



Unveiling Invisible Emissions: Collective Advocacy for Sustainable Meat Supply Chains in East Asia

WEBINAR INSIGHTS & KEY TAKEAWAYS

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1. Executive Summary

The steady growth of meat consumption in Asia drives the expansion of the livestock market, resulting in greater environmental pressures throughout the supply chain, including rising methane emissions and land-use change. As demand for meat continues to rise, improving transparency and accountability throughout the supply chain has become increasingly important in reducing climate risks and supporting a transition toward more sustainable food systems.

Recent findings from across East Asia were presented to the public in a June 18, 2026 webinar titled “**Unveiling Invisible Emissions: Collective Advocacy for Sustainable Meat Supply Chains in East Asia**”. Co-hosted by **Solutions for Our Climate** and **Mighty Earth** with contributions from **WWF China**, **Imazon** and **Trase**, the webinar provided a holistic analysis spanning the entire supply chain and highlighted opportunities for collective action across the region.

Webinar Highlights:

- **Climate Impacts of Meat Consumption:** SFOC presented South Korea's first life cycle assessment (LCA) based analysis of greenhouse gas emissions associated with meat consumption. The analysis underscored the need for greater transparency in emissions information to help consumers better understand the climate impacts of their food choices.
- **Retailers’ Role in Food System Transformation:** Mighty Earth shared the findings of its first assessment of major food retailers in Asia, demonstrating significant gaps in methane disclosure and climate performance, while highlighting the important role of retailers can play in building more sustainable food systems.
- **Supply Chain-Wide Verification:** WWF China demonstrated how verified Deforestation- and Conversion-Free (DCF) can effectively eliminate environmental degradation within major import pipelines.

Food systems transformation in East Asia requires the collective alignment of multiple stakeholders spanning policy, consumer awareness and producer engagement and supplier certification. Establishing transparent, supply chain-wide emissions data and

management systems must be a priority for governments, while retailers, uniquely positioned to connect producers, corporate enterprises and consumers, can enhance due diligence and influence consumer choices. Combined, strengthened supplier engagement, improved transparency and clearer consumer communications can help reduce methane emissions throughout the supply chain, ultimately supporting the transition to more sustainable food systems increasingly resilient to the growing threat of climate change.

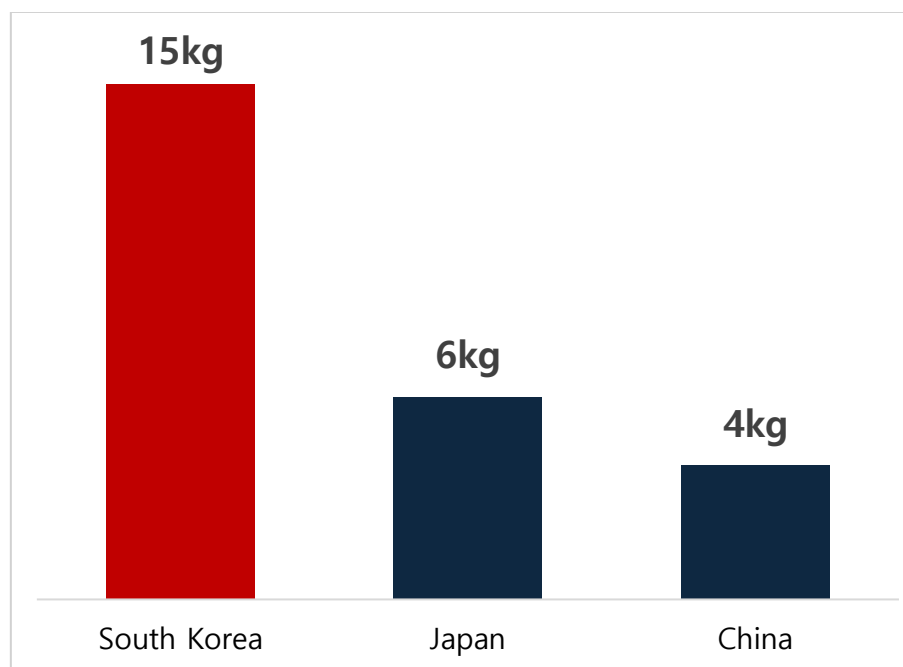
2. South Korea: Climate Impacts of Rising Meat Consumption

2.1 Meat Consumption and Market Supply Structure

South Korea's Dietary Shift: Between 2014 and 2024, South Korea's annual per capita meat consumption rose from 45kg to 61.4kg, an approximately 35% increase.

Within East Asia, South Korea has emerged as a major outlier in beef demand. In 2024, the average South Korean consumed 15 kg of beef annually—significantly outpacing neighboring nations including Japan and China.

