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Negative and Positive Environmental Effects of Technical Trade Barriers on Developing Countries

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ABSTRACT

This study examines the complex issue of the environmental consequences arising from technical trade barriers on the economies of developing nations. International standards and technical specifications play a crucial role in ensuring the protection of human, animal, and plant health, as well as environmental integrity. However, these standards can sometimes manifest as technical impediments to international trade. This study aims to clarify the concept of technical trade barriers within the framework of the World Trade Organization (WTO), delineate their legal foundation, identify the various types of technical barriers adopted by member states, and subsequently evaluate the positive and negative environmental effects of these barriers on developing countries.

1. INTRODUCTION

The significance of this research emanates from its exploration of the intricate interplay between technical trade barriers and their far-reaching environmental implications for developing economies. As the global trade landscape evolves, the relationship between international standards, technical specifications, and their influence on safeguarding human, animal, and plant health, as well as the environment, assumes increasing importance. Paradoxically, the adherence to these standards sometimes introduces unintended consequences, often taking the form of obstacles to international trade. This study addresses a pivotal question: Do these technical impediments to international trade yield adverse or beneficial outcomes for the developmental trajectories of participating nations? Furthermore, do international agreements provide mechanisms for environmental and health protection against the effects of technical trade barriers?

1.1 Research objectives

To navigate this complex inquiry, the research objectives are structured as follows:

• Clarifying the essence of technical trade barriers within the context of the World Trade Organization.

• Mapping the landscape of divergent technical barriers implemented by member states.

• Conducting a comprehensive analysis to uncover the intricate web of environmental impacts—both detrimental and favourable—stemming from the array of technical trade barriers, specifically within the realm of developing economies.

1.2 Methodology

The study employs a descriptive-analytical approach as its methodological foundation, facilitating the exploration of this multifaceted topic. The study culminates in a nuanced set of findings, enhancing our comprehension of the intricate interplay between technical trade barriers and the environmental welfare of developing economies.

2. CONCEPTUALIZING TECHNICAL TRADE BARRIERS WITHIN THE WORLD TRADE ORGANIZATION

2.1 Legal basis

The intricate interplay between diminishing customs tariffs and heightened environmental concerns has led to the articulation of protective international standards and technical specifications, ensuring the well-being of humans, animals, plants, and the environment. The era preceding the Uruguay Round witnessed a collective endeavour to establish robust global benchmarks, safeguarding various dimensions of well-being [1]. Exemplifying this endeavour is the Agreement on Technical Barriers to Trade, which bestows upon member states the authority to formulate international standards geared towards ensuring the preservation of well-being. However, the proviso of non-arbitrary application is crucial, preventing

member states from capriciously imposing standards that hinder international trade [2]. The agreement further distinguishes between two categories of standards: voluntary standards guiding producers towards specific quality or performance benchmarks, and mandatory technical regulations binding domestic or imported products to predefined attributes [3].

It is pertinent to note that technical trade barriers encompass a range of elements, including packaging, labelling, provision of product information, alignment of commodities and services with international standards, inspection procedures, and the acquisition of certificates affirming compliance [4].

The foundational principles of the agreement converge around four interrelated axes [2]:

(1) Ensuring that imports receive treatment on par with domestically produced goods.

(2) Encouraging member states to harmonize their technical specifications and regulations with established international standards.

(3) Advocating for transparency in the adoption of technical specifications.

(4) Upholding procedural requirements necessitating the notification of changes to relevant specifications and regulations, thereby fostering a cohesive ecosystem within the agreement.

2.2 Types of technical trade barriers in international trade

2.2.1 Sanitary and phytosanitary measures

Through multilateral international negotiations, an agreement concerning sanitary and phytosanitary measures was reached during the Uruguay Round in 1994. This agreement is considered part of a set of international trade agreements that impose obligations on all member states of the World Trade Organization [5]. The agreement stipulates that any member state of the organization has the right to implement protective measures to safeguard human, animal, and plant health. However, these measures must not impose unjustifiable constraints on international trade. The application of these measures is in accordance with the provisions of Article 20, paragraph (b), of the General Agreement on Tariffs and Trade (GATT), relying on the exceptions specified therein. It was developed to curtail the arbitrary application of Article 20 in the field of agriculture, thereby serving as a complementary part of the Agreement on Agriculture, while also being developed as a component of the Agreement on Technical Barriers to Trade [4].

