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# THE ROLE OF MSMES IN SHAPING INDIA'S CLIMATE-INTEGRATED TRADE POLICY IN A GLOBAL ECONOMY

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***Abstract***

*Micro, Small, and Medium Enterprises (MSMEs) are critical to India's economic growth, employment generation, and participation in international trade (Ministry of Micro, Small & Medium Enterprises, Government of India. (2025). Annual Report 2024–25. New Delhi: Government of India.). In the contemporary global economy, trade policies are increasingly influenced by climate change and sustainability concerns, necessitating a shift toward climate-integrated trade frameworks(World Trade Organization, 2023; UNFCCC, 2022)..MSMEs, due to their flexibility, innovation capacity, and sectoral diversity, play a pivotal role in aligning India's trade policy with global climate imperatives. This paper examines the role of MSMEs in shaping India's climate-integrated trade policy within the context of a global economy. It explores the contribution of MSMEs to exports, the challenges they face in complying with environmental and sustainability standards,(OECD, 2023) and the opportunities presented by green trade and low-carbon global value chains. The study highlights policy measures that can strengthen MSMEs' competitiveness while advancing India's climate commitments. By integrating MSMEs into climate-responsive trade strategies, India can promote sustainable growth, enhance global trade linkages, and position itself as a leader in a climate-integrated economic order.*

***Keywords: MSMEs, Climate-Integrated Trade Policy, International Trade, India, Sustainable Exports.***

## 1. Introduction

International trade has long been a key driver of economic growth, innovation, and global integration (Krugman & Obstfeld, 2022). However, the growing importance of climate change has reshaped the trade landscape, with countries increasingly embedding environmental standards, low-carbon regulations, and sustainability practices into trade agreements and policies. Trade is now not only an economic tool but also a mechanism for promoting sustainability and climate resilience (Sachs, 2021).

In India, Micro, Small, and Medium Enterprises (MSMEs) form the backbone of the economy, contributing around 30% of GDP, employing over 120 million people, and accounting for nearly 45% of merchandise exports (Ministry of MSME, 2024). MSMEs play a crucial role in both economic development and integration into a climate-oriented global trade system (Government of India, 2023; NITI Aayog, 2022; WTO, 2023).

This paper examines the role of MSMEs in shaping India's climate-integrated trade policy, focusing on their contributions to exports, sustainable supply chains, and low-carbon innovation. It also analyzes the challenges they face and outlines policy measures needed to strengthen their resilience and global competitiveness (OECD, 2023; World Bank, 2023).

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## 2. Conceptual Framework: Climate-Integrated Trade and MSMEs

A climate-integrated global economy refers to an economic system where trade, investment, and production decisions incorporate climate change and environmental sustainability considerations. (WTO, 2023; UNFCCC, 2021).”.

The **trade–climate nexus** affects MSMEs in multiple ways:

1. **Compliance Requirements:** International trade increasingly demands adherence to environmental standards, carbon footprint limits, and sustainability certifications. MSMEs must adapt to these requirements to access global markets.
2. **Technology and Innovation:** MSMEs that adopt low-carbon technologies, renewable energy solutions, and energy-efficient production methods can gain competitive advantages in climate-conscious markets.
3. **Global Value Chain Integration:** MSMEs supply goods and services to larger firms participating in global value chains. Their compliance with environmental standards directly affects the competitiveness of the broader supply chain.
4. **Market Opportunities:** Climate integration creates demand for green products, sustainable packaging, renewable energy components, and low-carbon services—areas where MSMEs can excel due to their flexibility and innovation capacity.

By positioning MSMEs as central actors in climate-integrated trade, India can simultaneously advance economic growth and environmental sustainability

## 3. MSMEs in India’s International Trade

International trade remains a key driver of growth, but climate change has transformed it into a tool for sustainability, with environmental standards and low-carbon regulations shaping global trade policies (Krugman & Obstfeld, 2022; Sachs, 2021). In India, MSMEs contribute around 30% of GDP, employ over 120 million people, and account for nearly 45% of exports, making them central to both economic development and climate-integrated trade (Ministry of MSME, 2024).

This paper analyzes the role of MSMEs in advancing sustainable trade, while examining the challenges they face and the policy measures needed to enhance their resilience and competitiveness (OECD, 2023; World Bank, 2023).