2024 Per Capita Beef Consumption in East Asian Countries



Source: Reconstructed by [the author](#) based on 2024 data from National Bureau of Statistics of China, Ministry of Agriculture, Forestry and Fisheries of Japan, and the Korea Meat Trade Association

Beef Supply Structure and Import Reliance: Beef demand in South Korea is rising, with imports exceeding 460,000 tons and representing around 60% of total consumption. This import market is highly concentrated, solidifying into a near-equal duopoly between the United States and Australia, which each capture approximately 47% of the market share.

2.2 The Cradle-to-Retail LCA Framework

Expansion of System Boundary: Applying a full Life Cycle Assessment (LCA) methodology, this study established a 'Cradle-to-Retail' boundary, encompassing the entire process from livestock rearing and slaughtering to processing and retail.

Inclusion of Global Supply Chains: Since roughly 60% of beef consumed in South Korea is imported, the evaluation incorporates the full global supply chain — from overseas production and transport to domestic retail — to provide comprehensive, consumer-oriented emissions data.

2.3 Quantifying the Climate Footprint of Meat Consumption

Emission Disparities by Livestock Type: South Korea's carbon footprint per kg of beef was calculated to be 58.15 kg CO₂-eq, approximately 4.4 times higher than that of pork and 10.8 times higher than that of chicken.

Per Capita and National GHG Emissions (2024):

- **Individual Impact:** South Korea's annual per capita meat consumption of 61.4 kg generated an estimated 1,115 kg CO₂-eq per person.
- **Macroeconomic Scale:** Total national consumption of pork, chicken, and beef reached 3.08 million tons, producing an aggregate climate impact of 56.94 million tons CO₂-eq.
- **Imported Beef Contribution:** South Korea imported over 420,000 tons of beef in 2024. The associated greenhouse gas (GHG) emissions from the consumption of imported beef were estimated at 12.5 million tons CO₂-eq. This represents roughly 22% of the country's total meat-related emissions (56.94 million tons CO₂-eq), highlighting the substantial climate impact of imported beef.

2.4 Policy Recommendations

Advancing LCI Databases: There is an urgent need to establish a national standard LCI database that manages precise process-specific data—from feed cultivation to distribution—similar to Australia's 'AusLCI' model.

Enhancing Consumer Access to Information: To ensure informed and sustainable

choices, the market must transition to consumer-friendly "product-unit" carbon data displayed alongside price and origin. As ultimate gatekeepers between production and consumption, retailers possess the unique structural power to resolve this information asymmetry—exemplified by Norway's grocery retailer Oda and its point-of-sale "Climate Receipts."

3. Asian Retailers and the Methane Gap: Challenges and Opportunities for Food System Transformation

3.1 Why Methane Matters

Methane (CH₄) is a GHG responsible for approximately 30% of global warming to date. While it breaks down in the atmosphere comparatively quickly (~12 years), it traps over 80 times more heat than CO₂ over a 20-year period. As such, reducing methane emissions represents the fastest lever available to slow near-term global warming.

Asia's Agricultural Methane Emissions Profile

- **The Agricultural Driver:** Agriculture is the largest source of human-caused methane emissions, accounting for 40% of global methane emissions. Within agriculture, livestock generates 76% of methane emissions, while flooded rice cultivation accounts for 20%.
- **Asia's Escalating Impact:** In 2021, emissions from meat production in Asia reached 1 billion tons of CO₂-eq — surpassing the total annual GHG emissions of Japan.
- **The Rice Factor:** Asia produces and consumes 90% of the world's rice, a sector responsible for roughly 10% of global methane emissions.
- **Supply Chain Leverage:** Major Asian economies rely heavily on imported meat; for instance, South Korea and Japan import roughly 60% of their beef. This means procurement decisions made by Asian companies heavily influence global supply chain dynamics far beyond the region.
- **The Global Methane Pledge:** Over 150 countries, including South Korea and Japan, have pledged to reduce global methane emissions by 30% below 2020 levels by 2030.