The aim of the agreement on sanitary and phytosanitary measures is to protect human, animal, and plant health, as well as the environment, from risks arising from the transmission of diseases or disease-bearing agents. Furthermore, it aims to provide protection against risks resulting from additives, toxins, or disease-causing agents present in food and beverages [6]. States are required to assess the potential risks of pest presence on their territories and to elucidate the biological and economic implications, ensuring that these measures do not become additional obstacles to international trade. To enhance transparency, the organization has established a charter for the transparency of these measures, mandating immediate publication of all health and phytosanitary regulations. Additionally, countries must allow sufficient time between the publication and implementation of measures, enabling states to adapt their products or production methods accordingly. Members must also provide answers to all questions related to the health regulations endorsed by them [7], and notify the secretariat about the products affected by these measures, permitting other countries to submit proposals before the implementation of such measures.

Concerning control, inspection, and approval procedures, member states must ensure [2, 8]:

(1) Prompt actions without discrimination between imported and domestic products and declaration of the duration of the measure's application and submission of necessary documents during inspection. Member states must provide essential information regarding inspection procedures, including approval for additive use or setting allowable levels. The imposition of fees for such procedures must be equivalent to those imposed on domestic products or products of other countries.

(2) Equivalence of standards for determining the locations of control and inspection facilities.

(3) Establishment of a mechanism to address complaints and the necessary corrective actions in case the complaint is justified.

Thus, the key provisions and principles of this agreement can be summarized as follows [2, 4]:

- The import ban must remain within the minimum necessary to achieve its objectives and be based on scientific evidence explaining the reasons for the ban.
- Transparency: States must notify their trading partners of any new standard they intend to adopt.
- Encouragement of consistency between state measures and measures issued by international institutions.
- Consistency: The agreement encourages member states to accept international approvals issued by international institutions.
- Equivalence: Member states must consider the measures of other countries as equivalent to their own, even if there are differences. Inspection and examination procedures for imported goods must not exceed those applied to domestic goods.

The nature of sanitary and phytosanitary requirements can take the form of laws, requirements, procedures, or decisions [6]. The agreement also stipulates that standards should be based on a scientific foundation or a form of risk management. Developing countries sometimes face challenges in complying with certain standards, especially those requiring the exporting country to demonstrate that its standards are equivalent to those of the importing country. Nevertheless, developing countries are granted longer periods to fulfil their commitments under the agreement. This is due to difficulties in exporting food products from developing countries to developed ones. The main reason for this lies in measures favouring domestic producers. When tariff barriers are overcome, non-tariff barriers related to the environment, health, and food safety continue to challenge exporters in developing countries [9].

It's noteworthy that global trade has witnessed reciprocal battles concerning sanitary and phytosanitary standards. These measures have significantly impacted food products. For instance, strict inspections were imposed on imported salmon, affecting four countries: Cambodia, China, Thailand, and Vietnam. Measures were enacted to eliminate illegal fishing, including the adoption of international regulations for supervising fishing activities, enhancing ship inspections, and preventing unlawful fishing. Russia also imposed bans on imports of American pork and kangaroo meat from Australia, in addition to introducing new measures concerning health and

phytosanitary standards for used cars [5]. Canada implemented various protective measures, including the requirement by the Canadian Food Inspection Agency for import licenses of food products. The Canadian Council enacted a law regarding food safety, which tightened rules on food imports. Additionally, phytosanitary certificates were imposed on imports of grains to enhance human health protection.

It's important to mention that these protective measures have not spared any country. Developing countries have also adopted some protective measures related to environmental and health requirements. Angola, for instance, imposed a ban on imports of bananas and vegetables from Central and Eastern African countries. Syria and Lebanon banned the import of pork or pork-containing products. Saudi Arabia imposed a ban on meat imports from the UAE, while South Africa revoked permission for certain products from Namibia to enter its markets [9].

