

Global Drift: Navigating the Trade Waves amongst Environmental and Sustainability Concerns



CRIT/CWS Working Paper Series No 75*

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The production, movement, and consumption of goods and services, within and across borders, is the foundation of modern society and undeniably exacerbates climate change. At the same time, it is equally valid that trade is disrupted by climate change. We must recognise the decisive role that trade can play to promote a more sustainable world. In the wake of the realisation of the intertwined relationship between trade and the environment, the broader objective of the paper is to understand whether the liberalisation of Environmental Goods (EGs) will impact market access. If yes, will countries be impacted differently? Empirical analysis reveals that, in the long run, a negotiated outcome of tariff liberalisation on EGs without adequately addressing NTM incidence would lead to devastating results for developing economies. In this regard, the paper recommends fruitful outcomes for WTO Members in negotiations on EG's and ES's.

July 2024

Centre for WTO Studies (CWS)

Centre for Research in International Trade (CRIT), IIFT, New Delhi – 100014

* The authors thank the expert on the panel at the Indian Institute of Management (IIM), Kozhikode, for the valuable suggestions provided on the first draft paper presentation delivered on 2-3 December 2023 at the 4th International Conclave on Globalizing Indian Thought (GIT 2024), held at Kozhikode, Kerala. The authors received the best paper award at the conference. For comments and suggestions, please contact muralik@iift.edu.

Abstract

The production, movement, and consumption of goods and services, within and across borders, is the foundation of modern society and undeniably exacerbates climate change. At the same time, it is equally valid that trade is disrupted by climate change. We must recognise the decisive role that trade can play in promoting a more sustainable world. In the wake of the realisation of the intertwined relationship between trade and the environment, the broader objective of the paper is to understand whether the liberalisation of Environmental Goods (EGs) will impact market access. If so, will countries be affected differently? Empirical analysis reveals that, in the long run, a negotiated outcome of tariff liberalisation on EGs without adequately addressing NTM incidence would lead to devastating results for developing economies. In this regard, the paper recommends fruitful outcomes for WTO Members in negotiations on EGs and ESs.

Keywords: Non-Tariff Measures, Sanitary and Phytosanitary Measures, Technical Barriers to Trade, Environmental Goods, European Union, WTO.

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1. Introduction

We are facing a crisis that is both local and global. Climate change directly contributes to humanitarian emergencies, including heatwaves, wildfires, floods, tropical storms, and hurricanes, which are increasing in scale, frequency, and intensity. Moreover, research indicates that the direct damage costs to health are estimated to be between US\$2–4 billion per year by 2030.² All human and economic activities have impacted the environment and led society to this point. Trade is no different. The production, movement, and consumption of goods and services within and across borders is the foundation of modern society and undeniably exacerbates climate change. Each stage of the process entails a fresh contribution to greenhouse gas emissions. At the same time, it is equally valid that trade is disrupted by climate change.³ We must recognise trade's decisive role in promoting a more sustainable world. In this regard, a collaborative effort should be sought to encourage dialogue between the trade and environment communities since concrete solutions need collective actions. Removing unnecessary barriers to trade on environmental goods (EGs) and environmental services (ESs) could significantly augment the potential of trade, and it could help reduce prices, production costs, and thereby the exposure to climate-induced shocks. Climate change challenges and concerns about sustainability have brought the negotiations on trade and environment, which had taken a back seat to the forefront of the WTO negotiations.

Countries apply domestic rules and regulations to protect the environment from the detrimental production process. Due to the lack of market-driven pricing on environmental resources and a market failure, state intervention is necessary and justified. In this context, the best solution is to have a domestic ecological regulation that directly addresses the reasons for market failure. However, this does not correct the problem due to negative externalities (spillover effects) associated with public goods. Thus, domestic laws and regulations may not be a pertinent solution to the international problem of climate change. However, these are efficient tools for enforcing environmental standards within the nation-state. Therefore, trade measures concerning ecological/environmental protection may be used since these go beyond domestic jurisdiction. In other words, trade is a critical node to mobilise if the world is to achieve green, resilient, and inclusive development in the coming years.⁴

However, the effect of environmental-related trade measures on market access, especially in developing countries, mainly the least developed among them, and those situations in which the

²<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

³<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/644711632894241300/the-trade-and-climate-change-nexus-the-urgency-and-opportunities-for-developing-countries>

⁴https://www.wto.org/english/res_e/booksp_e/wtr22_e/wtr22_e.pdf



elimination or reduction of trade restrictions and distortions would benefit trade, and the relationship between environment and development need to be studied.⁵

Observing the need for trade and environmental linkages, the WTO members negotiated to eliminate the protection of ecological goods (EGs) and environmental services (ESs) under the Doha Round. The Ministerial document included provisions for enhancing the mutual supportiveness of trade and environment.

Emphasis should be laid on Paragraph 31(iii) which states:

*" we agree to negotiations, without prejudging their outcome, on the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services."*⁶

The objective of including such provisions was to create a triple-win situation for trade, the environment, and development. First, if negotiations were successful, trade would be facilitated through reduced or eliminated tariffs and non-tariff barriers on EGs and ESs (Ratna et al., 2010). Second, developing countries would benefit from better market access to EGs and ESs. Producers of EGs would have better access to large markets in Europe, the US, and high-income Asia, and it would be easier for developing countries to obtain high-quality EGs on world markets. Third, at the global level, the environment would be better preserved and beneficial for development by assisting developing countries in obtaining the tools needed to address critical environmental priorities.⁷

These efforts would be more effective if a comprehensive definition of EGs and ESs were adopted, which can be facilitated with highly focused rule-making. Since the launch of the Doha Round in 2001, and despite the adoption of Sustainable Development Goals in 2015, there has been little progress except for a tariff reduction of 5% for the list of 54 environmental goods (henceforth the APEC list) - expressed in HS 6-digit tariff line. Moreover, there are concerns about the increasing use of unilateral measures impacting trade, which are justified as environmental measures, with potential inconsistencies with the WTO rules and undermining the multilateral agreements. Several developing members, along with India, have underlined the importance of following the foundational UNFCCC principles of equity and CBDR-RC in adopting carbon border measures, minimum residual limits in agriculture trade, and tariff rate quotas based on the green content of commodities. Some of these aspects need urgent attention since the application of unilateral measures adopted by members can contribute to increased trade costs for exporters from developing and least-developed countries.

In the wake of the realisation of the intertwined relationship between trade and the environment, the broader objective of the paper is to understand whether the liberalisation of EGs will impact market

⁵ WTO Document JOB/TE/84

⁶WTO, 2008, "Negotiations on Trade and the Environment", https://www.wto.org/english/tratop_e/markacc_e/markacc_negoti_e.htm.

⁷ https://www.wto.org/english/tratop_e/envir_e/envir_neg_serv_e.htm

access. If yes, will countries be impacted differently? The analysis is conducted in two stages. Firstly, the paper will undertake a partial equilibrium analysis to model the impact of tariff reduction on EGs and its ex-post effects on different countries belonging to varying stages of development. Secondly, the paper will also include an analysis of non-tariff measures by other countries. Many papers do not take the latter aspect into account.

The paper is structured as follows: Section 2 entails a literature review, providing a comprehensive backdrop to the study's empirical underpinnings. Section 3 expounds upon the employed methodology, and Sections 4 and 5 summarise critical findings. In Section 6, we conclude our analysis with policy recommendations.

2. Literature Review

It is imperative to point out that the final price of an EG is determined by two factors: the quantum of tariffs (taxes) and the import regulations (NTBs/NTMs). Both have different implications, the former being 'price-enhancing' and the latter being 'cost-enhancing.' Since NTMs such as technical regulation (TBT measures) lead to altering the production process, they raise the free on board (FOB) price to accommodate the regulatory regime, which is imposed as a differential requirement by the importing member. Hence, they are coined as 'cost-enhancing.' Therefore, harmonizing such measures is necessary as the deviated standards may act as non-tariff barriers to the exporters of the EGs (Ratna et al., 2013; UNCTAD 2018).

Theoretical studies decompose the effects of trade in EGs into scale, composition, and technique effects (Bacchetta et al., 2022; Tamini et al., 2018; Grossman et al., 1991). First, increased trade in EGs would mean more economic activity and increased emissions (scale effect). Second, maintaining a constant scale of the economy and continuous carbon emissions intensities, the lowering of tariffs and NTMs on imports of EGs would lead to changes in countries' allocation of resources towards activities with either higher or lower emission intensities depending on their respective comparative advantages (composition effect). Third, holding scale and composition constant, improved access to EGs would encourage a switch to low-carbon production techniques, reducing emissions (technique effect). Hence, trade allows developing countries to adopt cleaner technologies and, in some instances, leapfrog the intensive fossil fuel energy use stage.