### 3.1Textiles and Garments

The textile and apparel sector remains one of India’s oldest and strongest export industries, with MSMEs dominating production in handlooms, powerlooms, garment manufacturing, and allied segments.(Ministry of Textiles, 2023; UNCTAD, 2023)**.** The industry:

- Employs **over** 45 million people directly**.**
- Recorded textile and apparel exports of approximately USD 34–35 billion in FY 2023–24**.** (Ministry of Textiles, 2024).”
- Has MSMEs accounting for around 80% of national textile capacity.

These statistics demonstrate that textile MSMEs serve as both major domestic employers and globally competitive exporters, linking traditional craftsmanship with international demand.

**3.2 Leather and Handicrafts**

India ranks among the world's leading exporters of leather products, often placing 2nd in leather garments (Leather Export Promotion Council, 2023) andtop five overall in leather exports**.** MSMEs form the backbone of this sector, producing:

- Footwear
- Bags and accessories
- Handcrafted leather goods

These products enjoy strong demand in markets such as Europe, North America, and the Middle East, particularly as international buyers increasingly seek ethically produced and low-carbon goods.

**3.3 Agro-Processing**

MSME-driven agro-processing exports include spices, rice, tea, honey, processed foods, and traditional snacks(FAO, 2023; Ministry of Food Processing, 2023). India's agricultural and processed food exports have shown steady growth in recent years, supported significantly by small enterprises that cater to rising global demand for organic, heritage, and specialty food products. Their flexibility enables them to meet niche consumer preferences in international markets.

**3.4 Engineering and Electronics**

Engineering goods represent one of India's largest export categories, and MSMEs contribute approximately 40% of engineering exports**.** Their export portfolio includes:

- Auto components
- Industrial machinery
- Pumps, valves, and hardware
- Electrical equipment

These products are shipped to major markets across Europe, Africa, Southeast Asia, and Latin America, illustrating the global reach of MSME-manufactured industrial **goods** (Ministry of Commerce & Industry, 2023; UNCTAD, 2023)**.**

**3.5 Renewable Energy and Green Technology**

Indian MSMEs are increasingly active in emerging clean-technology sectors aligned with global sustainability demand. Their contributions include:

- Solar photovoltaic components
- Biomass and bioenergy equipment
- Energy-efficient appliances and devices**(**IRENA, 2023; OECD, 2023)**.**

As climate regulations and sustainability standards tighten internationally, demand for low-carbon technologies is rising. MSMEs participating in green manufacturing therefore occupy a strategic position within the evolving structure of global trade.

The above evidence highlights the structural significance of MSMEs in India's international trade system. They account for nearly half of national merchandise exports**.**

They operate across both traditional sectors (textiles, leather) and high-growth sectors (engineering, green technology).Their products reach diversified markets across Europe, Asia, Africa, and the AmericasTaken together, these trends indicate that MSMEs form the backbone of India's export

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economy. Consequently, any climate-integrated trade policy must incorporate MSME-focused strategies, because their competitiveness, technological upgrading, and sustainability readiness will largely determine India's success in the evolving global trade regime.

**Table 1. Macroeconomic Importance of MSMEs in India's Trade System**

| Indicator | Latest Estimate (2025) |
|---|---|
| Share in total exports | ≈ 48% |
| Contribution to GDP | ≈ 31% |
| Share of manufacturing output | ≈ 35% |
| Employment | ≈ 32+ crore persons |
| Number of enterprises | ≈ 7.4 crore |

**(**Ministry of Micro, Small and Medium Enterprises, 2025; Reserve Bank of India, 2025)."

## 4. Evolution of India's Trade Policy Reforms

India's trade policy has undergone a profound transformation since independence, shifting from a protectionist, import-substituting framework to a more outward-oriented, globally integrated regime. This evolution can be understood across distinct historical phases shaped by domestic development priorities, global economic trends, and institutional reforms(Panagariya, 2008; Bagchi, 2014)**..**

### 4.1 Pre-Reform Era (1947–1991): Protectionism and Import Substitution

In the decades following independence, India adopted a state-led, inward-looking trade strategy designed to promote self-reliance and industrialization(Ahluwalia, 1985; Krueger, 1990)**..** Policymakers prioritized domestic production over international trade to reduce dependence on foreign goods.