2.2.2 Technical barriers to international trade

It is noteworthy that the United States of America enacted the American Clean Energy and Security Act 2009, under which substantial customs duties were imposed on products of countries that did not ratify the Climate Change Agreement. Additionally, entry was restricted for products not adhering to energy conservation standards and ecological labels, in accordance with the Preservation and Energy Policy Act. Canada also introduced supplementary requirements for importing forest products and timber from the United States [9]. Indonesia, on the other hand, imposed additional customs duties on pharmaceutical and personal care products, along with mandatory labelling requirements in the local language (Bahasa) for more than 70 defined items spanning 37 countries. Furthermore, Indonesia imposed additional measures on the import of mobile phones, electronic regulations, and computers to enhance health, security, and environmental aspects, while imposing supplementary obligations related to quality standards and technical requirements. Similarly, China imposed quantitative restrictions on trade in products containing rare materials such as antimony and tungsten. Argentina implemented various technical measures concerning used vehicle exports and vehicle engines [5].

The fundamental general principles pertaining to mandatory technical regulations can be summarized as follows [10]:

(1) Regulations must not be trade-restrictive and must adhere to the principle of non-discrimination among members. This implies that products originating from any member territory should receive no less favourable treatment than products originating from any other member territory.

(2) The principle of national treatment should be observed, meaning that similar products originating from any member territory should receive no less favourable treatment than similar products of local origin.

(3) Preferably, technical regulations should be framed in general terms, using terminology or expressions more related to product performance than to design or descriptive characteristics [10].

(4) All members are required to accept technical regulations from other members as equivalent to their own, even if these regulations differ from their own. Members should be convinced that these regulations are sufficient to achieve the objectives fulfilled by their own regulations [8]. Hence, technical barriers to trade apply to mandatory technical regulations, non-mandatory voluntary standards, and conformity assessment procedures [10].

2.2.3 Green protectionism indicators

The World Trade Organization (WTO) established principles through which environmental requirements could be applied as protective measures for the environment without harming the trade interests of nations. However, variations in standards from one country to another and the contradictions between certain multilateral environmental agreements and WTO agreements have led to differences in the application of these standards across countries. This situation raises concerns, as some countries might utilize environmental requirements to achieve trade-related goals rather than genuinely protecting the environment. Pearson, in his study titled "Economics and the Global Environment," introduced indicators that can be considered environmental protection standards, restricting the entry of goods and services into markets. Some of these indicators include [11]:

• If foreign goods and services are subject to standards different from those applied to local goods and services, or if the standards applied to foreign goods and services do not align with the intended environmental goals, then differences in procedural or regulatory standards could be used to impose additional burdens on foreign goods and services compared to local ones [5].

• If differences in environmental standards arise from variations in social preferences or tastes, i.e., using environmental standards to achieve a higher level of well-being rather than solely for environmental protection, such as requiring imported cars to have air conditioning or specific types of tires.

The application of protective measures shows that some advanced countries impose specific quality and product standards with the primary goal of achieving trade objectives. These countries also collaborate with environmental protection associations and non-governmental organizations to prevent certain products from entering their local markets, as seen in the case of the "tuna-dolphin" issue between Mexico and the United States. Consequently, implementing such measures contradicts the principle of national treatment by imposing additional standards on foreign products and creating administrative barriers and precautionary measures with trade-oriented intentions [8].

The technical barriers to trade and sanitary and phytosanitary measures have played a significant and crucial role in the World Trade Organization's dispute settlement system. The well-known "tuna-dolphin" case between Mexico and the United States [12] is among the first cases to have generated wide debate. In 1991, during the Uruguay Round, the United States imposed restrictions on the import of tuna fish from Mexico. This was due to U.S. maritime law that aimed to protect dolphins, as tuna fishing in Mexico often involved the use of nets that posed a risk to dolphins. The ban also affected intermediary countries involved in canning tuna, such as Costa Rica, Italy, Japan, Spain, France, the United Kingdom, Canada, Colombia, South Korea, and some Southeast Asian countries. Mexico raised a dispute through the WTO's dispute settlement system, marking one of the first cases involving environmental disputes. This case raised two significant questions: Can any country criticize another's environmental regulations? Do trade rules allow for measures concerning production processes rather than product quality?

