000-head feedlot.

Cattle, crops, and soils are managed in synchronized rotation over 12 months to **restore soil fertility, boost productivity, and generate year-round land use** without expanding the production footprint.

How it works



Current stage and scale

Coverage

>53,000 ha rotating soy, corn, forage, and beef cattle

~350 employees and **1,000** on-farm residents, with a **100%** school attendance rate for children living on-site

Stage

Mature integrated regenerative system operating since 2008, with validated outcomes across multiple metrics

Innovation

Long-term soil remineralization through **silicalcium**

Forest microbial inoculants reintroduce native soil biology

Fully composted cattle manure reused for fertility restoration

Integrated Livestock Production (ILP) replaces chemical packages with biologically active inputs

Accreditation

Results were **third-party verified** by Embrapa, KPMG, Pangea, and IBS

GHG balance includes GHG Protocol, Embrapa factors, FAO GLEAM model, and field-verified carbon sequestration

Key results

Economic viability (crops)

10% increase in bags per hectare (soybean)[1]

8% cost reduction vs. standard practices[2] (soybean)

Economic viability (beef)

21% reduction in months of slaughter age (beef cattle)[2]

Climate impact

Reduced[3] from **+17,471 tCO_2e/year** to **-231,595 tCO_2e/year**

Success factors

- Digital platform & data
- MRV & traceability
- Technical assistance
- Public sector & research partnership

Notes: 1) Data from 2022-2025 harvests (3 seasons); 2) Cost comparison between smart soy management and traditional practices, including seed treatment, soil preparation (furrow), fungicides, and insecticides across the 2022-2025 harvests (3 seasons); 3) Reductions are from 2007/2008 (17.471 tCO2e / year) until 2019/2020 (-231.595 tCO2e/year). Source: Data shared by Grupo Roncador

UPL

Low Methane Rice Project

Transition archetype
Rice methane emissions solutions

Rice

India

Overview

UPL's Low Methane Rice project supports Indian farmers in reducing methane emissions through the Alternate Wetting and Drying (AWD) technique, integrated with regenerative practices and agronomic support and tackles historic bottlenecks such as lack of MRV.

The program is fully funded by UPL and implemented in partnership with **local research institutes, which support field-level validation, farmer training, and gas sample analysis** via chromatography.

UPL provides **digital traceability** (app + geofencing), capacity building, insurance incentives, and regenerative inputs to ensure no yield penalty — with potential for **premium monetization via sustainable rice buyers**.

How it works

The program is fully funded by UPL

UPL provides

- Capacity building
- Regenerative inputs for no yield penalty
- Private gas chromatographs
- Digital traceability from seed to harvest
- Insurance incentives

Alternate Wetting and Drying (AWD) technique

Local research institutes provides

- Farmer training
- Gas sample analysis via chromatography
- Field-level validation

Current stage and scale

Coverage
~**10,400** ha and **6,000** farmers

Stage
Scaling toward 100,000 ha and 60,000 farmers by **FY 2029–30**

Innovation

Private gas chromatography lab for GHG measurement – unique among private players in India

Digital traceability via **app and geofencing** for compliance tracking

Personal accident insurance bundled with UPL input purchases via QR-scanned product activation

Accreditation

Results are **third-party verified** by public research institute (RARS)

Methods are aligned with **Verra VM42 and VM51,** enabling future carbon credit registration

MRV is executed via a **private GC lab** plus app and geofencing

Key results

Economic viability

- **+5%** yield increase
- **~5%** profitability increase

Climate impact

- **~23%** GHG Emissions reduction
- **+40%** water use efficiency

Success factors

- Digital platform & data
- MRV & traceability
- Technical assistance
- Incentives & de-risking
- Public sector & research partnership

Source: Data shared by UPL

Bayer

PRO Carbono

Transition archetype
Large/industrial crop solutions

Soy, corn, and cotton

Brazil
Argentina

Overview

Bayer's PRO Carbono program supports Latin American farmers in adopting regenerative agricultural practices that enhance soil carbon sequestration and reduce emissions while increasing productivity across major commodity crops like soy, corn, and cotton.

The program is co-developed with 19 leading research institutions and 47 experts, combining science-based protocols, soil diagnostics, farmer training, and a full-stack **MRV platform** to unlocked the main challenges for tropical agriculture to be part of the solution.

Farmers receive **personalized management plans**, undergo socio-environmental compliance checks, and have their soil carbon levels monitored through two sampling cycles. Bayer covers **technical assessments and data collection**, while farmers invest in **field-level interventions**.