**Key Characteristics**

1. High tariff barriers and quantitative import restrictions.
2. Licensing requirements for imports and exports.
3. Overvalued exchange rate discouraging exports.
4. Strong emphasis on heavy industries.

This approach was influenced by structuralism development theories and aimed to build domestic industrial capacity. However, by the late 1980s, the system led to inefficiencies, low export competitiveness, and persistent balance-of-payments pressures.**(**Nayyar, 1994; Balasubramanyam, 2002)**.**

### 4.2 Liberalization Phase (1991–2000): Structural Adjustment and Global Integration

A major turning point occurred in 1991 during a severe macroeconomic crisis. Under the leadership of Prime Minister P. V. Narasimha Rao and Finance Minister Manmohan Singh, India initiated comprehensive economic reforms.

**Major Trade Reforms Included**

1. Reduction of import tariffs.
2. Removal of quantitative restrictions.
3. Devaluation of the rupee to boost exports.
4. Simplification of export procedures.
5. Opening sectors to foreign investment.

India also strengthened its participation in global trade institutions, especially after joining the World Trade Organization in 1995, which required commitments to rules-based trade liberalization.

**Impact:** These reforms marked the transition from an inward-looking to an export-promoting trade strategy and significantly expanded India's integration into global markets**(World Bank, 1993)**..

**4.3 Consolidation and Expansion Phase (2000–2014)**
During this period, India focused on consolidating liberalization and expanding export competitiveness.

**Policy Developments**

1. Introduction of Export-Import (EXIM) Policies to promote sectoral exports
2. Establishment of Special Economic Zones (SEZs)
3. Reduction of peak customs duties
4. Expansion of free trade agreements (FTAs)(Ministry of Commerce & Industry, 2014; UNCTAD, 2013)**.**

Trade diversification increased, with growth in services exports such as IT and business process outsourcing. The government also began recognizing the role of MSMEs in export growth(OECD, 2013; NITI Aayog, 2014**)**., leading to targeted export incentives and cluster development programs.

**4.4 Strategic Trade Policy Phase (2014–2020)**
In recent years, trade policy shifted toward a more strategic orientation balancing liberalization with domestic industrial priorities.

**Key Features**

1. Emphasis on "Make in India" manufacturing promotion.
2. Production-linked incentive (PLI) schemes.
3. Greater scrutiny of imports from strategic sectors.
4. Digital trade facilitation initiatives.

The government also aimed to improve India's ranking in global ease-of-doing-business indicators and reduce logistics costs to enhance export competitiveness**(**Government of India, 2015; World Economic Forum, 2018)**..**

**4.5 Climate-Integrated and Resilient Trade Phase (2020–Present)**
The latest phase reflects the integration of trade, sustainability, and geopolitical considerations.
Emerging priorities:

1. Alignment with climate commitments and net-zero targets.
2. Promotion of green exports and renewable-energy supply chains.
3. Participation in carbon market mechanisms.
4. Supply-chain diversification after global disruptions.

Trade policy is increasingly designed not only to promote exports but also to ensure environmental compliance and resilience against global shocks. MSMEs are now viewed as key actors in this transition because their collective production scale affects national export sustainability.

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## 5. Climate Dimensions of Trade Policy for MSMEs

The integration of climate considerations into trade policy has become a defining feature of contemporary global economic governance. For India, aligning trade competitiveness with environmental sustainability is particularly important for Micro, Small, and Medium Enterprises (MSMEs).

### 5.1 Global Climate–Trade Linkages

International trade rules are increasingly influenced by environmental commitments under frameworks such as the Paris Agreemnt(UNFCCC, 2015)and regulatory disciplines shaped by the World Trade Organization(WTO, 2020)**..** These frameworks encourage member states to reduce carbon intensity, promote clean technologies, and discourage environmentally harmful subsidies. As countries introduce carbon border taxes, eco-labelling requirements, and sustainability certification systems, exporters must demonstrate compliance with climate-related standards.