The WTO's Dispute Settlement Body concluded that the

United States could not ban the export of tuna due to its dolphin protection systems being incompatible. However, the U.S. could apply regulations regarding product quality, which led to the concept of "product versus process" [12]. In response, the European Union raised its own case in 1994 as an intermediary country affected by the ban. The conflicts involving environmental issues in international trade did not end here; they extended to the automotive industry sector. The United States once again imposed taxes on vehicles, specifically on luxury cars valued at over $30,000 and on vehicles with high fuel consumption. This was done through the Medium Fuel Economy Act.

In conclusion, the Dispute Settlement Body of the WTO concluded that the first and second taxes aligned with Article III of the General Agreement on Tariffs and Trade, while the Medium Fuel Economy Act conflicted with it [13].

2.2.4 WTO dispute settlement body decisions

European Union (formerly EC) — Certain Measures on the Importation and Marketing of Biodiesel and Measures Supporting the Biodiesel Industry is a strong example of a dispute where a developed country (the European Union) implemented measures that potentially affected developing countries [14].

The E.U's measures aimed to restrict the use of biofuels which was extracted from food and feed crop alleging that such food and feed crop-based biofuels may have negative effects climate change and specifically indirect land use change. The measures included stricter standards for imported biodiesel compared to domestically produced EU biodiesel and potential limitations on market access for Argentinian biodiesel producers. Argentina and E.U were trying to settle the dispute through negotiations, that was indicated by WTO records which show that the case was listed as being "in consultations" status since 15th may 2013 [14]. There was no public information regarding the final decision was issued. Despite that, the case shows that developed countries' policies can unintentionally construct technical barriers for developing countries in international trade [14].

In *the United States — Measures Affecting the Production and Sale of Clove Cigarettes - A Case of Potential Discrimination***,** Indonesia challenged a US law banning the production and sale of clove cigarettes. This case centred on whether the US policy discriminated against clove cigarettes, primarily imported from Indonesia, as a developing country. The US Family Smoking Prevention and Tobacco Control Act included a prohibition on the sale of cigarettes with "characterizing flavours" other than tobacco or menthol. This effectively banned clove cigarettes which were a significant product for Indonesia [15].

Indonesia claimed that such act violates WTO agreements on non-discrimination and national treatment by placing imported clove cigarettes at a disadvantaged status compared to domestically produced menthol cigarettes.

The WTO panel decided in favour of Indonesia, finding that:

• The US policy discriminated against like products: Clove and menthol cigarettes were deemed similar enough to be considered "like products" under WTO rules.

• Did not provide sufficient justification: The US public health concerns regarding clove cigarettes were not sufficient to justify the unequal treatment compared to menthol cigarettes [15].

This case is an example of how regulations, even with good intentions like protection of public health, can disproportionately affect developing countries. Prohibition on clove cigarettes significantly impacted Indonesia's clove cigarette industry and its potential exports.

United States — Certain Country of Origin Labelling Requirements (COOL), a complaint was brought by Canada and Mexico against the United States' mandatory country of origin labelling (COOL) requirements for certain meat products. This is a significant case regarding how seemingly straightforward regulations can create trade barriers [16].

The US enforced COOL rules mandating that retailers disclose the origin of certain meat products at the retail level. Such mandate aimed to inform consumers about the origin of their meat. Canada and Mexico asserted that the US COOL requirements discriminated against imported meat. The labelling requirements were allegedly more burdensome for imported Canadian and Mexican meat compared to domestically produced US meat. Moreover, the US Cool requirements violated WTO agreements that promote fair trade practices and non-discrimination between imported and domestic products. The WTO panel in the original proceedings and the subsequent appeal ultimately decided in favour of Canada and Mexico [16].