How it works

Ecosystem Engagement | Researchers and partners address technical barriers and adapt tools to tropical agriculture for carbon market integration

Farmer

Socio-environmental compliance check
Compliance criteria verified before program entry

Soil Collection & Analysis
Soil samples collected, fertility and carbon stock mapped on FieldView platform

Management Plan Design
Consultants and farmers co-create multi-year farm management plans based on soil diagnostics

Practice Implementation
Deployment of conservation practices (e.g., no-till, cover crops, crop rotation)

Monitoring & Follow-up
Tracking of soil health, carbon sequestration, and input efficiency

2nd Soil Collection & Analysis
Impact of practices measured through new sampling

Benefits & Market Recognition
Producers access exclusive benefits and recognition from partner companies for sustainable practices

Current stage and scale

Coverage

~220,000 ha and **1,900+** farmers across 16 Brazilian states (representing 16% of the total soybean area in Brazil)

~**17,000 ha** and **160+** farmers across 10 Argentina states

Stage

Mature, with field deployment since 2021

Phase-2 soil sampling underway with results expected by late 2025

Expanding to new regions and crops

Innovation

Digital MRV platform end to end solution tested and validated in 3 countries

Tropicalized Carbon model (PROCs) to estimate sequestration and reduce MRV costs and risks

Tropicalized LCA tool, covering LUC and Scope 1/2/3 emissions

Decision-support tool with practice-level tips to boost yield and cut emissions built on machine learning, 6 years of data and 147 studies

Accreditation

MRV tools (LCA calculator and digital platform) are **third-party audited** by Bureau Veritas and Control Union

Methods aligned with **carbon model and an LCA tool** covering land use change and Scope 1–3

Blockchain-enabled traceability ensures data integrity, security, and buyer trust across the value chain

Key results

Economic viability

+11% yield increase[1]

+7% profitability increase[2]

+16% Increase in carbon sequestration

Climate impact

Success factors

- Digital platform & data
- MRV & traceability
- Technical assistance
- Incentives & de-risking
- Public sector & research partnership

Source: Data shared by Bayer

Soil and Water Outcomes Fund® PEPSICO

Soil and Water Outcomes Fund

Transition archetype Large/industrial crops	Corn, soy, wheat, alfafa, sugarbeets	United States

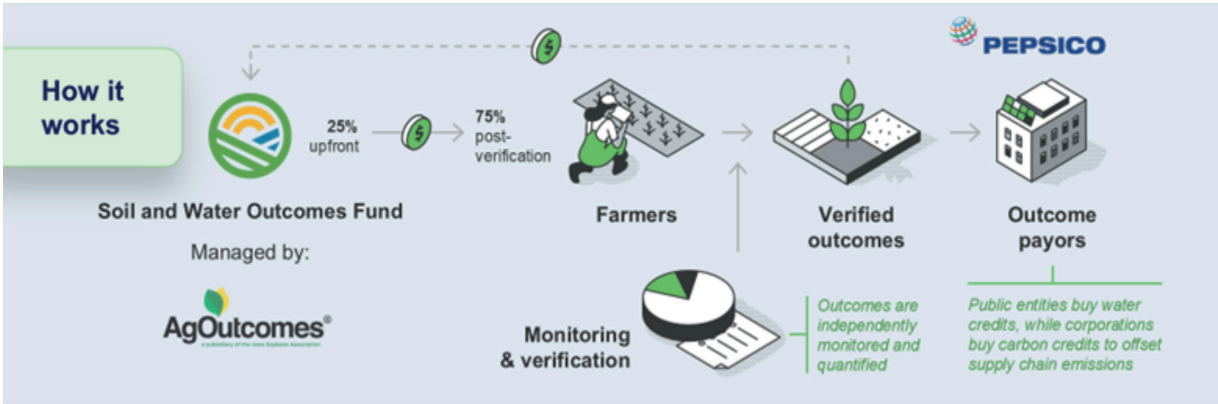
Overview

The Soil and Water Outcomes Fund (SWOF) enables agri-food companies and government agencies to pay farmers for quantified environmental benefits resulting from the adoption of regenerative agriculture practices.

Payments are made for **modeled and verified outcomes** such as soil carbon sequestration, nitrous oxide mitigation, and nitrogen and phosphorus runoff reduction.

In addition to outcome payments, SWOF also **funds technical** assistance and **MRV support** for participating farmers.