Empirical work on the potential effects of liberalizing EG trade is relatively scarce or inconclusive. This is primarily because of difficulties in classifying and distinguishing EGs and the many channels through which trade in EGs can affect economic and environmental outcomes (Bacchetta et al., 2022). Recent work includes an Energy-Related Environmental Goods (EREGs) analysis using a dynamic computable general equilibrium (CGE) model, which entailed tariff liberalization and a reduction in NTMs. The study found only a modest reduction in global emissions (Bacchetta et al., 2022). Studies have found trade policies introduced with environmental justification to be protectionist in intent and are used by developed economies to promote their domestic goals. A paper (Mani, 1996) argues that

trade policy measures typically are not the first best instruments for achieving environmental objectives. In their paper, Tamini et al., 2017) focus on whether the SDG objectives can be achieved by increasing trade in EGs following a differentiated liberalization. Their study highlights that the gains from liberalization would be modest for most countries, and those already dominating international trade in EGs would strengthen their positions.

While the previous studies are enriching, there is a limitation in the existing literature that we aim to overcome with our study. Firstly, at the global level, most contemporary literature only addresses the impact of price. However, this study provides a holistic point of view by incorporating an analysis of NTMs and the regulations that enhance cost, specifically when tariffs are liberalized across countries with no harmonization or reduction attempted for the NTMs. The study advocates for harmonizing the NTM measures as it would lead to more equitable and more effective implications for all the participants towards achieving environmental concerns as envisaged under the CTE mandates (Ratna et al., 2010; Ratna et al., 2013). Secondly, we try to study how trade policy instruments affect countries' market access at different development levels, which many studies have not attempted. Lastly, we employ a partial equilibrium economic framework, which scholars have overlooked. CGE models provide insights into the interaction of sectors not directly affected by trade changes. However, there are limitations to the CGE model that the partial equilibrium model can overcome. Firstly, CGE models are sensitive to several underlying assumptions, and the results obtained from such models have several apparent difficulties. Secondly, the partial equilibrium model has minimal data requirements and permits analysis at a reasonably disaggregated (or detailed) level, which CGE does not allow. Moreover, the partial equilibrium model resolves several “aggregation biases” (a level of aggregation that is neither convenient nor possible in the framework of a general equilibrium model). Lastly and more importantly, the partial equilibrium model tends to be more transparent and more accessible to implement. Our study contributes to the growing body of trade and environment literature.

3. Data Sources and Methodology

In the context of the challenges and concerns for WTO membership in trade and the environment, the paper analyzes the future impact of tariff reduction on environmental goods. The WITS Single Market Partial Equilibrium Simulation Tool (SMART) is applied to visualize the ex-post impact of the tariff reduction on EGs on the countries' imports.

SMART is a partial equilibrium modeling tool in WITS used for market analysis. As the name suggests, it focuses on one importing market and several exporting partners and assesses the impact of a tariff change scenario by estimating new values for a set of variables. SMART relies on the Armington assumption to model the behavior of the consumer. In particular, the adopted modeling approach is based on imperfect substitution between different import sources (different varieties). The SMART model can be used to analyze the impact of domestic trade reform as it provides insights

into the distribution of potential gains and losses from any contemplated policy changes. Thus, it can help predict any adjustment costs associated with reform implementation. It also provides an analytical framework for examining the impact of foreign trade liberalisation. It thus simulates the possible effect of a given trade policy intervention or reforms (tariff changes) for a single market on critical variables, including import flow, variations in tariff revenue, economic welfare effects (limited only to consumers), and other measures (Othieno et al., 2011).

The SMART has advantages and disadvantages while conducting the analysis. It permits analysis at a reasonably disaggregated level - which is the basis for tariff negotiations, and this view is supported by (Milner et al., 2005). However, it misses essential interactions and feedback between various markets because it neglects the critical inter-sectoral input/output linkages, a basis of general equilibrium analysis (WITS, 2011). It also excludes the existing constraints that apply to the various factors of production and their movement across sectors. The analysis emphasises more on the import side of the trading activity and we cannot predict anything about the changes in the export perspective of the reporting countries. This is a significant limitation of SMART analysis, and policymakers should consider it.

In the SMART model, we have analysed 480 environmental products at HS 6-digit, listed under the nine members' proposals to the CTE. At 4-digit these, in turn, fell to a much lesser number, 247 environmental products. The MFN bound rate data has been extracted from the WTO Tariff profiles. The MFN bound rate provides data on the average bond rate applied by the countries on their import. Kallummal and Banerjee's analysis in 2023 did address the presence of non-ad-valorem tariffs across developed countries and the issue of past studies not factoring them as market access barriers.

The study presents exploratory data analysis to identify the impact on selected countries regarding top markets and suppliers of environmental goods under existing trade scenarios.

3.1 Approaches Suggested under the CTE

Para 31 of the Doha Agenda provides a perspective to liberalise EGs based on eliminating tariffs and NTBs - various proposals (approaches) were notified to the WTO by its Members under the Trade and Environment Committee. Based on the mandate of para 31 of the Doha Declaration Agenda (DDA⁸), the countries made a series of proposals on EGs.

Paragraph 31(iii) of the Doha Ministerial Declaration calls for negotiations on "the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services" to enhance the mutual supportiveness of trade and environment.⁹

The EU was the group that submitted the first proposal under the Committee of Trade and the Environment. Under the CTE, four approaches and types of practices were observed. These can be

⁸ Also referred to as Doha Development Mandate (DDM).

⁹ WTO. see https://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm.

summarised as listed-based¹⁰, project-based¹¹ integrated, and combined¹¹ Approaches. Under these approaches, two cumulative conditions would have to be met to benefit from the reduction/elimination of tariff and non-tariff restrictions under paragraph 31(iii) of the Doha Mandate.¹² Without identifying the NTMs, the second pillar of the market access mandate will remain incomplete and achieve less than the proposed mandate under Para 31(iii) of DDA.

Table 1: Country-wise Proposals and WTO Summary Reports 2002 to 2011

Type of Submissions	2002	2003	2004	2005	2006	2007	2009	2010	2011	Numbers of Total Proposals
Jobs				1	5	4	1	2	3	16
TN/MA/W - [TN/TE/W]		2			1					3
TN/TE/W	3		1	11	1		1	1	1	19
Total Proposals	3	2	1	12	7	4	2	3	4	38

Source: Authors based on data from the WTO’s document download facility, <https://docs.wto.org/>.

Table 1 shows that only 38 submissions by Members were made under the CTE from 2002 to 2011, suggesting that over the past decade, no constructive approaches were proposed. There are 16 documents under the submission type ‘Jobs’ in 2011, two in 2003 and one in 2006 under both NAMA and CTE and 21 under the CTE alone. This points to a direct link to the NAMA negotiations, which were stalled owing to the differences in the negotiation formats between the developed and developing countries. The approaches proposed were by countries belonging to the developing countries groups like Chinese Taipei¹³, Qatar¹⁴, Peru¹⁵, Singapore¹⁶, India¹⁷, Argentina¹⁸, and Brazil¹⁹. Three developed countries provided a list-based approach, while others like India, Argentina, and Brazil focused on the discussions on trade liberalisation. They suggested that trade liberalisation

¹⁰ Many countries like Canada, ECs, New Zealand, Norway, Qatar, Singapore, Switzerland, and the US

¹¹ WTO. 2011, Combined Approach for Environmental Goods, Submission by Mexico and Chile, 15 February 2011, JOB/TE/16.

¹² WTO. para. 10. ‘Integrated Proposal on Environmental Goods for Development’, submission by Argentina, dated 14 October 2005, TN/TE/W/62.

¹³ WTO. Taipei listed EG under the following, Air pollution control; Monitoring and analysis and assessment; Noise and vibration abatement; Remediation and clean-up of soil and water; Solid and hazardous waste management; and Waste water management. See WTO, 2005 and 2007, ‘Synthesis of Submission on Environmental Goods’, Informal Note by the Secretariat, Annex 1, TN/TE/W/63.

¹⁴ WTO. Qatar listed only under one products category which is cleaner technology and products. See WTO, 2005 and 2007, ‘Synthesis of Submission on Environmental Goods’, Informal Note by the Secretariat, Annex 1, TN/TE/W/63.

¹⁵ WTO. See ‘Environmental Goods and Services for Development’, Paragraph 31(iii) and Paragraph 32(i) and (ii), Submission by Peru. Job/Ext/07161, and ‘Environmental Goods and Services for Sustainable Development’, Communication from Peru, Paragraph 31(iii) of the Doha Ministerial Declaration, Committee on Trade and Environment Special Session, Job/Ext/09177, dated 27 November 2009.

¹⁶ WTO. Singapore TN/TE/W65.doc and TN/MA/W/70, JOB/TE/5, and Job/TE/15.

¹⁷ WTO. An Alternative Approach for Negotiations under Paragraph 31(iii), India’s submission, TN/TE/W/51, 3 June 2005. India also submitted proposal with China, for details see the WTO document titled ‘WTO Negotiations on Environmental Goods and Services: Addressing the Development Dimension for a "Triple-Win" Outcome’, TN/TE/W/79.doc, dated April 15, 2011.

¹⁸ WTO. para. 10. ‘Integrated Proposal on Environmental Goods for Development’, submission by Argentina, dated 14 October 2005, TN/TE/W/62 and TN/TE/W/76 dated 30 June 2010.