For Indian MSMEs, these developments create dual pressures:

1. **Compliance pressure** due to stringent environmental norms in export markets.
2. **Competitiveness pressure** from larger firms that can more easily invest in green technology (OECD, 2021; UNCTAD, 2021)**.**

### 5.2 Emerging Green Trade Regulations Affecting MSMEs

One of the most significant recent developments is the Carbon Border Adjustment Mechanism introduced by the European Union. This mechanism imposes carbon-linked tariffs on imports of emission-intensive goods such as steel, cement, and aluminum (Government of India, DPIIT, 2022).. Indian MSMEs involved in supply chains for these sectors must now monitor and report emissions data to maintain market access.

### 5.3 India's Policy Response: Climate-Sensitive Trade Strategy

The Government of India has begun aligning trade and climate policy through initiatives such as green hydrogen missions, renewable-energy incentives, and sustainability certification programs for exporters(Ministry of New & Renewable Energy, 2021; Ministry of Commerce & Industry, 2021)**.**Trade policy instruments increasingly incorporate climate considerations in the following ways:

1. **Export Incentives for Green Products:** Subsidies and tax benefits for environmentally friendly goods and technologies.
2. **Technology Upgradation Schemes:** Financial assistance for MSMEs to adopt energy-efficient machinery.
3. **Sustainability Standards Infrastructure:** Development of testing, certification, and carbon-accounting facilities.

These initiatives aim to ensure that climate compliance becomes a driver of export competitiveness rather than a barrier.

### 5.4 Structural Constraints Facing MSMEs

Despite policy support, MSMEs face structural limitations that constrain climate adaptation:

1. **Financial Constraints:** High upfront cost of clean technologies.
2. **Information Gaps:** Limited awareness of international environmental standards.
3. **Technological Limitations:** Restricted access to advanced production methods.
4. **Certification Barriers:** Complex documentation and auditing processes.

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Without targeted support, these constraints risk marginalizing smaller exporters from global value chains as sustainability standards tighten.

### 5.5 Strategic Opportunities for Climate-Responsive MSMEs

Climate-integrated trade policy also presents new avenues for growth. Global demand for green goods—such as renewable-energy components, eco-textiles, and organic agricultural products—is rising rapidly. MSMEs that adopt sustainable practices can benefit from:

1. Preferential access to environmentally conscious markets.
2. Higher price premiums for certified green products.
3. Inclusion in sustainable global supply chains.
4. Improved brand reputation and investor confidence.(OECD, 2021; Panagariya, 2018).

Thus, environmental compliance can function as a competitive asset rather than merely a regulatory obligation.

### 5.6 Policy Imperatives for Inclusive Climate-Trade Integration

To fully integrate MSMEs into climate-aligned trade systems, policy design must emphasize inclusivity. Recommended measures include:

1. Dedicated green transition funds for MSMEs.
2. Simplified carbon reporting frameworks tailored for small firms.
3. Capacity-building programs on environmental standards.
4. Trade diplomacy to ensure fairness in global climate trade rules.

Such measures can help bridge the gap between sustainability objectives and developmental priorities.Climate considerations are reshaping the architecture of international trade, making environmental performance a determinant of export success. For India, MSMEs occupy a pivotal position in this transition. With appropriate policy support, technological upgrading, and institutional facilitation, they can evolve from vulnerable actors into strategic drivers of a climate-resilient trade ecosystem.

## 6. Challenges for MSMEs in a Climate-Integrated Global Economy

As global trade increasingly aligns with climate objectives, Micro, Small, and Medium Enterprises (MSMEs) face a complex landscape shaped by environmental regulations, technological transitions, and market restructuring.

### 6.1 Regulatory Compliance Burden

Climate-linked trade rules are expanding under international regimes influenced by institutions such as the World Trade Organization and environmental commitments associated with the Paris Agreement. Exporting firms must now comply with:

1. Carbon disclosure requirements.
2. Environmental product standards.
3. Lifecycle emission reporting.
4. Sustainable sourcing certifications.

Large corporations often have dedicated compliance teams, whereas MSMEs must navigate these requirements with minimal administrative capacity. This increases transaction costs and delays export readiness.