How it works



Current stage and scale

Coverage

464,906 acres[3] enrolled in partnership with **PepsiCo** across **7** US states

Stage

Full implementation since **2023 after 2020–22** pilots with farmer enrollment and outcome payments in place

Innovation

Integrated carbon-and-water MRV within the payment model

Hybrid outcome finance blending pay-for-practice and pre-season pay-for-outcome verified post-season to **de-risk adoption**

Accreditation

On-farm practices are **verified through field visits**

GHG outcomes are modeled using **COMET-Farm, IPCC, and additional tools** and **field-verified** to Tier 3 standards

Key results

Economic viability

$33 per acre in average farmer payments[1]

94% reported yield parity or increase[2]

97.5% reported profitability parity or increase[2]

Climate impact

403,151 $MtCO_2e$ sequestered since 2020

Success factors

- Digital platform & data
- MRV & traceability
- Technical assistance
- Incentives & de-risking
- Public sector & research partnership

Note: 1) Avg. incentive since 2020; 2) Percentage calculated among the of survey participants who were already able to assess outcomes (yield = 31%, profitability =56%); 3) 2024 data

Source: Data shared by SWOF.

(JBS)

Green offices 2.0

Transition archetype Livestock solutions | **Cattle beef** | **Brazil**

Overview

Green Offices 2.0 is JBS's integrated platform to accelerate environmental compliance, productivity, and emissions reduction among small and medium-sized cattle producers in Brazil, with focus on the Amazon and Cerrado.

Farmers receive tailored support across 3 pillars: **environmental compliance, agronomic productivity** (e.g. soil health, pasture recovery), and **business management**.

The program leverages **satellite monitoring, digital tools, and field visits** to reach suppliers and promote low-carbon intensification aligned with national climate goals.

How it works

Environmental compliance	Free environmental regularization of properties and **commercial reintegration of producers**	Supported by **internal experts** and **partner consultancies**
Technical assistance	Free support for small producers to **improve productivity indices of properties**	Focus on **soil** recovery, **pasture** improvement, **water** protection, and family **well-being**
Management assistance	Training to **improve management and productivity** of small and medium farms	Provides **education, technology**, and **financial benchmarking**

(JBS)

Current stage and scale

Coverage

20 Green Offices in operation, with **5** already offering technical assistance

15,336 farms regularizations completed since 2021

800+ producers under the 2.0 model

6,470 ha designated for restoration

Stage

Mature, with **2** new offices underway

Expanding through **digital green offices**

Innovation

First cattle supplier program to combine legal compliance, productivity improvement, and climate-resilient practices in **one platform**

Soil analysis, benchmarking, and performance tracking for **continuous improvement**

Digital tools and satellite monitoring support extension to reach remote Amazon areas

Accreditation

Data third-party verified through study made with **Instituto Inttegra & FGV**

Structured 4-visit protocol with diagnostics, soil sampling, follow-up and closure is supported by **digital and satellite monitoring**

Key results

Economic viability

- **$3.76** return per $1 invested in ATER
- **29%** increase in gross revenue per year[2]
- **27%** productivity[1] increase (head/ha)

Climate impact

- **23%** GHG[3] emissions reduction

Other indicators

- **~73K** hectares of farms under technical assistance

Success factors

- Digital platform & data ✔
- MRV & traceability ✔
- Technical assistance ✔
- Incentives & de-risking ✔
- Public sector & research partnership ✔

Notes: 1) ATER-supported farms vs. similar peers (2024); 2) Annual uplift linked to ATER-driven intensification; 3) Top 30% most profitable farms vs. avg of remaining farms, values found in an academic study performed with 100 farms participating in the Green Offices 2.0 initiative (carcass CO_2e/t)
Source: Data shared by JBS; Assad, ED, et. Al (2023)

Nestlé

Reshaping the Coffee Production in Brazil

Transition archetype Agroforestry	Coffee	Brazil Global initiative

Overview

Nestlé's Regenerative Coffee initiative supports the transition of over 2,000 Brazilian coffee farms toward regenerative agriculture, as part of Nestlé's global strategy to promote regenerative agriculture, reduce GHG emissions, and improve farmer livelihoods

The program is embedded in Nestlé's **responsible sourcing system** and goes beyond certification by classifying farms into regenerative maturity levels and offering direct technical support.

Farmers receive **training, tailored action plans**, and **price premiums** based on adoption of regenerative practices and responsible sourcing certification, with traceability and emissions tracking ensured via Cool Farm Tool, satellite monitoring, and third-party verification.