¹⁹ WTO, See ‘Environmental Goods for Development’, Submission by Brazil Paragraph 31 (iii), TN/TE/W/59; ‘Environmental Goods for Development’, Submission by Brazil Paragraph 31(iii) JOB/EXT/07146; ‘Environmental Goods and Services-Biofuel’, Communication from Brazil Paragraph 31(iii), JOB/TE/6; ‘Special and Differential Treatment’, Communication from Argentina and Brazil, and TN/TE/W/76.

should not focus only on the increased sales (imports) of EGs. Still, they must encourage more significant participation of developing countries in commerce (exports) and promote their capacity (technology transfer) to develop EG industries. Brazil defines EGs based on a triple-win situation, i.e., trade promotion, environmental improvement, and poverty alleviation.

While supporting Brazil's proposal, Peru stressed the importance of providing a lesser role for technologically sophisticated products and services, which is not within the scope of most developing countries. In particular, some countries such as Peru, Brazil and India have emphasised the need to amend Article 29 of the TRIPS Agreement to include the requirement to disclose origin in the patent system.²⁰ Improved market access for products that have a low environmental impact or are derived from or incorporate cleaner technologies contributes to poverty alleviation through income generation and job creation for the local population. This structural move has multiple developmental effects throughout the respective society. Under the "Environmental Project Approach," India provides tariff reductions on goods and appropriate concessions on services included in specific environmental projects.²¹ The approach aims to address the ecological and developmental goals of the Doha Development Agenda through trade liberalization. The approach is need-based and objective-oriented, bringing positive measures like capacity building and technology transfer. The Indian approach has seen a slight departure from the past position submitted by India in 2005. Argentina goes for the adoption of an integrated approach that brings together elements from each one of the identified categories of environmental projects: air pollution control; water and wastewater management; soil and soil conservation; solid waste management; remediation and clean up; noise and vibration reduction; environmental monitoring and analysis; process optimisation; energy saving management; renewable energy; and environment-friendly products.

European Commission's CTE proposal also lists private standards products like eco-labelled products. Switzerland²² It follows the OECD definition with modifications in the broad categories: pollution management, resource management, cleaner technology and products, and environmentally preferable products. Canada, South Korea, and New Zealand define the environmental goods categories as air pollution control, recycling system, solid/hazardous waste management, heat/energy management, portable water treatment, wastewater management, environmental monitoring and management, clean-up of soil and water, noise abatement, renewable energy plant, end-use disposal of environmentally preferable products. The USA added natural resource protection to this list.

²⁰ WTO. 'Doha Work Programme – The Outstanding Implementation Issue on the Relationship between the TRIPS Agreement and the Convention on Biological Diversity', Communication from Brazil, China, Colombia, Cuba, India, Pakistan, Peru, Thailand and Tanzania, General Council Trade Negotiations Committee Council for Trade-Related Aspects of Intellectual Property Rights, WT/GC/W/564/Rev.2, TN/C/W/41/Rev.2., P/C/W/474, dated 5 July 2006.

²¹ WTO. 2005. Submission by India, TN/TE/W/5, July 2005.

²² WTO, Switzerland had EG products belonging to cleaner technology and cleaner products; and the Environmentally preferable products based on end-use or disposal characteristics. See WTO, 2005, 'Synthesis of Submission on Environmental Goods', Informal Note by the Secretariat, 17 November 2005, TN/TE/W/63.

Delegations from Canada, ECs, New Zealand, Norway, Singapore, Switzerland, and the US in a joint submission on the market access proposal to eliminate tariffs on environmental goods, recognizing the need for flexibility in the case of developing countries, including more extended implementation periods.²³ Specifically identified non-tariff barriers should also be addressed to facilitate trade in environmental goods. This was the only submission to the negotiating group on Market Access and the Committee on Trade and Environment Special Session.²⁴ It suggested the identification of NTMs that restrict trade in EG. Besides APEC, other international organizations like the OECD also provide a detailed list of environmental goods at the HS-6-digit level. The OECD list broadly focuses on pollution management, cleaner technologies, and resource management groups. Developed countries like the ECs²⁵, Japan²⁶, Canada²⁷, New Zealand²⁸, the USA²⁹ and South Korea³⁰ Follow the list-based approach to defining Environmental Goods.

None of the members' submissions regarding the present format of negotiations under the CTE on EGs suggests an identification of NTBs/Ms.³¹ Furthermore, it would only lead to the elimination of bound tariffs applied across the EGs. This would, therefore, lead to a partial outcome and would not address the challenges of sustainability and environmental concerns.

²³ WTO, Environmental Goods Agreement (EGA). https://www.wto.org/english/tratop_e/envir_e/ega_e.htm.

²⁴ WTO, 2006, Market Access for Non-Agricultural Products, https://www.wto.org/english/tratop_e/markacc_e/markacc_negoti_e.htm.

²⁵ WTO, European Communities' EG list belonged mainly to sixteen broad categories like air pollution measurement and monitoring (gas, particles and aerosols in the environment and at the emission source), air pollution measurement and monitoring (gas, particles and aerosols in the environment and at the emission source); air purification, including odour control; and air handling; the protection of ambient air and climate; Environmental monitoring, analysis and assessment not already included elsewhere; Noise and vibration abatement; Protection and remediation and cleaning up of soil and water; Solid and hazardous waste management; Water for human use; wastewater management; vegetable plaiting materials; pulps of fibrous cellulosic material; vegetable textile fibres; other natural products; sustainable agriculture or gardening (organic fertilisers, natural pest control); energy efficiency (low consumption bulbs); sustainable transport (public transport of persons/transport of goods, other forms of sustainable transport); and eco-labelled products.. See TN/TE/W/56, Job/Ext/06140, TN/TE/W65, TN/MA/W/70, and TN/TE/W/47.

²⁶ WTO, Japan's EG belonging to mainly eight broad categories like the Air pollution control; Monitoring and analysis; Noise and vibration abatement; Remediation and clean-up; Solid waste management; Waste water management; Cleaner technology and products; and Resource management. See Job/Ext/06140, Job/Ext/0726, and TN/TE/W/75.

²⁷ WTO, Canada's EG eleven products belonged to Air pollution control; Environmental monitoring, analysis and assessment equipment; Remediation and clean-up of soil and water; Solid and hazardous waste management; Waste water management; and Cleaner Technology and Products - Clean technologies, processes and products. And Resources Management products and services like Heat and energy management; Potable water treatment; Renewable energy plant; Recycling systems; and other product like the Soil conservation. see, TN/TE/W/65, TN/MA/W/70, TN/TE/W/5 and Job/Ext/06140.

²⁸ WTO, 2002, Environmental Goods, Committee on Trade and Environment Special Session, Submission by New Zealand Paragraph 31(iii),

²⁹ WTO, The US listed products like Air Pollution Control; Environmental monitoring, analysis and assessment; Noise and vibration abatement; Remediation and clean-up of soil and water; Solid and hazardous waste management; Waste water management; Heat and energy management; Potable water treatment; Renewable energy plant; Recycling Systems; and environmentally preferable products based on end-use or disposal characteristics. See WTO, 2005, 'Synthesis of Submission on Environmental Goods', Informal Note by the Secretariat, TN/TE/W/63.

³⁰ WTO,

³¹ Non-tariff Measures or Non-Tariff Barriers.

4. Key finding from SMART Analysis

In our SMART model, the bound rate has been set to zero to help us understand the implications of tariff liberalization.³² The new tariff rate and import and export elasticity are kept at the default levels of 0.5 and 99 percent, respectively. The paper reports the period before and after liberalization as ex-ante and ex-post scenarios, respectively. The members that proposed a list-based approach are selected based on their import values and average bound duty rate.

The paper provides an ex-ante analysis of the nine proponents of the list-based approach and China being identified as one of the largest markets of EGs. Additionally, the same study was carried out in India to understand the directions of trade creation and trade diversion in the EG sector and to identify the possible list of countries that would gain from liberalization. Table 1 reports the country-wise impact of tariff reduction. The following table reports the import change, amount of foregone tariff revenues, consumer surplus generated, and increased welfare due to reduced bound duty.

As seen in Table 2, all the reporter countries would experience increased imports after binding the tariff to zero as a pre-requisite under the EG proposal. Consequently, the countries must forego the tariff revenue they enjoyed in the ex-ante situation.

Table 2: Impact of tariff liberalisation on the Reporting countries (billion USD)

Reporting Countries	Total Import Change	Tariff Change in Revenue	Consumer Surplus	Welfare Effect
Developed Members				
European Union	12.59	-11.41	0.22	0.25
United States	10.63	-8.58	0.11	0.12
Korea	6.40	-2.26	0.08	0.11
Japan	0.90	-1.17	0.01	0.01
Canada	1.02	-1.07	0.02	0.02
Chinese Taipei	4.86	-2.38	0.33	0.35
New Zealand	0.27	-0.21	0.00	0.00
Switzerland		0.00	0.00	0.00
Developing Members				
China	27.38	-25.09	1.17	1.23
India	24.85	-7.73	3.21	3.33
Qatar	0.77	-0.43	0.02	0.02

Source: Authors based on SMART Analysis of the WITS Comtrade database.