The WTO Panel found that the US COOL requirements:

• Unnecessarily burdened imported meat: The labelling requirements were more complex and costly for imported meat, creating a disadvantage. The WTO considered informing consumers a legitimate objective, but the specific COOL requirements weren't deemed the least trade-restrictive way to achieve that goal.

• Discouraging imports: Strict labelling requirements can make importing meat to the US less attractive, potentially impacting developing countries who might want to export meat products.

In conclusion, the case serves as a reminder that trade regulations, even with good intentions, can have unintended consequences. It emphasizes the importance of designing trade policies that are fair and non-discriminatory to ensure a level playing field for all WTO members, including developing countries.

In the United States — Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products, the case involved a World Trade Organization (WTO) dispute between Mexico and the United States concerning the US "dolphin-safe" tuna labelling regulations [17]. This case shows how eco-labelling policies can have unintended consequences for developing countries. The US mandated that tuna labelled "dolphin-safe" in the US market had to be caught using methods that met specific dolphin protection standards set by the US. Mexico, being a major tuna exporter, challenged these regulations, arguing that they discriminated against Mexican tuna labelled "dolphin-safe" under the international Dolphin Protection Consumer Information Act (DPCIA) standards [17].

The WTO panels in both the original proceedings and the appeal decided that specific regulations discriminated against imported tuna. The stricter requirements for imported tuna compared to US-caught tuna using the same DPCIA standards were found to be discriminatory [17]. This case is significant for developing countries in a few ways:

• Market Access Barriers: Stricter eco-labelling requirements in developed countries can make it harder for developing countries to export products, limiting market access and economic opportunities.

• Disproportionate Impact: Developing countries may rely more on specific fishing methods, and stricter eco-labelling regulations could disadvantage them compared to developed countries with more diverse fishing industries.

3. NEGATIVE ENVIRONMENTAL IMPACTS OF TECHNICAL BARRIERS TO TRADE ON DEVELOPING COUNTRIES

3.1 Increased production costs

The imposition of protective environmental standards has significant implications for developing countries. Products from these nations are compelled to bear additional costs in order to align with the imposed environmental standards. This, in turn, reshapes the structure of expenditures and costs. The impact becomes more pronounced when these standards are applied in some countries and not in others, causing the implementing countries to lose their competitive edge. Furthermore, these standards can be set in a manner that places the products of developing nations at a lower level compared to foreign products. This enables foreign producers to exert pressure and enforce stricter environmental standards on local products, creating an impediment to international trade. These standards augment the production costs in developing countries, leading to higher prices for exported goods and hindering their access to global trade markets. Consequently, these nations encounter difficulties in industries where such standards are applied, weakening their competitive ability in the local market.

3.2 Restriction of developing countries' exports and limited marketing opportunities

The protective measures undertaken by industrialized countries, such as health and environmental regulations, significantly constrain the exports of developing nations and narrow their market opportunities. The concept of green protectionism, in the form of stringent quality and health standards on imported goods, weakens the competitive edge of developing nations in global markets. Advanced countries often stipulate environmental labels on imported products, promoting competition based on efficiency, quality, and sustainability. These labels, however, raise concerns among developing nations, as they perceive them as technical trade barriers specifically aimed at their exports, particularly to advanced economies. Furthermore, the agricultural exports of developing countries rely on preferential agreements with major trading partners like the European Union. As a result, these nations are adversely affected when markets open up, intensifying competition for non-signatory countries and causing significant losses. This trade-related debate was ignited during the inaugural Ministerial Conference of the World Trade Organization (WTO) in Singapore in 1996. Developing countries view this discourse initiated by industrialized nations as an attempt to weaken their competitive capacity, resulting in disparate price levels for similar goods in industrialized and developing nations. Consequently, the question of competitiveness in global trade becomes a complex issue. Industrialized nations, under the pretext of adhering to quality and health standards, resort to safeguarding their markets from environmentally compromised goods imported from developing nations. This can lead to a situation where the latter's exports are banned from entering foreign markets unless they meet the stipulated environmental standards. The damage incurred by developing nations due to these standards far exceeds that resulting from health and safety regulations. Moreover, these standards can impact production methods, necessitating adjustments. However, local projects might lack the capability to implement these changes and may subsequently find it challenging to compete in the market.