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### 6.2 Carbon Border Measures and Trade Barriers

Climate-related trade instruments such as carbon border taxes imposed by markets including the European Union function as non-tariff barriers for many developing-country exporters (European Commission, 2020). MSMEs are particularly vulnerable because:

1. They lack emissions monitoring systems.
2. They rely on traditional production methods.
3. They have limited bargaining power in global value chains.

As a result, even when products meet quality standards, they may fail to meet carbon intensity thresholds required for market entry.

### 6.3 Financial Constraints in Green Transition

Transitioning to low-carbon production requires investment in:

1. Energy-efficient machinery.
2. Renewable power integration.
3. Waste-reduction technologies.
4. Sustainable packaging systems.

For MSMEs, these upgrades involve high upfront capital costs and long payback periods. Access to green finance remains limited due to collateral requirements, risk perceptions, and insufficient awareness of sustainability-linked credit schemes. (World Bank, 2022)."

### 6.4 Technological and Knowledge Gaps

Technological readiness is a major determinant of climate competitiveness. Many MSMEs operate with outdated equipment and have limited access to innovation networks. Constraints include:

1. Lack of technical expertise to measure emissions
2. Limited R&D capabilities
3. Weak linkages with research institutions
4. Inadequate digital infrastructure

Without technological upgrading, MSMEs risk exclusion from environmentally certified supply chains that prioritize traceability and low carbon footprints.

### 6.5 Supply Chain Pressures

Global lead firms increasingly require suppliers to meet environmental, social, and governance (ESG) criteria. MSMEs integrated into export value chains must therefore comply with sustainability audits and reporting standards imposed by multinational buyers. These requirements often shift compliance responsibility downward without corresponding financial support, creating asymmetric obligations for smaller suppliers.

### 6.6 Institutional and Policy Coordination Challenges

Climate-trade integration demands coordination across multiple policy domains—trade, environment, industry, finance, and technology. In India, initiatives led by the Government of India aim to support sustainable industrialization, yet implementation challenges persist:

1. Fragmented policy frameworks.
2. Overlapping regulatory authorities.
3. Complex certification procedures.
4. Limited last-mile institutional outreach.

Such administrative complexity can discourage MSMEs from participating in export markets altogether.

### 6.7 Risk of Market Marginalization

If climate standards tighten faster than MSMEs can adapt, the result may be structural exclusion from international trade. This could lead to:

1. Concentration of exports among large firms.
2. Reduced diversity in export sectors.
3. Declining participation of rural and informal enterprises.
4. Widening income disparities.

Thus, climate-integrated trade rules while environmentally necessary may unintentionally reinforce global inequality unless accompanied by inclusive transition mechanisms.

### 6.8 Strategic Imperatives for Resilience

To overcome these challenges, MSMEs require targeted interventions:

1. Simplified carbon accounting tools designed for small firms
2. Subsidized access to clean technologies
3. Dedicated sustainability advisory services
4. Capacity-building programs on green standards
5. Preferential financing instruments

These measures can transform climate compliance from a constraint into a pathway for innovation and competitiveness.

## 7. Opportunities for MSMEs in a Climate-Integrated Global Economy

While climate-aligned trade regimes impose new compliance demands, they also MSMEs can leverage them as strategic tools for differentiation and long-term resilience(Panagariya, 2018; World Bank, 2022)**.**

### 7.1 Expansion of Global Green Markets

The global transition toward low-carbon development has generated rapidly expanding demand for environmentally sustainable goods and services. Markets for renewable-energy components, eco-textiles, biodegradable packaging, organic foods, and circular-economy products are growing faster than conventional sectors. International institutions such as the World Bank estimate that climate-related industries will dominate future trade flows, creating export niches ideally suited for flexible, innovation-driven MSMEs(World Bank, 2022)**.**

### 7.2 Integration into Sustainable Global Value Chains

Multinational corporations increasingly prioritize environmentally responsible suppliers. Sustainability certification, carbon disclosure, and traceability systems are becoming prerequisites for participation in global value chains shaped by frameworks promoted through the World Trade Organization. MSMEs that adopt greener production practices can gain:

1. Preferred supplier status.
2. Long-term procurement contracts.
3. Access to international technology transfer.
4. Higher export price realization.

This integration improves productivity and reduces vulnerability to market volatility.