The larger the tariff liberalization, the greater the amount conceded as revenue earned regarding tariff rates on EG products. Amongst all countries, developing countries stand out significantly, exhibiting significant increases in total imports and steep declines in tariff revenue. China leads this trend, with an expected import surge of 27.38 billion USD and a substantial reduction in tariff revenue of 25.09 billion USD. India follows closely, with imports rising by 24.85 billion USD. Among developed nations, the European Union shows a notable increase in total imports, amounting to 12.59 billion USD, alongside a significant decrease in tariff revenue of 11.41 billion USD. The United States also experienced considerable import growth of 10.63 billion USD and a reduction in tariff revenue of

³² All the past plurilateral agreements under the WTO the bound rates are reduced to zero.

8.58 billion USD. Remarkably, the combined import increases in China and India surpass the total import growth of eight developed economies combined, underscoring the profound impact of tariff liberalisation on these developing markets.

The product's fall in price, as a consequence of the tariffs, would enhance the consumer surplus, which is reflected in the result. Hence, the change in the import and the amount of consumer surplus is positively correlated, and so is welfare. The liberalized tariff rate significantly reduces the deadweight loss and increases the overall welfare of society, as seen in Table 1 below. However, the welfare gains or losses of the producers are not captured by the SMART analysis, which is a significant weakness of the model.

Tables 3 and 4 look particularly at what will happen to India's import and export basket and see if there are any possibilities for India's gains in the EGs sectoral. Table 3 highlights India's imports from major partners post-tariff elimination. China's exports to India have increased significantly, with imports rising by 8.44 billion USD and a 33.89% share in total positive change in India's imports. Germany and the USA also see considerable increases in exports to India, with Germany's imports rising by 2.44 billion USD and the U.S. by 1.86 billion USD. Overall, the total positive impact in imports into India from all countries amounts to 24.91 billion USD, while the negative impact is negligible. The total imports in 480 EGs in India will grow from 106.64 billion USD to 131.49 billion USD, indicating a robust positive inflow of imports.

Table 3: India's SMART Results for EGs Liberalisation

Reporter	Partner	USD Billions			Percentage (%)	
		Imports before elimination	Imports after elimination	Change in Imports	Shares to Positive Changes	Shares to Total (Positive and Negative)
India	China	23.37	31.81	8.44	33.89	33.97
	Germany*	6.60	9.05	2.44	9.82	9.84
	The U.S.	10.27	12.13	1.86	7.47	7.49
	U.K.	2.67	4.33	1.66	6.65	6.66
	Italy*	2.15	3.28	1.13	4.55	4.56
	U.A.E.	4.89	5.71	0.82	3.28	3.28
	Australia	1.29	2.09	0.81	3.24	3.24
	Sweden*	0.60	1.38	0.78	3.12	3.13
	Finland*	0.33	1.08	0.75	2.99	3.00
	France*	1.95	2.42	0.47	1.90	1.90
Countries' + ve Impact		105.47	130.37	24.91	160	
Countries' - ve Impact		-0.06	0.00	-0.06	33	
Total 480 EGs		106.64	131.49	24.85	193	

Note: *Five of the ten positively impacted economies are from the European Commission.

Source: Authors based on SMART Analysis of the WITS Comtrade database.

Besides the EU, India can look for possible expansion of its business networks with countries like the US, Canada, Qatar, and the UK. In Table 4, we have reported changes in India's exports to some of the identified markets. The most prominent change after the reduction of tariffs was seen in the EU, followed by the US and Canada. If the European Union liberalizes tariffs, India will rank fourth among top exporters, with imports from India increasing by only 0.60 billion USD. After a tariff reduction, India would account for 3.70% of the total positive change in the EU's imports and an

overall 5% in total change in the EU’s imports. Similarly, post tariff liberalization in the USA, India ranked eighth amongst top exports, with imports witnessing a slight increase of 0.39 billion USD — moreover, Canada and Qatar exhibit minor increases in imports from India. Overall, the total change in India's exports to these markets is 1.07 billion USD, contributing 13.5% to positive changes in imports and 17.65% to the total share of changes. Hence, India's post-tariff liberalisation could not capture more markets; instead, it would concede market access across the EG products to various suppliers (exporting countries).

In Table 5, we have focused our analysis on each of the EU members in detail and looked at which partner would get maximum access to the Indian market post-tariff reduction. It can be seen that imports from Germany saw the maximum change (2.44 USD billion), followed by Italy (1.13 USD billion) and Sweden (0.78 USD billion). Additionally, Germany would account for approximately 10% of the EU’s EGs that would likely come to India.

Table 4: India’s Export Changes in Other Markets: EG

Reporter	Rank in the Reporters’ Market	Imp. before (US bn.)	Imp. after (US bn.)	Ch. in Imp’s (US bn.)	% Sh. to Positive Changes	% Share to Total (Positive and Negative)
EU	4	12.40	13.00	0.60	3.70	5.00
US	8	11.93	12.32	0.39	2.60	3.66
Canada	7	1.35	1.40	0.04	2.42	4.10
Qatar	8	0.35	0.39	0.04	4.78	4.89
Total		26.03	27.11	1.07	13.5	17.65

Source: Authors based on SMART Analysis of the WITS Comtrade database.

Italy would account for 4.5% of the same, and Sweden would account for 3.12% of the total EU EGs. Lastly, the table also reports that the EU’s EGs would get approximately 12 times more market access to the Indian market than Indian EGs would get in the EU market.

Table 5: India’s Imports from the EU in 480 EGs³³: SMART Analysis

Reporter	Partners	Imports before (US bn.)	Imports after (US bn.)	Ch. in Imp’s (US bn.)	% Share to Total (Positive)
India	Germany	6.60	9.05	2.44	9.82
	Italy	2.15	3.28	1.13	4.55
	Sweden	0.60	1.38	0.78	3.12
	Finland	0.33	1.08	0.75	2.99
	France	1.95	2.42	0.47	1.90
	Belgium	1.57	1.98	0.41	1.64
	Spain	0.60	0.89	0.29	1.16
	Netherlands	1.26	1.53	0.28	1.11
	Poland	0.20	0.28	0.08	0.32
	Denmark	0.33	0.40	0.07	0.29
	Austria	0.25	0.32	0.06	0.26
	Romania	0.18	0.22	0.03	0.14
	Czech Rep.	0.15	0.18	0.03	0.12
	Ireland	0.31	0.34	0.03	0.11
	Slovenia	0.10	0.13	0.03	0.11
Greece	0.04	0.07	0.02	0.09	
Portugal	0.05	0.06	0.01	0.05	

³³ WTO,

	Hungary	0.08	0.09	0.01	0.05
	Cyprus	0.02	0.03	0.01	0.03
	Bulgaria	0.04	0.05	0.00	0.02
	Slovak Rep.	0.03	0.03	0.00	0.01
	Luxembourg	0.02	0.02	0.00	0.01
	Croatia	0.01	0.01	0.00	0.01
	Lithuania	0.03	0.03	0.00	0.01
	Estonia	0.02	0.02	0.00	0.01
	Malta	0.00	0.01	0.00	0.01
	Latvia	0.02	0.02	0.00	0.01
	European Union in EGs	16.94	23.90	6.96	27.95
	India's Market Access in the EU	12.40	13.00	0.60	
	India's MA for EC (times)			11.6	

Source: Authors based on SMART Analysis of the WITS Comtrade database.

To increase India's market access in the European market, India's standards need to be harmonized and upgraded to the level of developed partner countries. Second, technical regulations (mandatory), standards (non-mandatory), and conformity assessment procedures, which are also market access barriers, must be identified.³⁴ As we can see in Table 5, these TBT measures have been analysed in terms of India's cumulative change in imports (131.5 USD Billion) into categories of percentage change in imports. To avoid hollowing out manufacturing capacities in India, there is a need to adopt or adapt to the already notified TBT measures by six countries. It can be seen that an initial 0-10% change in imports would lead to the highest imports in absolute terms (81.2 USD Billion), and correspondingly, TBT notifications were also higher compared to other categories (2,573). Amongst the six countries, the EU had the maximum number of notifications. Overall, the number of notifications by the EU stands at 2,221, the highest among the six partner countries. For the exporters to these six markets (excluding the UK³⁵), the harmonization needed would depend on how TBT measures deviate from international standards (ISO, ITU, etc.).

Table 6: India's Imports in EG and NTM Applied in Markets: (1995 to 2020)

Change in Imports -%	Total change in imports (USD bn.)	TBT Measures Notified Impacting the 247 EGs (Numbers)						TBT Measures
		EU	Japan	Switzerland	USA	Korea	Canada	
0 to 10	81.2	912	204	107	314	285	239	2,573
11 to 20	13.8	608	60	35	97	65	52	1,101
21 to 40	15.8	203	72	14	141	53	49	716
41 to 60	10.1	331	132	47	219	199	121	1331
61 to 80	2.5	57	17	4	35	21	8	199
81 to 100	8.0	58	15	11	117	11	15	302
No Change		52	11	4	43		13	139
EG Sectoral	131.5	2,221	511	222	966	634	497	6,361

Source: Based on the Online TBT database Centre for WTO Studies from 1995 – 2020.

³⁴ Kallummal Murali, Simran Khosla, and Hari Maya Gurung, 2024, Profiling of Conformity Assessment Procedures (TBT Measures): Special Reference to Sectoral Domination Across Country Grouping, CRIT/CWS Working Paper 70, <https://wtocentre.iift.ac.in/workingpaper/Working%20Paper%20No%2070.%20V4.1.pdf>.