3.3 Lack of active participation of developing countries

The committee responsible for technical barriers to trade within the World Trade Organization (WTO) has noted the absence of active participation by developing countries in the formulation of global standards or guidelines prepared by international institutions specialized in this field. Furthermore, developing countries have not received the technical assistance promised by advanced nations to build the necessary technical capacities and infrastructure, enabling them to adopt international standards, implement conformity assessment procedures for imported goods, and acquire technical assistance for necessary technology transfer in this domain [18].

The committee has identified the fundamental lack of infrastructure in developing nations, particularly the absence of specialized institutions for technical standards adoption and conformity assessment. Rectifying this situation requires radical and structural changes within these countries to enable the proper adoption of international standards [19]. These countries still suffer from institutional weaknesses due to their lack of technological advantages held by foreign companies. This consequently undermines their ability to showcase their goods and services in global markets [20].

It's worth noting that environmental standards have become increasingly urgent amid the intensification of global trade competition, especially considering the rapid growth in commodity and service exchanges worldwide. Consequently, environmental requirements pose significant obstacles to the exports of developing nations. Many organizations have recognized the necessity of involving developing countries in negotiations concerning environmental requirements. They emphasize the development of laws and environmental standards closely tied to production processes [13].

3.4 Arbitrary use of technical standards by industrialized countries

The imposition of excessively stringent conditions by certain member states serves as a technical barrier to international trade. Despite the freedom these nations have in establishing technical conditions to fulfill their policy objectives, such conditions should not be implemented restrictively to impede trade. In evaluating the risks of non-compliance, governments are urged to consider available scientific and technical information, the final use of the product, and the necessity for governments to review and amend technical regulations if the justifications for their implementation no longer apply. Such practices represent technical barriers to international trade [10].

Environmental requirements often obstruct trade due to their extremity. The increase in environmental measures within trade policies of countries, alongside the surge in multilateral environmental agreements, has led to a distortion

of these requirements. Many advanced countries have adopted misleading policies, using environmental requirements as a pretext for safeguarding human, animal, and plant health, public health, and the environment. This has resulted in an escalation of trade-related measures and disputes within the World Trade Organization [19].

The attempts by advanced nations to impose environmental standards and link them to global trade within the WTO have raised several questions about the true motives of these nations. Moreover, it raises inquiries about genuine interests in an era where conventional trade barriers are rejected. This reveals the efforts of technologically advanced nations to make this technological edge the controlling factor in trade flows among different countries. Consequently, advanced nations have chosen to focus on environmental issues, often disregarding the limited economic capacities of developing nations. Therefore, the future of the environment within the organization is closely tied to its ability to reconcile conflicting environmental interests between developing and advanced nations—an endeavour challenging to achieve in the present time [21].

4. POSITIVE EFFECTS OF TECHNICAL BARRIERS ON DEVELOPING COUNTRIES

4.1 Ensuring food safety for agricultural and animal products

Technical barriers to trade encompass production standards, including product specifications, production processes, symbols, packaging requirements, and labelling. Production processes that do not affect product specifications and quality are not subject to the Technical Barriers to Trade Agreement. This agreement aims to encourage countries to establish international standards and conformity assessment systems while ensuring that regulations and technical standards do not create obstacles to international trade [20].

All international agreements have aimed to enhance human, animal, plant, and environmental health. The provisions within these agreements should not be discriminatory among member states or serve as restrictive measures on international trade. These provisions cover laws, decrees, regulations, requirements, organized procedures, product standards, production processes and methods, testing procedures, inspection and certification procedures, sampling requirements, packaging regulations, and safety-related labelling. The necessary international references for the application of these standards have also been established. For instance, the Codex Alimentarius Commission has established principles concerning food additives, and the principles and guidelines for veterinary practices and pesticides have been outlined in collaboration with regional organizations under the International Plant Protection Convention [22].