### 7.3 Government Incentives and Policy Support

The Government of India has launched multiple initiatives promoting sustainable manufacturing and exports, including production-linked incentives for clean technologies, renewable-energy adoption programs, and MSME modernization schemes(Ministry of Commerce & Industry, 2021; Ministry of New & Renewable Energy, 2021).These initiatives create opportunities for smaller firms to:

1. Upgrade machinery with subsidized financing.
2. Adopt energy-efficient production systems.
3. Access export promotion assistance.
4. Receive training on environmental compliance.

Such policy interventions lower the cost barrier for green transition and make sustainability commercially viable.

**7.4 Access to Green Finance and Investment**

Climate-focused financial instruments—green bonds, sustainability-linked loans, and ESG investment funds—are expanding rapidly. Financial institutions and development banks increasingly prioritize lending to environmentally responsible enterprises. MSMEs demonstrating measurable emission reductions or resource efficiency gains can attract:

1. Preferential interest rates.
2. Risk-sharing credit guarantees.
3. Impact investment funding.
4. International development finance.

This shift signals a structural transformation in capital markets where environmental performance influences creditworthiness.

**7.5 Technological Upgradation and Innovation Potential**

Climate-oriented trade encourages adoption of advanced technologies such as:

1. Smart energy management systems.
2. Low-emission manufacturing processes.
3. Digital carbon accounting tools.
4. Waste-recycling innovations.

For MSMEs, technological upgrading improves productivity, reduces operating costs, and enhances product quality. Collaboration with research institutions and industry clusters can further accelerate innovation diffusion.

**7.6 Brand Differentiation and Market Reputation**

Consumers worldwide are increasingly environmentally conscious. Products labeled as organic, low-carbon, recyclable, or ethically sourced command price premiums and stronger brand loyalty. MSMEs that integrate sustainability into their business model can strengthen their reputation in export markets, positioning themselves as responsible producers rather than low-cost suppliers(UNCTAD, 2021)**.**

**7.7 Regional and South–South Trade Opportunities**

Climate-friendly production methods are not only demanded in developed markets but are also gaining traction in emerging economies. Regional trade agreements and South–South cooperation frameworks emphasize technology sharing and sustainable development partnerships. This creates opportunities for Indian MSMEs to export green products to Asia, Africa, and Latin America, where demand for affordable sustainable goods is rising.

**7.8 Strategic Transformation Potential**

The most significant opportunity lies in structural transformation. Climate-integrated trade encourages MSMEs to move:

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1. From low-value production → high-value sustainable manufacturing
2. From informal operations → formalized export enterprises
3. From domestic markets → global supply chains
4. From resource-intensive methods → efficiency-driven production

This transition enhances productivity, employment generation, and long-term competitivene. With targeted policy support, technological access, and financial inclusion, MSMEs can emerge not merely as participants but as leaders in the global green trade transformation.

## 8. Policy Recommendations

To ensure that Micro, Small, and Medium Enterprises (MSMEs) effectively participate in a climate-integrated global economy, policy frameworks must simultaneously address competitiveness, sustainability, and inclusiveness.

### 8.1 Establish a Dedicated Green Transition Framework for MSMEs

A national-level climate–trade facilitation architecture should be developed under the leadership of the Government of India to integrate environmental goals with industrial policy. This framework should:

1. Provide sector-specific decarbonization roadmaps
2. Offer simplified compliance templates for small firms
3. Create digital platforms for carbon accounting and reporting
4. Align domestic standards with international sustainability benchmarks

Such institutional alignment would reduce regulatory uncertainty and enable MSMEs to plan long-term investments.

### 8.2 Expand Access to Climate Finance

Financial constraints remain the most significant barrier to sustainable transition. Policy must therefore prioritize:

1. Green credit guarantee schemes for MSMEs.
2. Interest subsidies for energy-efficient technologies.
3. Dedicated sustainability funds through development banks.
4. Blended finance partnerships with institutions such as the World Bank.

Improving access to climate finance will accelerate technology adoption and reduce transition risks for smaller firms.

### 8.3 Simplify Environmental Compliance Mechanisms

Global sustainability regulations influenced by bodies like the World Trade Organization often involve complex documentation requirements. Governments should design MSME-friendly compliance systems by:

1. Standardizing certification procedures.
2. Creating single-window clearance portals.
3. Offering subsidized testing and audit services.
4. Providing multilingual compliance guidelines.