³⁵ Only one notification made after the Brexit, United Kingdom was using the EU notifications for regulations.

5. Analysis of Non-Tariff Measures

The non-tariff measures (NTMs) are the second barrier to market access, and these measures are imposed ‘behind the border’; hence, they are domestic measures that may not assure a predictability function. The tariff, the first barrier, is mainly applied at the border and, as per the WTO, is disciplined with applying two principles, i.e., the Most Favoured Nation (MFN) and National Treatment (NT). Therefore, each WTO member ensures predictability in the application of tariffs by scheduling their bound commitments under the goods schedule of the WTO. The Doha Ministerial Declaration (DMD) mandates Member countries to negotiate on the reduction or, as appropriate, elimination of non-tariff barriers on EGs and ESs to enhance the mutual supportiveness of trade and the environment. The intent inherent in this is to bring economic benefits (promote dynamic efficiency in production and greater access to consumption goods at lower prices), developmental benefits (addressing basic human needs in terms of sustainable development goals), environmental benefits (promote sustainable modes of production and consumption), and achieve gains from trade with improvement in environmental quality so that it leads to "win-win" situations.³⁶ A balanced approach—eliminating tariffs and harmonizing or eliminating non-tariff measures—is needed to bring this condition to the global level. Therefore, harmonizing technical regulations, standards, and conformity assessment procedures (CAPs) forms the foundation of adequate market access for the EGs across significant markets under the WTO.

5.1 SPS Measures in the EGs

In the first place, both technical NTMs, like the SPS and TBT measures, were considered, but it was found that SPS measures were used sparsely. We observed that SPS measures were not as relevant for EGs. It was found that India dominated the SPS-based restrictions with 15 SPS-based measures imposed out of a total of 31 SPS measures across the five markets on HS code 4418 (*Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes*). The EU maintained a single SPS measure on HS code 8419 (*Machinery, plant, or laboratory equipment, whether or not electrically heated*), and the US maintained a single SPS measure on HS code 8421 (*Centrifuges, Including Centrifugal Dryers; Filtering or Purifying Machinery and Apparatus, for Liquids or Gases*). Hence, we have not considered the SPS measures as they were not actively used to impose cost-enhancing measures.

While the SPS measures are not considered for the overall analysis, it is worth mentioning that some members have taken voluntary measures to address the environmental concerns by addressing them under the ambit of sustainable agriculture.³⁷ A sustainable food system (SFS) that delivers food security and nutrition for all and ensures economic, social, and environmental protection based on

³⁶ WTO, 2005, ‘An Alternative Approach for Negotiations under Paragraph 31(III)’, Submission by India, Committee on Trade and Environment Special Session, TN/TE/W/51, dated 3 June 2005.

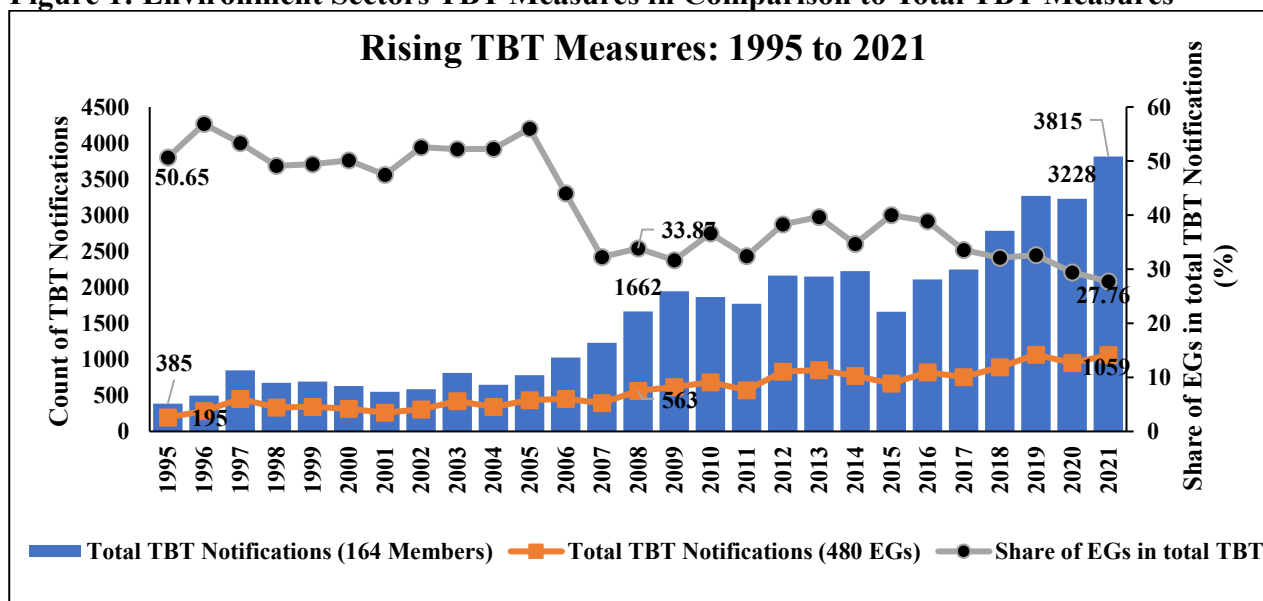
³⁷ WTO, refer, https://www.wto.org/english/tratop_e/sps_e/spsund_e.htm.

generating food security and nutritional security for all and future generations. It has three main components: 1) profitable throughout, leading to economic sustainability; 2) is broad-based in terms of benefits for society, ensuring social sustainability; and lastly, it has a positive or neutral impact on the natural environment by way of the limited application of contaminants, pesticides, and fertilizers thus ensuring environmental sustainability.³⁸ The agricultural products were not listed under the environmental goods by any of the “friends of the environment,” a grouping under the WTO members or, for that matter, the other members. Hence, we have not considered including maximum residual limits (MRLs) based on restrictions imposed on a few members based on climate change and sustainability concerns stemming from the SDGs of 2015.

5.2 TBT Measures in the EGs

The TBT measures assessment is performed by analyzing total TBT notifications for all 164 WTO members and then providing a mapping of notifications of those measures applicable to the identified 480 EG products at 6-digit levels from 1995 to 2021. From 1995 to 2021, there was a clear upward trend in the product coverages of TBT measures, which increased from 385 in 1995 to a peak of 3,815 in 2021. The measures specific to EGs also show an increasing trend, rising from 195 in 1995 to 1,059 in 2021. This trend aligns with global efforts to address environmental issues through trade policies.³⁹

Figure 1: Environment Sectors TBT Measures in Comparison to Total TBT Measures



Source: Compiled based on the CWS online database on TBT measures.

However, this growth is not as steep as the overall TBT notifications, and the share of EG notifications in the total TBT notifications exhibits notable fluctuations. In the early years (1995-1997), EG

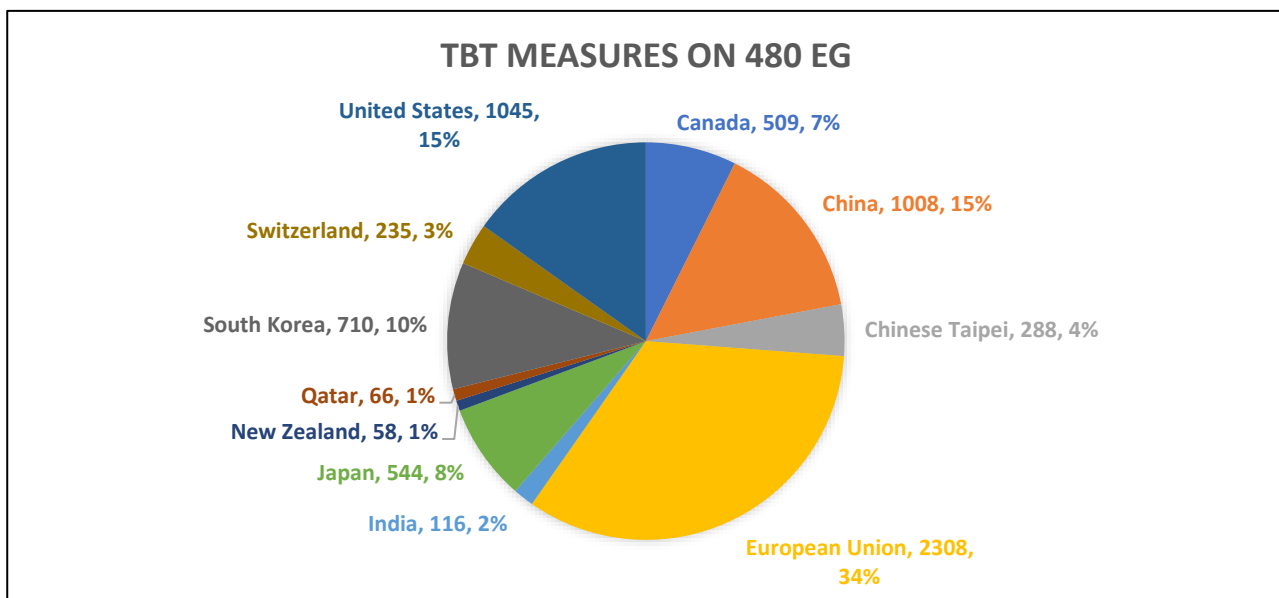
³⁸ FAO. 2018. Sustainable food systems Concept and framework. Food and Agricultural Organisation of the United Nations. <https://openknowledge.fao.org/server/api/core/bitstreams/b620989c-407b-4caf-a152-f790f55fec71/content>.