It's important to note that environmental standards don't have the same impact on different economic sectors and goods. Their effect varies based on a country's development status and its position in the growth ladder. Developing countries may be more sensitive to environmental standards. Some countries perceive environmental standards that hinder manufacturing and export as crucial, especially in sectors like fisheries, textiles, leather, food products, fertilizers, cement, and more [20].

Contrary to this, certain studies suggest that implementing environmental standards and regulations could have positive aspects that enhance the competitiveness of products from developing nations [23]. This is especially relevant when industries in developed countries seek alternatives with less environmental pollution, such as reusing primary natural resources like raw cotton and natural silk, reducing inputs and chemical-intensive industrial compounds. Such developments could increase demand for exports from developing countries and improve trading conditions for them [24]. Moreover, the implementation of environmental standards can encourage innovation and development, potentially reducing costs and partially compensating for the increased expenses of compliance. Innovation might lead to reduced energy usage, economic use of materials, etc. [25]. Additionally, environmental standards can yield sector-specific gains by creating new markets or driving growth in existing markets based on new production methods, environmentally friendly products, and services.

4.2 Strengthening the global collective dimension of environmental protection

Environmental issues have led to disruptions in ecological balance due to the international community's inability to confront various environmental challenges. This has exacerbated damages that recognize no national boundaries or sovereignty. These damages pose one of the most significant threats to global environmental security. The international community acknowledges that these damages are of a global nature, as affirmed by reports from specialized international organizations and bodies. For instance, phenomena like global warming resulting from cumulative greenhouse gas emissions have been identified as one of the most crucial climate-related challenges globally, leading to destructive consequences across many regions. This phenomenon has resulted in increased warmth, accompanied by waves of droughts and floods. Such events have jeopardized food security, economic sectors, and have led to the extinction of various species [26].

Hence, there's a need for international collaboration to address these phenomena and find appropriate solutions. Measures like imposing pollution taxes, as Denmark has done, could be considered. Moreover, establishing a global environmental charter is essential. This charter would provide a comprehensive framework for international environmental law, aiming to establish and strengthen the law in light of pressing environmental challenges. This would enhance its implementation to achieve sustainable development goals and globally agreed environmental objectives [27].

The creation of an open membership dedicated team is also vital to identify potential gaps in environmental law and related documents. This would enhance their implementation and discuss possible solutions for these gaps. Additionally, international conferences could be convened to further embed the global collective dimension of environmental protection [28].

The Trade and Environment Committee believes that the optimal framework for addressing environmental issues is cooperation within the scope of multilateral environmental agreements. The committee emphasizes that unilateral measures that conflict with the principles of trade freedom within the World Trade Organization should not be allowed under the pretext of environmental protection. Advanced countries advocate for prioritizing the resolution of environmental disputes within the framework of multilateral

environmental agreements, whereas developing countries prefer dispute settlement within the World Trade Organization and uphold their right to resort to the dispute settlement body [24].

4.3 Other positive effects for technical trade barriers

Other positive effects for technical barriers to trade may include:

• Increasing quality: Promoting technical barriers to trade can improve the quality of products and services traded in markets, which play the role of quality control and ensure compliance with technical, health and environmental standards [29].

• Protecting consumers, by imposing quality and safety requirements on products: technical barriers protect consumers from products that are of poor quality or may be harmful to health [29].

• Promoting fair international trade: With uniform and product-matching technical standards, cost gaps between countries and firms can be reduced, fostering fair competition and enhancing access to international markets [29].

• Promoting investment and international trade: Technical barriers to trade may increase confidence among States, manufacturers and consumers, encouraging investment in sectors that adhere to technical standards and increasing trade [29].

• Promoting sustainable development: Technical barriers can promote sustainable development by promoting the use of clean technologies and sustainable materials and improving the efficiency of production [30].

• Reducing health and environmental risks: Thanks to imposed safety and environmental standards, technical barriers can reduce risks [31].

5. CONCLUSION

The Technical Barriers to Trade Agreement affirms countries' rights to establish international standards and technical specifications aiming to ensure the protection, health, and safety of humans, animals, plants, and the environment, provided they are not applied arbitrarily.