3.2 Why Retailers are the Key Catalysts

Food retailers occupy a unique position within the food system, influencing both what is

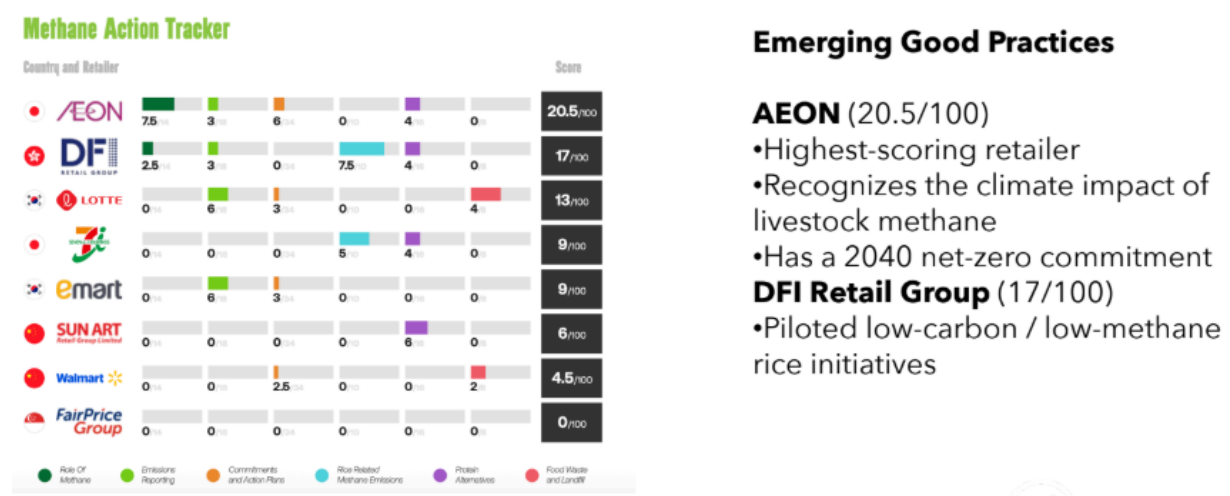
produced through sourcing decisions and what is consumed through product offerings and consumer engagement.

The Scope 3 Reality: For the vast majority of food retailers, over 90% of total emissions are Scope 3 (value chain), heavily concentrated in high-emission commodities like beef, dairy, and rice. Meaningful climate action requires retailers to address these product-level emissions.

3.3 The First Asia Retailer Methane Assessment

Mighty Earth's study evaluates 8 major food retailers across four key Asian markets: Japan, South Korea, China, and Singapore. Combined, these retail giants operate over 9,500 stores and generate more than \$220 billion USD in annual revenue.

Key findings revealed a widespread performance deficit across the retail sector, with significant gaps in methane disclosure, target setting, and supply chain policies.



3.4 Strategic Recommendations for Asian Retailers

To bridge the gap between current performance and international climate goals, Mighty Earth outlines four priority actions for corporate grocery operators:

- **Enhance Transparency:** Systematically measure, track, and publicly disclose comprehensive Scope 1, 2, and 3 greenhouse gas emissions.
- **Establish Methane-Specific Targets:** Set concrete methane reduction targets and execution pathways consistent with the Global Methane Pledge of reducing methane emissions 30% by 2030 (from 2020 levels).
- **Accelerate the Protein Transition:** Actively expand and promote plant-based and low-emission product food options, making them more affordable and accessible for consumers.
- **Increase Low-Methane Rice:** Promote low-methane cultivation practices, such as Alternate Wetting and Drying (AWD) and engaging with farmers and suppliers.
- **Enforce Sourcing Policies:** Adopt group-wide deforestation-and conversion-free sourcing policies supported by greater supply chain traceability.

4. Actions on Deforestation and Conversion Free Beef Supply Chains in China

4.1 The Global Food System and the "Invisible" Land Use Footprint

The global food and agriculture system accounts for roughly one-third of global carbon emissions when factoring in land-use change. To meet the Paris Agreement's 1.5°C target, global food system emissions must decline by at least 80%.

While climate discussions frequently target on-farm Scope 1 and 2 emissions (including enteric methane), the massive, embedded carbon footprint of Land Use Change (LUC) is often ignored.

- **The Deforestation Disparity:** Only about 2% of current beef production occurs on deforested land. However, beef produced on deforested land has an 11 times higher GHG intensity than beef raised on non-deforested land.
- **Agricultural Drivers:** The wider agricultural sector drives nearly 90% of global deforestation, with just three commodities—beef, soy, and palm oil—responsible for 40% to 50% of that total.
- **Systemic Impact:** The beef sector's land conversion alone drives 70% to 34% of food system land-use change emissions, which translates to 4% to 9% of total global food system emissions. Furthermore, soy supply chains tie these conversion risks directly to the domestic consumption of pork and poultry.

4.2 WWF China's 2030 Strategy and Market Engagement

WWF China (active since the 1980s as the first international NGO invited by the Chinese government) has expanded from traditional wildlife conservation to multiple areas including cross-border commodity trade solutions.

The 2030 Target: WWF China aims for at least 50% of the market share of soybean and palm oil-relevant commodities in China to be verified *Deforestation- and Conversion-Free (DCF)*, triggering a mainstream market shift to eliminate ecological conversion risks.