³⁹ IISD. 2022. Still Only One Earth: Lessons from 50 years of UN sustainable development policy. International Institute for Sustainable Development. POLICY BRIEF #32. <https://www.iisd.org/system/files/2022-01/still-one-earth-trade-environment.pdf>.

notifications represented a significant portion of total TBT notifications, peaking at 56.85% in 1996. The compositional share in proportion decreased over the years, reaching its lowest point in 2021 at 27.76% - suggesting a phenomenon of front loading of such TBT standards by a group of countries.

This indicates a pattern known as frontloading of the barriers. Unlike tariffs, only the latest data is the applicable barrier – in EG's case, the bound rate is as notified in the Uruguay Round. In the case of NTMs, all measures notified would be relevant unless it is withdrawn. However, the most commonly used are tariffs alone, even when countries liberalize tariffs and are confident of the resilience in the outcome of the new competitive environment, such as under a free trade agreement. A similar pattern is seen in the case of TBT measures, which have the EGs covered in terms of products. TBT measures across the EGs are growing across all members of the WTO, as suggested in Figure 1. Hence, achieving effective trade (enabled by market access) would need harmonization or elimination of some of these measures, especially those identified as deviated. It is to be noted that the figure shows a marked increase in TBT notifications following the 2008 financial crisis. This could be due to a breakdown in Doha negotiations.

Figure 2: Total TBT Measures Country-wise

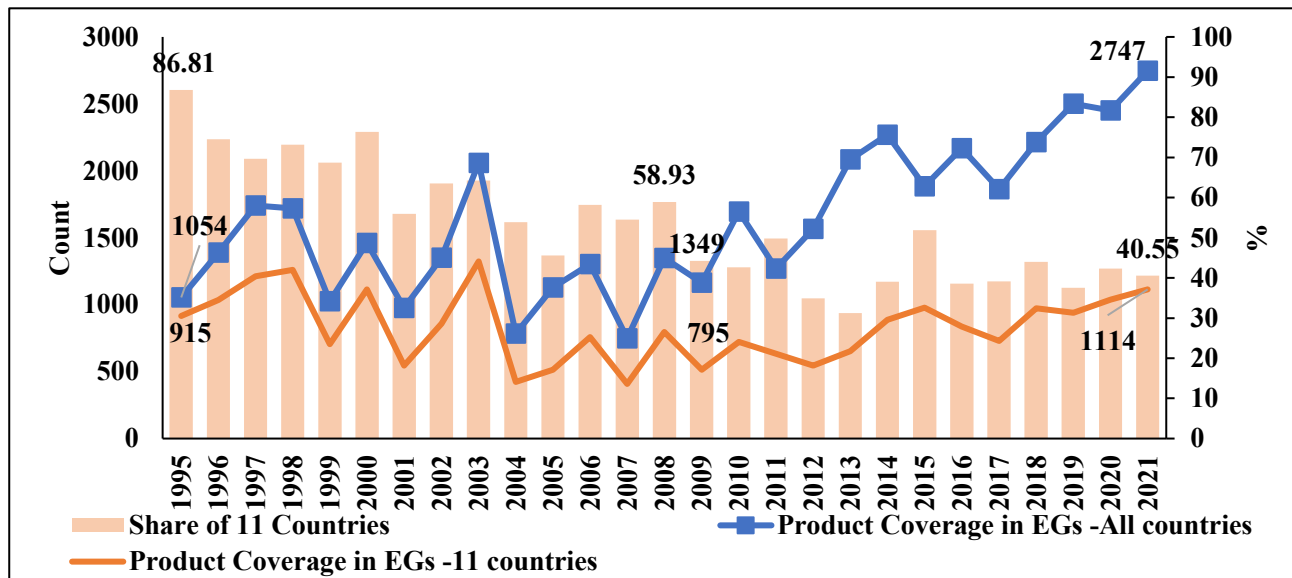


Source: Compiled based on the CWS online database on TBT measures.

Figure 2 provides a detailed examination of TBT measures implemented by dominant countries in the case of EGs. The European Union stands out with the highest number of TBT measures at 2,308 and a share of 34%, indicating a rigorous regulatory framework aimed at ensuring high standards for imported goods. The United States and China follow 1,045 and 1,008 measures, respectively, with a share of 15%, each showcasing their substantial focus on trade regulations to protect domestic markets and consumers. In contrast, India, with 116 measures (with only a 2% share), and New Zealand, with 58 measures (with only a 1% share), have relatively fewer barriers, suggesting a more open trade policy for EGs.

In Figure 3, we look at the product coverage of the TBT measures applied by 164 WTO member countries and then provide a relative understanding of 11 members' measures, which were part of a list-based approach. Overall, over this period, the share of these 11 countries in the total product coverage for EGs shows notable fluctuations.

Figure 3: Product Coverage of TBT Measures



Source: Compiled based on the CWS online database on TBT measures.

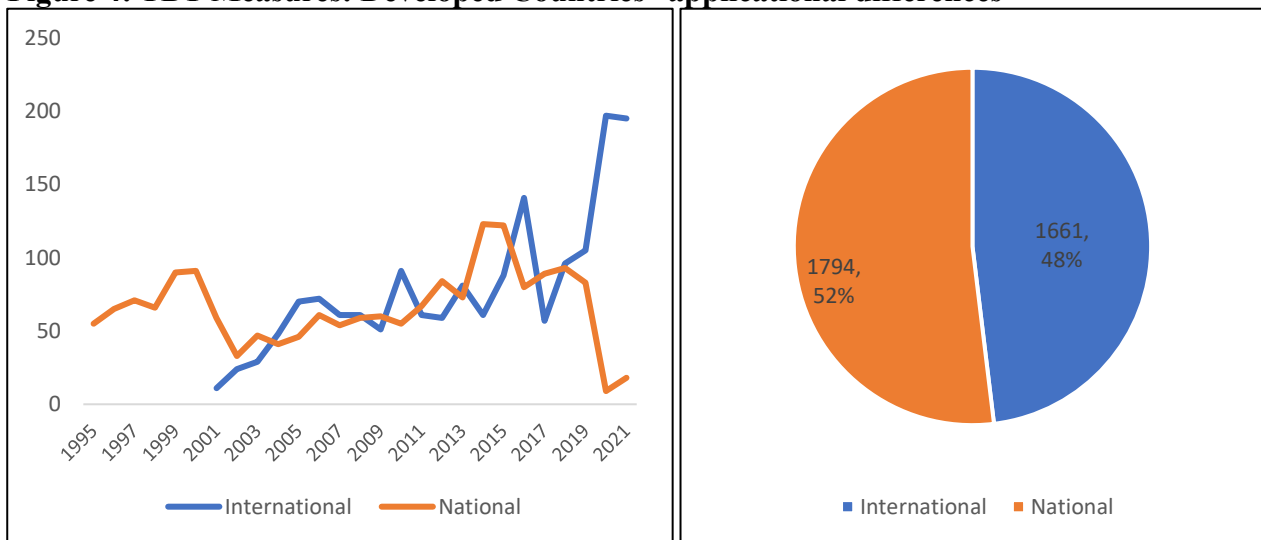
In 1995, approximately 1,054 products were covered by notifications from all the WTO members. The 11 countries accounted for 86.81% of the product coverage, indicating their substantial involvement in regulating EGs. One single notification by these 11 countries covered, on average, 6 EG products in 1995. However, this share began declining, dropping to 74.51% in 1996 and 69.67% in 1997. The downward trend continued, reaching 68.68% in 1999, showcasing a gradual reduction in their collective dominance. Between 1995-2005, a single TBT measure by 11 members covered, on average, 5 EG products. However, from 2006 to 2010, the share of product coverage by these 11 countries saw some recovery, peaking at 58.93% in 2008. However, this recovery was short-lived as the share continued to decline, hitting a significant low of 31.27% in 2013. This period likely reflects a broader global engagement in EG regulation, reducing the relative share of these 11 countries. Between 2006-2013, a single TBT measure by 11 members provided coverage to two EG products.

In 2021, approximately 2,747 EG products were covered by TBT notification by all WTO members, while the shares of 11 members in product coverage were low but significant at about 40.55%. Between 2014 and 2021, a single TBT measure by 11 members covered three EG products. Hence, it may be concluded that although these countries remain key players, the global landscape of product coverage for EGs has diversified. There is a need to assess the quantum of deviation of these TBT measures notified by the members. That alone would assess the extent of work the trade and environment committees would need to undertake.