Regenerative Maturity Assessment | Farms classified into maturity levels against a regenerative scorecard

How it works

1. **Responsible Sourcing Onboarding** — Farmer enrolled with digital traceability in Nestlé responsible sourcing
2. **Capability Building** — Agronomist coaching and peer learning to build farm capabilities
3. **Tailored Farm Action Plan** — Context-specific practice package and timeline agreed with the farmer
4. **Practice Implementation** — Adoption of priority practices such as cover crops, agroforestry and optimized fertilization
5. **Incentives and Price Premiums** — Conditional incentives and per-kg premiums triggered by verified adoption and certification

Goals

- **Reduce** greenhouse gas emissions
- **Increase** farmers' income
- **Create** better social conditions

Current stage and scale

Coverage

+2,000 supplier farms in Espírito Santo and Bahia (all with traceability, certification, and regenerative classification)

Stage

Mature and scaling, with KPIs (soil, carbon, biodiversity) tracked over the next 5 years

Innovation

Blends **technical assistance, traceability**, and conditional economic **incentives** into one operational model

Practice adoption tracked through an accessible, educational **digital platform**

Accreditation

Results are third-party verified by **Rainforest Alliance** (sample farm level) and **EY** (all ESG data)

Cool Farm Tool and satellite monitoring through third party partner **Agrotools**

Results are reported into Nestlé **Scope 3 GHG inventory**

Key results

Economic viability

- **+18%** yield increase[1]
- **~10%** profitability increase[2]

Climate impact

- **~30%** GHG Emissions reduction

Success factors

- Digital platform & data
- MRV & traceability
- Technical assistance
- Incentives & de-risking
- Public sector & research partnership

Note: 1) Comparing against country average (based on TechnoServe Regen Ag study – 2024 and GCOI internal data); 2) Considering analysis of input savings and yield x prices of 761 Conillon farmers complemented with estimated cost of transition to higher Regen Ag levels (2023/24 crop)
Source: Data shared by Nestlé

REFERENCES

"A Year in the Lives of Smallholder Farmers," World Bank Group, February 25, 2016, https://www.worldbank.org/en/news/feature/2016/02/25/a-year-in-the-lives-of-smallholder-farming-families.

Adrien Covo, "Financial Inclusion of Agricultural Cooperatives & SMEs in Africa: Market Status," KSAPA, June 18, 2025, https://ksapa.org/financial-inclusion-of-agricultural-cooperatives-smes-in-africa/.

Agroecology Coalition, Strategy 2024-2030: *Accelerating Food Systems Transformation through Agroecology* (2024).

Agroecology Coalition, *The Agroecology Assessment Framework* (2023).

"AQUASTAT – FAO's Global Information System on Water and Agriculture," FAO, published 2021, https://www.fao.org/aquastat/en/overview/methodology/water-use.

Arushi Goel and Sowmya Komaravolu, "How Is Agritech Helping to Optimize the Farming Sector?," World Economic Forum, October 31, 2023, https://www.weforum.org/stories/2023/10/artificial-intelligence-agriculture-innovation-agritech-india/.

"Asia-RiCE," Asian Rice Crop Estimation & Monitoring (Asia-RiCE), accessed May 30, 2025, https://asia-rice.org/.

Barbara Buchner et al., *Global Landscape of Climate Finance* 2023 (Climate Policy Initiative, 2023), https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/.

CAADP and New Partnership for Africa's Development (NEPAD), *Guidelines*: CAADP *Country Implementation under the Malabo Declaration* (2016).

Camila Genaro Estevam et al., *Quantificação das Emissões de GEE no Setor Agropecuário: Fatores de Emissão, Métricas e Metodologias* (Observatório de Bioeconomia and FGV, 2023).

CCARBON/USP. "Sustainable Management for Methane Emission Reduction in Rice Cultivation." March 18, 2025.

"Child Labour," International Labour Organization (ILO), accessed September 15, 2025, https://www.ilo.org/topics/child-labour.

Claudio Spadotto and Rafael Mingoti, "Climates, Soils, and Agriculture in the Tropical Region," in *Meio Ambiente: Agricultura, Desenvolvimento e Sustentabilidade* 2, ed. Cleiseano Emanuel da Silva Paniagua (Atena Editora, 2023), 6–23.

Climate Policy Initiative (CPI) and FAO, *The Triple Gap in Finance for Agrifood Systems* (revised ed.) (ClimateShot Investor Coalition, CPI, and FAO, 2025), https://doi.org/10.4060/cd3611en.

CNI and B20 Brazil Secretariat, *Sustainable Food Systems & Agriculture Policy Paper* (2024).

D BALBINO, L. C.; BARCELLOS, A. de O.; STONE, L. F. (Ed.) Marco referencial em integração lavoura-pecuária-floresta. Brasília, DF: Embrapa Informação Tecnológica, 130p. 2011.

Data provided by Ajinomoto (2025).

Data provided by BASF (2025).