Streamlined procedures can significantly lower transaction costs and encourage export participation.

### 8.4 Strengthen Technology Access and Innovation Ecosystems

Technological upgrading is essential for reducing carbon intensity. Policy should promote:

1. Technology transfer partnerships.
2. Public–private innovation clusters.

3. Shared green manufacturing facilities.
4. R&D tax incentives for MSMEs.

Collaboration with academic institutions, research centers, and industrial clusters can accelerate diffusion of clean technologies across small enterprises (UNCTAD, 2021)

**8.5 Build Institutional Capacity and Awareness**

Many MSMEs remain unaware of evolving climate-linked trade regulations shaped under global climate governance platforms such as the UNFCCC. Capacity-building initiatives should include:

1. Training programs on sustainability standards.
2. Export readiness workshops.
3. Digital literacy campaigns.
4. Sector-specific advisory services.

Such initiatives enhance managerial capability and enable MSMEs to respond proactively to international policy shifts.

**8.6 Promote Cluster-Based Green Industrialization**

Cluster-based approaches allow MSMEs to share infrastructure, reduce costs, and achieve economies of scale in sustainability investments. Governments can support eco-industrial clusters through:

1. Common effluent treatment plants.
2. Shared renewable-energy systems.
3. Collective certification programs.
4. Joint marketing of green products.

This collaborative model is particularly effective for sectors such as textiles, leather, handicrafts, and food processing.

**8.7 Integrate Trade Diplomacy with MSME Interests**

India's trade negotiations should explicitly incorporate MSME concerns into climate-related provisions. Strategic priorities include:

1. Advocating fair carbon border measures.
2. Securing technology transfer clauses.
3. Ensuring recognition of developing-country constraints.
4. Negotiating mutual recognition of sustainability certifications.

Such diplomacy can prevent climate standards from becoming disguised protectionist barriers.

**8.8 Develop Data-Driven Monitoring Systems**

Robust policy design requires reliable data. Establishing national databases on MSME emissions, energy usage, and sustainability practices would enable:

1. Evidence-based policymaking.
2. Sector-specific support targeting.
3. Measurement of climate-trade performance.
4. Early identification of compliance gaps.

Digital monitoring platforms can also enhance transparency and investor confidence.

**9. Conclusion and Future Research Directions:** The integration of climate considerations into global trade is reshaping export competitiveness, especially for Micro, Small, and Medium Enterprises (MSMEs). As sustainability standards become central to market access, environmental performance is emerging as a key determinant of trade success. For India, where MSMEs play a vital role in

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employment, manufacturing, and exports, aligning trade policy with climate goals is both economically and developmentally essential.

Global frameworks influenced by agreements like the Paris Agreement are promoting low-carbon production, sustainable sourcing, and environmental transparency. While these shifts create compliance challenges for MSMEs, they also open opportunities in green markets, sustainable value chains, and climate finance.

India's policy efforts increasingly support MSME adaptation through technology, finance, and capacity building. However, constraints such as limited capital, technological gaps, and complex regulations still restrict their participation. Strengthening MSMEs as active drivers of climate-responsive trade can enable inclusive growth, export expansion, and emissions reduction.

**Future Research Directions**

Despite growing scholarship on trade and sustainability, several areas require deeper empirical and theoretical exploration:

1. **Firm-Level Climate Readiness Studies:** Micro-data analyses assessing MSME preparedness for carbon reporting, certification, and green technology adoption.
2. **Sector-Specific Transition Pathways:** Comparative research on decarbonization trajectories across MSME-dominated industries such as textiles, food processing, and light engineering.
3. **Impact Evaluation of Policy Instruments:** Rigorous assessment of green subsidies, carbon pricing mechanisms, and sustainability incentives on MSME productivity and export performance.
4. **Digital–Climate Trade Linkages:** Investigation of how digital platforms, blockchain traceability, and AI-based monitoring systems can reduce compliance costs for small exporters.
5. **South–South Cooperation Models:** Analysis of collaborative climate-trade frameworks among developing economies that prioritize MSME inclusion.

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