5.3 Grouped Analysis of EG Sectoral (suggested approach on EGs)

The sub-section provides an assessment based on some observations from the past literature on the subject. The applicational differences across the WTO members can be suggested as a direct impact of the GDP and technological capabilities – a similar observation also holds in the case of EG sectoral. Therefore, the nine proponents of the list-based approach are bifurcated into four groups to bring some methodological consistency in comparison. The paper thus deals with developed countries per the WTO classifications (Canada, Japan, South Korea, Switzerland, New Zealand, and the United States. The second category is the European Commission alone.⁴⁰, which is dealt with separately to highlight the differences in the application and usage; the third is the group of high-income countries like Taiwan and Qatar with very high per capita incomes; finally, China is analysed as a manufacturer of the World. The task has been undertaken primarily to understand India's market access possibilities in the environmental sector.

Figure 4: TBT Measures: Developed Countries⁴¹ applicational differences



Source: Compiled based on the CWS online database on TBT measures.

The following graphs delve into various country groupings based on their development status to understand the differences in TBT measures. Among developed countries, national (deviated) TBT measures predominantly influenced the yearly composition and have been prominent until 2015. After 2015, international TBT measures became more prevalent in yearly notifications, as illustrated in Figure 4. The pie chart further corroborates this trend, which shows that deviated TBT measures constitute 52% of the total TBT measures notified by developed members. This suggests that these deviated measures may hinder market access for exporters from developing and least-developed countries (LDCs).

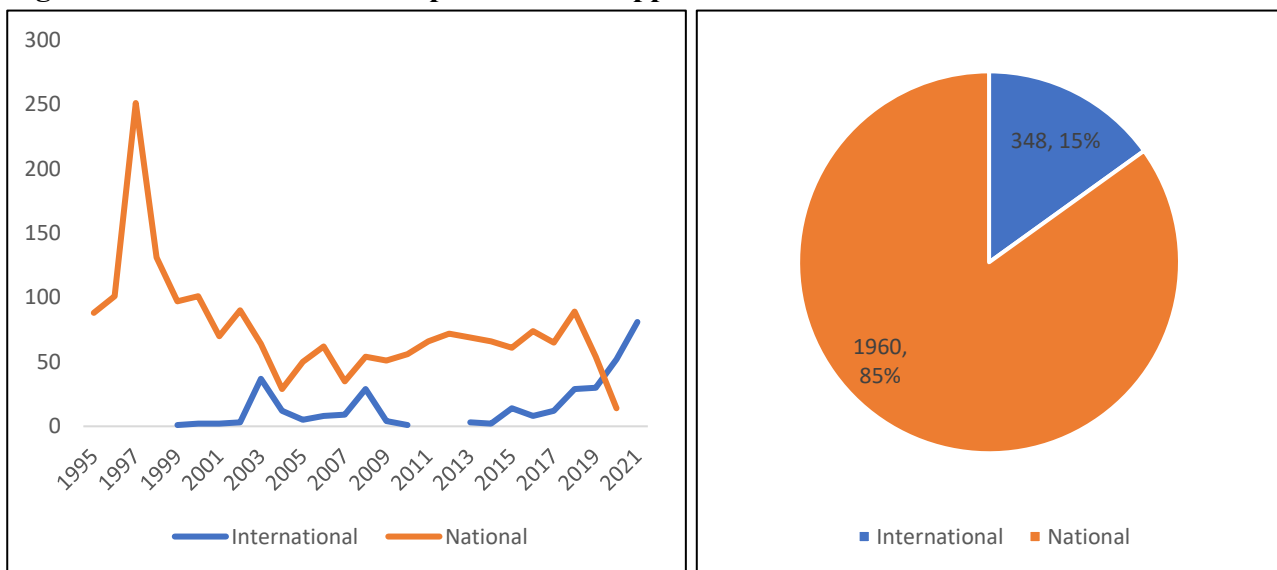
⁴⁰ See Figure 2 a and b.

⁴¹ High and Developed countries like Canada, Japan, New Zealand, Qatar, South Korea, Switzerland, and United States.

Further, in 2024, the CWS profiled TBT measures based on the UNIDO classification of the CIP index on the spatial pattern of application of conformity assessment procedures (CAPs), a mandatory standard done by Kallummal, Khosla, and Gurung. The study suggested that standards were made mandatory across the bottom countries by way of CAPs across industries wherein no production possibilities existed. This indicated a discerning consolidation pattern of these markets for developed country products using the TBT measures route. (Kallummal, Khosla and Gurung 2024).

The second group is discussed in Figure 5, which illustrates the European Union's application of TBT measures, highlighting a distinct separation between national and international regulations over the years. From 1995 to 2018, national TBT measures were predominantly used, with notable peaks in specific years. For example, there were 251 national measures in 1997 and 88 in 1995, indicating a strong focus on national regulations. However, a significant shift was observed after 2018, when international TBT measures began to rise. Initially, these international measures were minimal, with only 4 in 1995 and 1 in 1999, but by 2021, they had increased to 81. This growing trend towards international measures suggests an increasing alignment with global standards. By 2021, the EU had implemented 348 international TBT measures, compared to 1960 national measures over the same period. This disparity is evident in the accompanying pie chart, which shows that deviated TBT measures account for 85% of the total TBT barriers to market access for EGs.

Figure 5: TBT Measures: European Union’s applicational differences

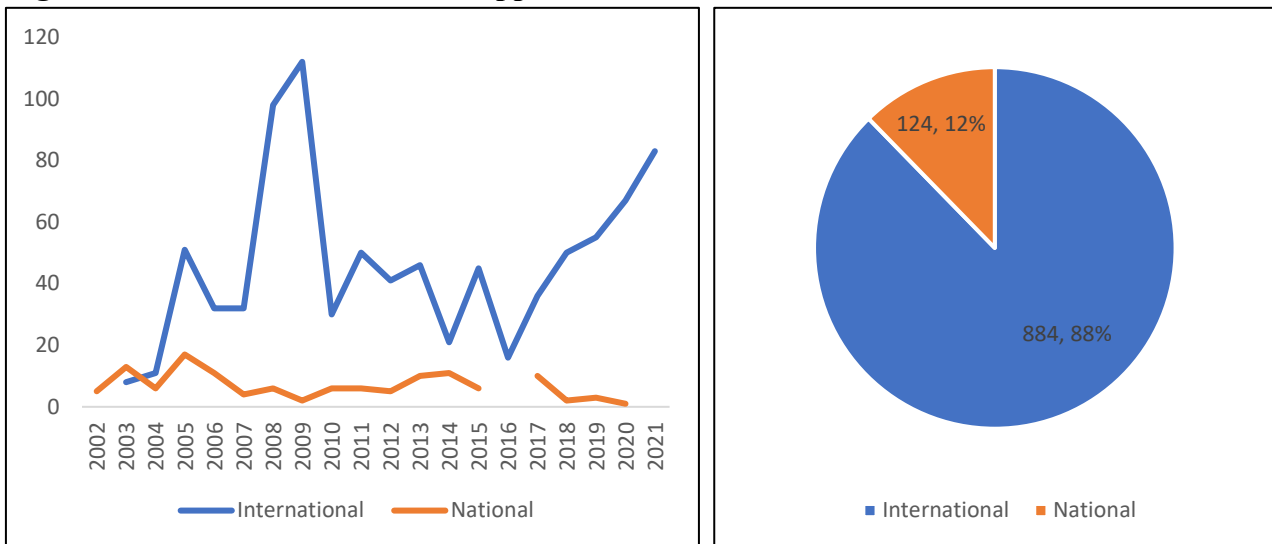


Source: Compiled based on the CWS online database on TBT measures.

The analysis suggests a double-edged sword for India’s market access in the EU’s EG market, as the already identified tariff liberalisation impact has provided the EU with 13 times more market access than India. The apparent domination of deviated measures suggests a negative picture for India and many other developing countries in the EU. Frontloading all deviated TBT measures on the EGs can be identified in the EU since 1995.

Lastly, the Chinese case starkly contrasts the previous two groupings, as seen in Figure 6. As the "manufacturer of the world," China has maintained a high compositional share of 88% for internationally harmonized TBT measures from 1995 to 2020. The annual application of these measures on EGs in China has been in place since 2003, when the country introduced eight international TBT measures. Over the period, China implemented 884 international TBT measures compared to 124 national measures, demonstrating its commitment to aligning with global standards.

Figure 6: TBT Measures: China’s Applicational Differences



Source: Compiled based on the CWS online database on TBT measures.

India's situation could be comparable, but it faces the dual challenge of scaling up to match China's manufacturing capabilities while producing sustainably under the 2015 Sustainable Development Goals (SDG) framework and the Montreal Protocol. Managing this balance will be crucial for India to navigate the complexities of international trade.

5.4 Bound Rates and TBT Measures Product Coverage

We have undertaken a simple HS heading-level tariff line-wise comparison of the Bound rates and the total applicable TBT measure on the EG products. However, due to technical complexity, we have not attempted a detailed transposition of the 480 6-digit tariff lines for HS 2017. Instead, we have focused on the APEC list of 54 products (transposed to 59 in HS 2017) and traced their bound status for the WTO members listed in Table 7.

In Table 7, we present a correlation analysis conducted across five markets. The results highlight that the EU exhibits a negative correlation between MFN bound rates and the number of TBT measures notified, suggesting a tendency to replace tariffs with TBT measures. In other words, TBT measures are more frequently used for product categories where MFN-bound tariffs are low. Conversely, the correlation for the US, India, and China was positive, with India showing the lowest correlation, close to zero. This indicates that, unlike the EU, these countries do not show a strong tendency to substitute tariffs with TBT measures based on the MFN bound rates.

