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Green Trade Corridors and the Shift Toward Certified Sustainable Agricultural Exports

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Green trade corridors are organized trade routes designed to make global trade cleaner and more sustainable. These corridors connect farms, storage facilities, transport systems, and ports using low-carbon fuels, renewable energy, modern cold chains, and digital tracking systems to reduce greenhouse gas emissions. As climate policies and measures such as carbon border adjustments become stricter, exports from developing countries face increasing environmental scrutiny. Agricultural exporters, including India, can no longer rely only on producing large quantities at low cost. They must now prove that their products are sustainably produced and transported. This article explains how green trade corridors help countries shift from exporting raw commodities to selling certified sustainable goods supported by traceability and carbon transparency. By improving infrastructure, reducing post-harvest losses, and strengthening documentation systems, these corridors help protect export markets. Early investment in green corridor systems can reduce emissions, improve competitiveness, and ensure long-term economic stability in a climate-regulated global trade environment.

Keywords: Green trade corridors; Sustainable agricultural trade; Carbon border adjustment; Supply chain traceability; Low-carbon logistics

Introduction: defining green trade corridors

Green trade corridors are designated trade routes—across maritime, rail, road, and multimodal systems—where governments and private actors collaborate to significantly reduce greenhouse gas (GHG) emissions and environmental externalities along specific supply chains (Global Maritime Forum [GMF], 2025). Initially conceptualized as “green shipping corridors” following COP26 commitments, the framework has evolved into a broader logistics model integrating clean fuels, renewable-powered infrastructure, and emissions tracking systems. Rather than pursuing economy-wide decarbonization simultaneously, the corridor model concentrates investments in high-volume trade lanes to accelerate learning, reduce coordination failures, and create scalable templates (McKinsey & Company, 2022). As of 2025, more than 80 green shipping corridor initiatives have been announced globally, signaling rapid institutional adoption of this approach (GMF, 2025).

The trade–climate nexus

International trade contributes significantly to global emissions. Shipping alone accounts for nearly 3% of global greenhouse gas emissions (International Maritime Organization [IMO], 2023). When road freight, aviation, and embedded emissions in traded goods are included, the trade-related carbon footprint becomes substantially larger. At the same time, climate policy is increasingly influencing trade architecture. The European Union’s Carbon Border Adjustment Mechanism (CBAM), implemented in transitional form beginning in 2023, requires reporting of embedded emissions in certain imported goods and is expected to

expand in scope over time (European Commission, 2023). While agriculture is not yet fully covered, sustainability disclosure requirements and deforestation-linked regulations are tightening. For developing nations, these measures signal a structural shift: exports may increasingly face carbon scrutiny and environmental compliance barriers. Green trade corridors therefore serve both as mitigation tools and strategic safeguards against future trade restrictions.

Developing nations in a race against environmental tariffs

Developing economies—such as India, Brazil, Indonesia, and Vietnam—are major exporters of agricultural commodities. Traditionally, their competitiveness was grounded in cost efficiency and natural resource endowments. However, climate-linked trade measures are altering this dynamic. The World Bank (2023) notes that carbon border measures could disproportionately affect developing economies if supply chains lack emissions transparency. Similarly, UNCTAD (2023) warns that sustainability-linked trade barriers may widen trade inequality unless developing countries upgrade infrastructure and certification systems.

In response, developing nations are investing in:

- Low-carbon port infrastructure
- Renewable-powered processing facilities
- Electrified logistics systems
- Digital product traceability

India, China, and Brazil have recently announced participation in green shipping corridor dialogues, highlighting their strategic engagement (GMF, 2025).

The race is not merely environmental—it is economic. Countries that fail to adapt risk market exclusion or price penalties.

From raw commodities to certified sustainable goods

A fundamental transformation in global agricultural trade is underway: the shift from exporting undifferentiated raw commodities to marketing certified sustainable goods.

Historically, competitiveness depended on production volume and price. Today, market access increasingly requires proof of:

- Carbon intensity
- Water-use efficiency
- Deforestation compliance
- ESG standards
- Supply chain traceability

OECD (2023) analysis indicates that sustainability certification and carbon transparency are becoming central determinants of agri-food trade competitiveness.

This shift can be summarized as:

Old Trade Paradigm: Quantity × Price

Emerging Paradigm: Sustainability × Traceability × Compliance × Price

Without verified documentation, even sustainably produced goods may face barriers in premium markets.