Multi-Stakeholder Approaches and Current Progress

- **Corporate Commitments:** Over 100 companies have signed onto 2030 DCF commodity commitments, with 16 actively running sustainable sourcing pilots.
- **Standardized Frameworks:** WWF China has established guidelines and group standards for retailers and meat sectors to align local supply chains with international DCF criteria.
- **Sustainable Finance & Consumption:** The initiative actively leverages public finance incentives and consumer behavioral changes to create economic value for sustainable trading practices.

4.3 Major Milestones: International Supply Chains & National Certification

WWF China's efforts have recently yielded two major structural milestones for international meat procurement:

- **First Verified DCF Beef Shipment:** As announced at COP30 in Brazil, partners successfully verified the first-ever DCF beef shipment from Brazil to China. The verification process aligns with strict baseline criteria co-developed by Brazilian stakeholders (including WWF Brazil) and matches the global Accountability Framework principles.
- **Launch of China's First DCF Certification:** As announced at the Shanghai Climate Week 2026, WWF China is partnering with the China Meat Association to transition existing group trade standards into an official, homegrown Chinese DCF certification. Aimed for a full rollout by the end of this year, this certification establishes a domestic mechanism aligning with global DCF ambitions.

5. Panel Discussion Highlights

5.1 The Strategic Value of Trase's Traceability Framework

- **Open-Access Lifecycle Tracking:** Developed by Global Canopy and SEI, the platform connects downstream consumer demand directly to upstream environmental impacts.
- **Granular Municipal Mapping:** Links international buyers and traders directly to specific production municipalities, exposing localized deforestation and ecological risks.
- **Market Incentives:** Delivers the transparent data necessary to financially reward sustainable producers and accelerate green procurement.
- **Climate & Operational Resilience:** Maps precise food origins to help companies mitigate biosecurity threats (e.g., disease outbreaks) and manage structural exposure to climate disruptions like severe droughts.

5.2 Market Incentives for Sustainable Cattle Production in Brazil

- **The Emissions & Degradation Loop:** Livestock accounts for 51% of Brazil's total greenhouse gas emissions, driven by pasture clearing and enteric methane. This widespread deforestation has disrupted regional climate patterns, shortening rainy seasons and leaving 40% of Brazil's 105 million hectares of pasture degraded—pushing the ranching frontier deeper into the Amazon.
- **The "China Effect" as a Market Driver:** Since 2018, China's restriction on importing cattle older than 30 months has forced Brazilian suppliers to finish cattle faster on smaller, intensified, and restored plots. This commercial mandate effectively lowered methane footprints by shortening animal lifespans while halting horizontal pasture expansion.
- **Leveraging "Radar Verde" for Procurement:** East Asian buyers should integrate Imazon's Radar Verde (Green Radar) public index into their procurement

frameworks to evaluate and benchmark Brazilian meatpackers based on their zero-deforestation performance.

- **Eliminating Indirect Supplier Blind Spots:** While major meatpackers control 55% of the Amazon's slaughter capacity, they often fail to track upstream breeding and rearing farms (indirect suppliers). Asian buyers can force absolute compliance across the supply chain by explicitly sourcing from meatpackers that achieve top-tier visibility on Radar Verde.

6. Conclusion

Downstream actors in East Asia, including retailers, consumers and policymakers, wield significant structural influence over global methane emissions and land use change through their procurement and consumption patterns. From consumer awareness and retailer action to verified Deforestation and Conversion-Free (DCF) sourcing and producer engagement, stakeholders across the food system have distinct but complementary roles to play. The findings highlighted in this brief demonstrate the importance of these stakeholders' role in strengthening and improving emissions and supply chain transparency and advancing practical solutions which address methane emissions and deforestation.

To build a truly sustainable food system, the corporate and industrial sectors must foster collaborative ecosystems that provide tangible incentives for producers and enterprises to adopt more sustainable practices. Parallel to this corporate shift, consumers must be empowered to support this transition by receiving clear, standardized product-unit emission data at the point of sale, effectively transforming everyday purchasing decisions into active drivers of supply chain accountability.

Ultimately, the market for sustainable commodities cannot mature in isolation; governments must actively cultivate the regulatory frameworks and financial infrastructure necessary for a sustainable food market to establish itself and thrive. A resilient food system capable of confronting the climate crisis will only be realized through this collective alignment, where policy design, market incentives, and consumer choices converge to create shared prosperity from farm to fork. Practical solutions already exist, but scaling them, however, will require stronger collaboration across the supply chains and continued engagement from retailers, producers, researchers, civil society, and policymakers.

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