The World Trade Organization has established foundations through which environmental requirements can serve as protective measures for the environment without harming the trading interests of countries.

The negative environmental effects of technical barriers to trade on developing countries include increased production costs, restricted exports for developing countries, diminished marketing opportunities due to heightened health standards imposed by industrialized countries, lack of active participation by developing countries, and arbitrary use of technical standards by industrialized countries.

On the other hand, the positive effects of technical barriers on developing countries lie in ensuring the food safety of agricultural and animal products and reinforcing the collective global dimension of environmental protection. International cooperation is necessary to meet global challenges to the environment for several reasons:

(1) Environmental impacts vary: Environmental challenges do not recognize national boundaries; pollution, climate change and low biodiversity can affect everyone regardless of their geographic location. Countries must work together to effectively address these challenges [32].

(2) Shared responsibility: The environment is a common heritage of all humanity, and States must therefore shoulder the shared responsibility to preserve it and limit potential damage [33]. The impact of environmental challenges can have significant economic and social impacts, and international cooperation can mitigate these impacts and help achieve sustainable development [34].

(3) Peace and human security: Environmental challenges overlap with security and humanitarian challenges, and neglecting them can lead to conflicts and wars over natural resources, and international cooperation can contribute to preventing such conflicts [35]. In general, international cooperation is necessary because environmental challenges require a joint and integrated response from different parties at the global level to ensure the sustainability of the environment and preserve the future of future generations.

Catalysing international cooperation to address environmental challenges is very vital, especially, as environmental problems at the local and global levels are constantly increasing and damage caused to the environment is becoming more obvious. Thus, the following are ways in which international cooperation can be surely accelerated:

(1) International agreements: Signing binding international agreements to make commitments and set clear common goals to conserve the environment and reduce pollution. For example, the Paris Agreement on Climate Change is a case in point. Moreover, providing financial support to developing countries suffering severe and significant environmental challenges, will assist them to implement environmental projects and adopt clean and environment friendly technologies [36].

(2) Furthermore, exchange of knowledge and technology through promoting cooperation in research and development of environmental technology can assist in the transfer of modern environmental technology from developed to developing countries. There is a need for establishment of international nature reserves and the development of joint strategies for the protection of wildlife and marine life, including combating illegal fishing and biodiversity conservation measures. Promoting awareness and education among peoples regarding the importance of environmental conservation would be very helpful in accelerating international cooperation to face environmental challenges [36].

Here are some recommendations that can be addressed for effectively addressing technical barriers to trade:

• Strengthening international cooperation: Promoting international cooperation and constructive dialog among States to exchange knowledge and experience in the development and implementation of policies and laws on technical barriers to trade [37].

• Harmonization of technical standards: Work towards the standardization and approval of international technical standards by the States concerned, which reduces trade barriers and facilitates cross-border movement of goods [37].

• Technical and financial support: technical and financial support to developing States to strengthen their capacity to comply with technical standards and develop the necessary infrastructure [37].

• Promote awareness and education: Promote awareness and education among businesses, organizations and consumers about the importance of compliance with technical barriers to trade and the economic and environmental benefits

they can bring [37].

• The following are some suggestions for future research on the long-term impact of technical barriers to trade on the environment:

• Studying the impact of technical barriers on biodiversity: Explore how technical barriers to trade affect biodiversity in the areas concerned, including impact analysis on different ecosystems, plant and animal species.

• Assessment of Technical Barriers and Climate Change: A study to analyse the interaction of technical barriers to trade with climate change and how this affects the environment, including response to changing weather challenges and changes in the natural environment.

• Impact of technical barriers on the use of natural resources: An analysis of how technical barriers to trade affect the use of natural resources such as water and land, and an assessment of how this affects the environmental balance.

• Studying the impact of technical barriers on waste and pollution: Exploring how technical barriers to trade affect waste production and pollution, and how they affect the local and global environment in the long term.

• Analysis of technical barriers and impact on environmental and human health: A study of how technical barriers to trade affect environmental and human health, including analysis of the health impacts of pollution and environmental changes associated with technical barriers.

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