Table 7: APEC EG List Approach: Comparison of MFN Bound[#] Vs. TBT Measures

S.N.	4-digit HS	China (NTMs-No.)	China (%-Bound) [#]	EU (NTMs-No.)	EU (% Bound) [#]	India (NTMs-No.)	India (% Bound) [#]	USA (NTMs-No.)	USA (% Bound) [#]	UK (NTMs-No.)	UK (% - Bound) ^{**}
1	4418	1	p	53	p	0	0.0	9	3.7		
2	8402	14	10.3	30	2.7	0	30.0	14	4.2	1	
3	8404	1	0.0	3	0.0	0	0.0	0	0.0		
4	8406	0	2.0	0	2.7	0	25.0	3	3.4		
5	8411	1	4.0	2	2.1	0	25.0	3	0.8		
6	8412	1	5.0	2	1.2	0	25.0	1	0.0		
7	8417	3	8.0	3	1.7	0	25.0	4	3.9		
8	8419	41	11.5	26	1.6	1	36.5	28	0.8		
9	8421	10	8.6	18	1.1	0	36.3	12	0.0		
10	8474	2	5.0	4	0.0	0	25.0	0	0.0		
11	8479	7	1.4	6	0.9	0	37.0	8	0.4		
12	8501	21	7.3	39	2.7	7	25.0	19	2.4		
13	8502	3	9.0	2	1.4	0	32.5	1	1.3		
14	8503	0	6.5	0	2.7	0	25.0	0	3.1		
15	8504	25	7.3	17	1.3	2	12.5	19	0.0		
16	8514	1	0.7	1	1.3	0	25.0	9	0.9		
17	8541	2	0.0	20	0.0	1	0.0	3	0.0		
18	8543	7	0.0	23	1.5	0	13.3	9	0.0		
19	9013	3	0.0	9	0.0	0	0.0	1	0.0		
20	9015	1	5.0	4	3.1	0	40.0	0	0.0		
21	9026	5	0.0	70	0.0	0	0.0	2	0.0		
22	9027	9	1.2	49	0.7	0	6.3	3	0.1		
23	9031	2	1.8	24	15.6	0	15.0	4	0.0		
24	9032	6	3.7	1	20.7	0	20.4	2	0.7		
25	9033	0	6.0	0	3.7	0	40.0	0	1.1		
26	9620		0.0		0.0	0	0.0	0	0.0		
Correlation		0.54		-0.12		0.00		0.15		n.a	

Note: # = for simplicity, an average of six-digit MFN bound rates are used; * the UK does not have Independent MFN bound rates as it was an integral part of the EU until 2020.
 Source: Kallummal Murali and Banerjee Somdutta, 2023. "Trade and Environment Negotiations Status under the WTO: An investigation into the tariff alone approach negotiations," Policy Brief No. 7, Centre for WTO Studies. https://wtocentre.iift.ac.in/PolicyBrief/Policy%20Brief%207_08022023.pdf.

What the EU is doing is problematic and not in true spirit for addressing the sustainability and environmental challenges – observing these trends from a champion of free trade is discouraging. These TBT measures, which function as behind-the-border measures, are less transparent and more complicated to challenge than traditional tariffs. This lack of transparency makes it difficult for exporters, particularly from developing countries, to understand and comply with the regulations, thereby creating significant barriers to market access. It, therefore, undermines the principles of fair trade and can lead to trade distortions, making it an urgent issue that needs to be addressed to ensure a level playing field in global trade in green goods (environmental products).

6. Conclusion

This study offers a different perspective from the existing literature, which mainly focuses on tariffs. It demonstrates that regulations are cost-enhancing, mainly when tariffs are liberalized without harmonizing NTMs. Harmonizing TBT measures is desirable to achieve equitable and effective outcomes for all participants and address environmental concerns outlined in the Committee on Trade and Environment (CTE) mandates.

A notable flaw that negotiators of developing countries often commit is to pick the latest data on tariffs and non-tariff barriers (UNCTAD, 2013). The paper empirically observed and indicated that most developed markets frontloaded TBT measures applicable to EGs from 1995 to 2015. The measurement of market access outcome under a sectoral plurilateral agreement (under the WTO, like the Information Technology Agreement⁴²) is often measured by the extent of tariff liberalization provided under the WTO's plurilateral agreement. Therefore, in the case of EG sectoral, the applicable tariff rate is the Uruguay Round bound rate. Additionally, in the case of NTMs, all measures need to be addressed and factored into effective market access outcomes. Therefore, the language and the grammar need to be changed while addressing the NTMs. The NTMs continue to remain legally binding unless they are withdrawn by the market wherein it is applicable. Globally, most trade negotiators are faced with the issue of affordability,⁴³ reliable, and accessible data on NTMs – there are two databases like WTO, I-TIP⁴⁴ and TRAINs⁴⁵ and other private sources⁴⁶. In this context, India's submission⁴⁷ It will become crucial for the WTO to make a database of all countries available in a single place in 2024.

⁴² Kallummal Murali. 2012. Process of Trade Liberalisation under the Information Technology Agreement (ITA). CWS/WP/200/3. <https://wtocentre.iift.ac.in/workingpaper/Working%20Paper3.pdf>.

⁴³ Global MRL database is being provided by Bryant Christie Inc. See, <https://bcglobal.bryantchristie.com/db#login>.

⁴⁴ TBT is not being covered in the database only SPS is addressed that too partially. See,

⁴⁵ The data on NTMs are not comparable as it is limited by having a varied years for mapping the NTMs across the broad sectors. See, <https://wits.worldbank.org/tariff/non-tariff-measures/en/ntm-bycountry>

⁴⁶ *ibid*, refer to footnote 42.

⁴⁷ WTO. 2024. Sixth Review of the operation and implementation of the agreement on the application of Sanitary and Phytosanitary measures. Challenges posed by Stringent MRLs. Proposal by India. G/SPS/W/358. Dated 17 April 2024. <https://eping.wto.org/en/OtherDocuments/Search?domainIds=2&members=C356>.

The study analyses the future impact of tariff reductions on EGs using the WITS Single Market Partial Equilibrium Simulation Tool (SMART) to visualize the ex-post impact on countries' imports. There are structural differences among WTO members, with economies generally categorized as developed, developing, and least developed countries (LDCs) based on innovation, technological capabilities, and per-capita incomes. Any trade liberalization aiming to promote the free international movement of EGs and ESs to accelerate sustainable development must focus on reducing tariffs and harmonizing or eliminating Technical Barriers to Trade (TBT) measures. Without these steps, the benefits will disproportionately favor higher-income, developed economies with numerous divergent (national) TBT measures and private standards.⁴⁸ These economies could restrict product movement from exporting countries that rely heavily on international standards, resulting in unbalanced gains primarily for a few countries within the EG sector.

Liberalizing trade in EGs may lead to significant import responses but not necessarily export responses. The final price of these goods is influenced by tariffs (taxes) and import regulations (non-tariff measures). Tariffs are price-enhancing, while NTMs are cost-enhancing. Technical regulations, such as TBT measures, alter the production process and increase the free on board (FOB) prices to meet the additional regulatory requirements imposed by the importing country. Therefore, harmonizing these measures is crucial, as disparate standards can act as non-tariff barriers, disproportionately impacting producers' costs.

The results for India indicate that tariff reduction alone is insufficient for an EG sectoral agreement. The study highlights the importance of TBT measures for these products and the urgent need for international harmonization. The trends in the CAPs need to be contained, and those CAPs that have been erected as a tool for ring-fencing the LDC's domestic markets also need to be considered for the EG sectoral negotiations. Ideally, a standard (non-mandatory) approach would be encouraged in the EG sector.

Against this backdrop, we recommend the following strategies:

1. Firstly, the primary goal should be to balance tariffs and non-tariff measures (NTMs) across EGs to enhance the mutual supportiveness of trade and the environment. Efforts should also be made to harmonize NTMs with international standards, as divergent national standards tend to be more onerous and stringent. For example, in the case of specific tariffs, providing ad valorem equivalents (AVEs) can aid in harmonizing tariffs with NTMs. Our analysis, as shown in Table 4, reveals that Switzerland applies specific duties on 1,556 national tariff lines out of 1,849 national tariff lines, indicating a need to address this issue.⁴⁹
2. Secondly, to bring about more effective change, WTO members should identify national tariff lines within the 6-digit Harmonised System (HS) codes with universal EG coverage. This

⁴⁸ Kallummal Murali and Hari Maya Gurung. 2020. Socioeconomic and International Geo-Politics in Private Sustainability Standards (PSS): Relevance for India, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3528066.

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smaller list approach makes it easier for countries to focus on these specific tariff lines and the associated duties and NTMs.

3. Lastly, for national tariff lines within the 6-digit HS codes that do not have universal EG coverage, a mix of the small list and project-based approaches should be adopted. This strategy would address diversity in environmental standards while upholding common but differentiated responsibilities. It would facilitate trade liberalisation to meet both environmental and development goals and address mandated requirements in a cohesive, focused, and integrated manner.
4. Finally, making the NTM measures data accessible to all members should be the top priority of a global trade body like the WTO.




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