Data provided by Bayer (2025).

Data provided by Danone (2025).

Data provided by FMC for Food (2025).

Data provided by JBS (2025).

Data provided by Nestlé (2025).

Data provided by PepsiCo (2025).

Data provided by UPL (2025).

David Baldock et al., "Realigning Selected CAP Payment Schemes," Institute for European Environmental Policy, June 12, 2025

"Definition and Principles", Biovision, accessed June 10, 2025, https://www.biovision.ch/infopool/definitions-and-principles/.

Dina Umali-Deininger, "Greening the Rice We Eat," *World Bank Blogs*, March 15, 2022, https://blogs.worldbank.org/en/eastasiapacific/greening-rice-we-eat.

Eric Holt-Giménez et al., "We Already Grow Enough Food for 10 Billion People and Still Can't End Hunger." *Journal of Sustainable Agriculture* 36, no. 6 (2012): 595–598, https://doi.org/10.1080/10440046.2012.695331.

FAO et al., *The State of Food Security and Nutrition in the World* 2023 (FAO, International Fund for Agricultural Development [IFAD], United Nations Children's Fund [UNICEF], United Nations World Food Programme [WFP], and World Health Organization [WHO], 2023).

FAO, *Climate-Smart Agriculture Sourcebook* (2013)

FAO, *Climate-Smart Agriculture: Managing Ecosystems for Sustainable Livelihoods* (2011).

FAO, *Proportion of Agricultural Area Under Productive and Sustainable Agriculture (SDG Indicator* 2.4.1*): Methodological Note* (*Revision* 11), (2023).

FAO, *The State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk* (Earthscan, 2011).

FAO. *International Alliance for Climate Smart Agriculture*, project page, start date April 1, 2014, end date December 31, 2024, https://www.fao.org/climate-change/projects-and-programmes/project-detail/international-alliance-for-climate-smart-agriculture/en. (Accessed September 23, 2025).

"FAOSTAT, Climate Change: Agrifood Systems Emissions – Totals and Indicators – Emissions Totals," FAO, last updated November 14, 2024, https://www.fao.org/faostat/en/#data/GT.

"FAOSTAT, Production – Crops and Livestock Products," FAO, last updated June 11, 2025, https://www.fao.org/faostat/en/#data/QCL.

FAO, Recarbonization of Global Soils: A Tool to Support the Implementation of the Koronivia Joint Work on Agriculture (FAO, 2019).

"Farm to Fork: Transforming the Hidden Middle," Tetra Pak, December 18, 2024, https://www.tetrapak.com/about-tetra-pak/stories/unlocking-hidden-middle.

"Forced Labour, Modern Slavery and Trafficking in Persons," ILO, accessed September 15, 2025, https://www.ilo.org/topics/forced-labour-modern-slavery-and-human-trafficking.

G. Buttoud, *Advancing Agroforestry on the Policy Agenda: A Guide for Decision-Makers* (FAO, 2013).

Gert-Jan Nabuurs et al., "Chapter 7: Agriculture, Forestry and Other Land Uses," in *Climate Change* 2022: *Mitigation of Climate Change* (Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change), ed. Priyadarshi R. Shukla et al. (IPCC, 2022), 792.

Henning Steinfield et al.,*Reducing Enteric Methane for Improving Food Security and Livelihoods*. (FAO, 2016)

J.M. Rodríguez Zúñiga, "Paying for Forest Environmental Services: The Costa Rican Experience," *Unasylva* 212, no. 54 (2003): 31–33.

J.P. Ometto et al., "Cross-Chapter Paper 7: Tropical Forests," in **Climate Change** 2022: *Impacts, Adaptation and Vulnerability*, eds. H.O. Pörtner et al. (Cambridge University Press, 2022).

Jack Gray, "TNFD Adoption Rises by 30% in Six Months; Additional

Guidance Launched," European Pension, June 28, 2024, https://www.europeanpensions.net/ep/TNFD-adoption-rises-by-30-in-six-months-additional-guidance-launched.php.

José Nilton De Souza Vieira, "Subsidies and Environmental Sustainability of Brazilian Agriculture – Some Drivers, Indicators and Results," presented at the Trade and Environmental Sustainability Structured Discussions (TESSD), Ministério da Agricultura e Pecuária, March 16–17, 2023.

Katharine R. Howell et al., "Alternate Wetting and Drying Irrigation Maintained Rice Yields Despite Half the Irrigation Volume, but Is Currently Unlikely to be Adopted by Smallholder Lowland Rice Farmers in Nepal," *Food and Energy Security* 4, no. 2 (2015): 144–157, https://doi.org/10.1002/fes3.58.