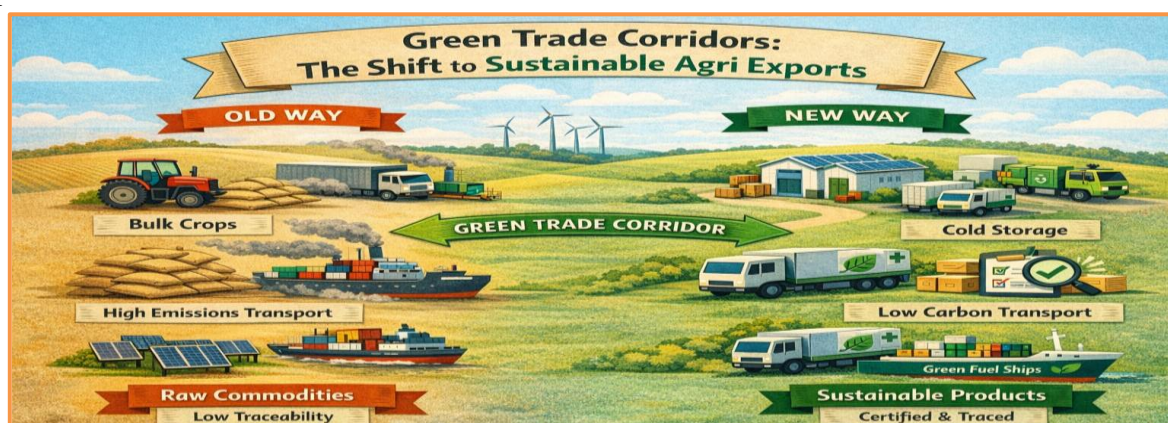


Fig- From high-emission raw commodity trade to green corridors with certified, low-carbon agricultural exports.

Traceability as the new gold

Traceability systems—digital platforms tracking product origin, emissions, and movement—are rapidly becoming core infrastructure in green corridors. According to the FAO (2022), digital traceability enhances food safety, improves market access, and reduces fraud. In climate-regulated trade environments, it also enables embedded carbon accounting. Technologies such as blockchain, IoT-enabled sensors, GPS freight monitoring, and digital documentation platforms are increasingly integrated into export supply chains (World Economic Forum [WEF], 2024). These systems allow exporters to demonstrate compliance with sustainability standards across the entire value chain—from farm to port. For developing countries, this transformation requires institutional upgrading, standardized carbon accounting methodologies, and farmer inclusion strategies. Smallholders must be integrated into digital systems to prevent exclusion from certified export markets. Traceability is no longer optional—it is becoming the currency of global agricultural trade.

India's position in the emerging green corridor landscape

a. Agricultural trade context

India's agricultural exports crossed USD 50 billion in 2022–23, reflecting strong global demand for rice, marine products, spices, and processed foods (Ministry of Commerce & Industry, 2024). As a major supplier to the EU and other regulated markets, India faces rising sustainability scrutiny.

b. Logistics and emissions

India's logistics costs remain approximately 8–9% of GDP, with road transport accounting for nearly 60% of freight movement (Government of India, 2022). This modal imbalance increases emissions intensity. Cold chain penetration remains uneven. The Indian cold chain market was valued at approximately USD 26 billion in 2024 and is projected to grow at over 10% annually (India Brand Equity Foundation [IBEF], 2024). However, post-harvest losses in fruits and vegetables remain substantial due to inadequate temperature-controlled logistics (NITI Aayog, 2022).

c. Policy alignment

Several Indian policy frameworks align with green corridor development:

- National Logistics Policy (Government of India, 2022)
- PM Gati Shakti Master Plan
- Integrated Cold Chain and Value Addition Infrastructure (ICCVAI) Scheme (Ministry of Food Processing Industries, 2023)
- Maritime sustainability initiatives aligned with IMO decarbonization targets

These initiatives provide structural foundations for agri-focused green corridors connecting production clusters to export hubs.

Economic rationale

Green corridor investments generate multiple economic gains:

1. **Reduced post-harvest losses:** Improved cold chains increase effective supply without expanding land use (NITI Aayog, 2022).
2. **Lower carbon intensity:** Cleaner fuels reduce emissions per tonne-kilometer (IMO, 2023).
3. **Improved market access:** Certified sustainable goods face lower risk of trade restrictions (OECD, 2023).
4. **Access to green finance:** Corridor projects qualify for climate-linked financing instruments (World Bank, 2023).

Thus, environmental compliance aligns with long-term trade competitiveness.

Challenges

Despite momentum, key barriers remain:

- High upfront capital costs for green fuels and electrification
- Limited availability of alternative marine fuels

- Fragmented institutional coordination
- Gaps in standardized emissions accounting

UNCTAD (2023) emphasizes that developing countries require technical and financial support to prevent sustainability measures from becoming de facto trade barriers.

Conclusion

Green trade corridors represent a structural reconfiguration of global commerce. They respond to rising environmental tariffs, carbon border adjustments, and sustainability-linked trade standards. For developing nations, participation is both defensive and strategic.

The transition from exporting raw commodities to certified sustainable goods requires integrated infrastructure, renewable energy adoption, emissions transparency, and digital traceability systems. In the emerging trade regime, traceability is the new gold. Countries that invest early in green corridors will not only reduce emissions—they will secure long-term access to climate-regulated global markets.

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