Lea Siebert, "New Law on Black Soil Protection," Deutsch-Chinesisches Agrarzentrum, accessed September 16, 2025, https://www.dcz-china.org/2022/07/22/new-law-on-black-soil-protection.

Madhur Gautam et al., *Repurposing Agricultural Policies and Support to Transform Food Systems* (World Bank Group, 2022). World Economic Forum and Bain & Company, *Food, Nature and Health Transitions*.

Murray W. Scown et al., "Billions in Misspent EU Agricultural Subsidies Could Support the Sustainable Development Goals," One Earth 3, no. 2 (2020): 237-250.

"Nations and Businesses Commit to Create Sustainable Agriculture and Land Use," United Nations Climate Change, November 6, 2021, https://unfccc.int/news/nations-and-businesses-commit-to-create-sustainable-agriculture-and-land-use.

Nestlé, *Nestlé Income Accelerator Program Progress Report Summary, June* 2025.

"New Zealand's Plans for Agricultural Emissions Pricing," OECD, November 7, 2022, https://www.oecd.org/en/publications/ipac-policies-in-practice_22632907-en/new-zealand-s-plans-for-agricultural-emissions-pricing_d4f4245c-en.html.

OECD and FAO, *OECD-FAO Agricultural Outlook* 2023-2032 (OECD Publishing, 2023).

OECD and FAO, *OECD-FAO Agricultural Outlook* 2023-2032.

OECD, *Agricultural Policy Monitoring and Evaluation* 2023: *Adapting Agriculture to Climate Change* (2023).

OECD, *Report of the 32nd Meeting of the OECD's Farm-Level Analysis Network* (2023).

Paulo D'Odorico et al., "Feeding Humanity through Global Food Trade, *Earth's Future* 2, no. 9 (2014): 458-469.

PIB Delhi, Government of India, "Launch of National Mission on Natural Farming," press release, November 25, 2024, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2077094.

Regen10, *Progress Report: Zero Draft Outcomes-Based Framework* (December 2023), https://regen10.org/wp-content/uploads/2023/12/Regen10-FrameworkReport-Final.pdf

Regenerating Together Programme, *A Global Framework for Regenerative Agriculture* (SAI Platform, 2024).

Regenerative Organic Certified (ROC), *Framework for Regenerative Organic Certified* (2023).

"Resource Mobilization", FAO, accessed September 16, 2025, https://www.fao.org/partnerships/resource-partners/get-involved/en. Tim G. Benton et al., *Food System Impacts on Biodiversity Loss* (Chatham House, 2021).

SAI Platform, *Farm Sustainability Assessment (FSA) Implementation Framework, Version 2a* (2019).

Sustainable Food Systems: Concept and Framework (Food and Agriculture Organization of the United Nations [FAO], 2018).

Tam and Mitchell, "How Farmer-Allied Intermediaries Can Transform Africa's Food Systems."

Tetra Pak, *Dairy Hub Handbook* (2025), https://www.tetrapak.com/content/dam/tetrapak/publicweb/gb/en/sustainability/Tetra-Pak-Dairy-Hub-Handbook.pdf.

"The Impact of Temperate Climate on Agriculture: What You Need to Know," Ask.com, accessed April 30, 2025, https://www.ask.com/news/impact-temperate-climate-agriculture-need-know.

"The status of women in agrifood systems", Food and Agriculture Organization of the United Nations, accessed September 23, 2024, https://www.fao.org/interactive/women-in-agrifood-systems/en/

"TNFD adoption now over 400 organizations and new sector guidance released", Climate Action, accessed September 16, 2025, https://www.climateaction.org/news/tnfd-adoption-now-over-400-organisations-and-new-sector-guidance-released.

Transforming Food Systems with Farmers: A Pathway for the EU (World Economic Forum, 2022).

U.S. Department of Agriculture, "USDA Makes $1.5 Billion Available to Help Farmers Advance Conservation and Climate-Smart Agriculture as Part of President Biden's Investing in America Agenda," press release, April 3, 2024, https://www.usda.gov/about-usda/news/press-releases/2024/04/03/usda-makes-15-billion-available-help-farmers-advance-conservation-and-climate-smart-agriculture-part.

UN Department of Economic and Social Affairs, *World Population Prospects* 2022 (2022), https://population.un.org/wpp/.

UNECA, *Transition to Renewable Resources for Energy and Food Security in North and West Africa*: *Concept Note for Expert Group Meeting, 1 November* 2023. Accra, Gahana: UNECA, 2023.

Vikki Tam and Chris Mitchell, "How Farmer-Allied Intermediaries Can Transform Africa's Food Systems," webinar, Bain & Company, November 10, 2020.

WBCSD and OP2B, *Business Guidance for Deeper Regeneration: Soil Chapter — Executive Summary* (August 2024), https://www.wbcsd.org/wp-content/uploads/2024/05/Business-guidance-for-deeper-regeneration_soil-chapter_executive-summary.pdf

WBSCD and OP2B, "Regenerative Agriculture Metrics: Climate Chapter," in *Business Guidance for Deeper Regeneration* (2024).

WBSCD and OP2B, "Regenerative Agriculture Metrics: Soil Chapter," in *Business Guidance for Deeper Regeneration* (2024).

WBSCD and OP2B, OP2B Five-Year Report: *Demonstrating Progress on Regenerative Agriculture* (2024).

"What Is the Difference between Practice and Outcome-based Criteria Being Looked at for the Unified Standard?," Textile Exchange, accessed June 10, 2015, https://textileexchange.org/faq/what-is-the-difference-between-practice-and-outcome-based-criteria-being-looked-at-for-the-unified-standard/.

Wilhelm Klümper and Martin Qaim, "A Meta-Analysis of the Impacts of Genetically Modified Crops," PLoS ONE 9, no. 11 (2014): e111629.

World Bank. *Soil Organic Carbon MRV Sourcebook for Agricultural Landscapes*. Washington, DC: World Bank, 2021.

World Bank Group, *The Greening of China's Agriculture: A Compendium of Thematic Papers* (World Bank, 2022).

World Economic Forum and Bain & Company, 100 *Million Farmers: Breakthrough Models for Financing a Sustainability Transition* (Insight Report) (2024).

World Economic Forum and Bain & Company, *Food, Nature and Health Transitions: Repeatable Country Models* (Insight Report) (2023).

World Economic Forum and Bain & Company, *Putting Food on the Balance Sheet: Financing Strategies to Scale Investment in Food Systems Transformation (Briefing Paper)* (2025).

"One in Eight People Are Now Living with Obesity," World Health Organization, March 1, 2024, accessed September 28, 2025, https://www.who.int/news/item/01-03-2024-one-in-eight-people-are-now-living-with-obesity.

"World Population Prospects 2024," United Nations Department of Economic and Social Affairs, Population Division, accessed September 15, 2025, https://population.un.org/wpp/.

Yue Li et al., "The Role of Conservation Agriculture Practices in Mitigating N_2O Emissions: A Meta-Analysis," *Agronomy for Sustainable Development* 43, no. 63 (2023): https://doi.org/10.1007/s13593-023-00911-x.

ANNEXES

ANNEX A - ACRONYMS

AFOLU	Agriculture Forestry and Other Land Use
AWD	Alternate Wetting and Drying
CAP	Common Agricultural Policy
CAR	Rural Environmental Registry
COMET-Farm	Carbon Management Evaluation Tool
CO2	Carbon Dioxide
CO2e	Carbon Dioxide Equivalent
CSA	Climate-Smart Agriculture
DFI	Development Finance Institution
ESALQ	Luiz de Queiroz College of Agriculture
EU	European Union
EY	Ernst & Young
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Database
FSA	Farm Sustainability Assessment
GACSA	Global Alliance for Climate-Smart Agriculture
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
ILP	Integrated Crop–Livestock
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
IPLCs	Indigenous Peoples and Local Communities
KPMG	KPMG International Limited
LDCs	Least Developed Countries
MRV	Measurement, Reporting and Verification

MVF	Minimum Viable Framework
N2O	Nitrous Oxide
NDC	Nationally Determined Contribution
NDCs	Nationally Determined Contributions
NDVI	Normalized Difference Vegetation Index
OECD	Organisation for Economic Co-operation and Development
OP2B	One Planet Business for Biodiversity
R&D	Research and Development
RARS	Regional Agricultural Research Station
ROC	Regenerative Organic Certified
SAI	Sustainable Agriculture Initiative
SAI Platform	Sustainable Agriculture Initiative Platform
SME	Small and Medium-sized Enterprise
SWOF	Soil and Water Outcomes Fund
TNFD	Taskforce on Nature-related Financial Disclosures
UFMG	Federal University of Minas Gerais
US	United States
USP	University of São Paulo
WEF	World Economic Forum
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
tCO2e	Metric Tons of Carbon Dioxide Equivalent
VM42	Verra Methodology VM0042
IoT	Internet of Things

SUSTAINABLE BUSINESS COP30

ANNEX B – COMPOSITION AND MEETING SCHEDULE

Distribution of Members by country

Brazil	15
Belgium	1
Nigeria	1
United States	2
Switzerland	1
India	2
Japan	1
Netherlands	1
Sweden	1
Colombia	1

Distribution of Members by gender

Male	16
Female	10

Task Force Chair

Name	Organization	Position	Country
Gilberto Tomazoni	JBS	CEO | President	Brazil

Task Force Deputy Chairs

Name	Organization	Position	Country
Marcela Rocha	JBS	Executive Director of Corporate Affairs	Brazil
Jason Weller	JBS	Global Chief Sustainability Officer	Brazil

Task Force Co-Chairs

Name	Organization	Position	Country
Dr. Livio Tedeschi	BASF / CropLife International	President Agricultural Solutions / Chairman	Germany
Ramon Laguarta	PepsiCo	CEO	United States
Idi Mukhtar Maiha	Nigerian Government	Minister of Livestock Development	Nigeria
Chris Hogg	Nestlé	Global Head of Public Affairs	Switzerland
Jai Shroff	UPL	Chairman and Group Chief Executive Officer	India
Pelerson Penido	Roncador	President and CEO	Brazil
Greg Heckman	Bunge	CEO	United States

Mauricio Rodrigues	Bayer	CEO Crop Science Latam	Brazil
Michael Gelchie	Louis Dreyfus Company (LDC)	CEO	Netherlands
Shigeo Nakamura	Ajinomoto	Representative Executive Officer, President & Chief Executive Officer (CEO)Japan	Japan

Task Force PMO

Name	Organization	Position	Country
Lisa Lieberbaum	GSS	PMO GSS	Brazil
Carolyne Caetano Gonçalves	GSS	PMO GSS	Brazil
Cecilia Michellis	GSS	PMO GSS	Brazil
Francine Hakim Leal	GSS	PMO GSS	Brazil

Task Force CNI Focal Point

Name	Organization	Position	Country
Georgia Franco	CNI	Policies and Industry Analyst	Brazil

Task Force Members

Name	Organization	Position	Country
Juliana de Lavor Lopes	Amaggi	ESG, Communications and Compliance Director	Brazil
Fernando Queiroz	Minerva Foods	CEO	Brazil
Grazielle Parenti	Syngenta	Head of Global Value Chain Alliances	Brazil
Roberto Perosa	ABIEC	President	Brazil
Vanessa Amaral	ABIA	Legal and Sustainability Director	Brazil
Lígia Dutra	Cargill	Assistant VP Government Relations	Brazil
Guilherme Schmitz	Yara	Market Development Director	Brazil
Eija Hietavuo	Tetrapak	Chief Corporate Affairs Officer	Brazil
Susy Yoshimura	Carrefour	Senior Sustainability Director	Brazil
Andrea Ocampo Betancur	ANDI	Zero Deforestation Business Management Coordinator	Brazil
Mariana Cruz	OCP	Corporate Affairs Manager at OCP BRASIL	Brazil
Mariana Spignardi	Nude	Head of Impact	Brazil

Task force Meetings Schedule

Data	Format
May 21st	Online Meeting
June 30th	Online Meeting
July 21st	Online Meeting
August 20th	Online Meeting

ANNEX C – PARTNERS

Knowledge Partner

BAIN & COMPANY

Network Partners

Embrapa
Amazônia Oriental

WORLD ECONOMIC FORUM

CNA
Brazilian Confederation of Agriculture and Livestock

UN GLOBAL COMPACT
United Nations Global Compact

DISCLAIMER AND ACKNOWLEDGEMENTS

This report was developed within the scope of the SB COP initiative, with the support of consultancy acting as Knowledge Partner, who assisted the Working Group by consolidating discussions, providing data, and offering technical assistance. The content reflects the collective contributions and decisions of the Working Groups, mainly composed of private sector representatives and coordinated by SB COP and CNI.

The analyses, data, and opinions presented herein are intended solely for informational and discussion purposes. They do not constitute technical, legal, financial, or investment advice, nor do they create any commitment by the participants. The involvement of the Knowledge Partner and Network Partner does not imply endorsement of the recommendations or conclusions. No responsibility or liability is assumed by the Knowledge Partner, Network Partner, their professionals, or any participating organizations for decisions or actions taken based on this report.

Each participant remains fully independent in business decisions, relying on their own judgment and publicly available information. This publication does not contain non-public or sensitive information, except where explicitly indicated for SB COP use. References to specific cases, products, or services do not imply endorsement.

SUSTAINABLE
BUSINESS
COP30

9 788579 572487

CNI Brazilian National Confederation of Industry