

NOTE

Weathering the Storms: Recommendations for Preparing Regional Trade Agreements for Climate Change

SAMANTHA LEAH CRISTOL*

ABSTRACT

Climate change poses a threat to the wellbeing of the international community, especially in regard to international trade. Foreseeable impacts to trade are identifiable in both the production and transportation segments of global value chains, and preparation will require international cooperation. Regional trade agreements offer nations an opportunity to prepare for the impacts of climate change, both by allowing for the diversification of trading partners and products, and by reaching beyond borders to align preparation plans.

To incorporate climate change readiness into trade agreements in an inclusive, equitable, and meaningful way, negotiators should seek to directly address climate emergencies, promote technology transfer, lower technical barriers to trade, and harden regional infrastructure. This paper proposes methods for accomplishing these goals and presents an evaluative framework to help negotiators understand and identify climate change preparation gaps while drafting or revising trade agreements.

TABLE OF CONTENTS

Introduction 504

 I. Climate Change Poses Foreseeable Threats To International Trade 505

 A. Production 505

 B. Transportation. 506

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II. Nations Can Prepare For Climate Change Impacts To Trade By Increasing And Diversifying Imports And Exports, Seeking Out And Increasing The Use of Resilient And “Green” Technologies, And Improving Resiliency Of Major Infrastructure Systems 507

 A. Production 507

 B. Transportation. 508

III. Regional Trade Agreements Are A Valuable Tool Nations Can Leverage To Prepare Trade For Climate Change 508

 A. Climate Emergency Protocols 509

 B. Technology Transfer Provisions 511

 C. Reducing Technical Barriers to Trade. 512

 D. Provisions to Harden Infrastructure. 512

IV. Negotiators Can Use A Framework To Analyze The Climate Change Readiness Of Regional Trade Agreements. 514

 A. Framework Proposal and Methodology 514

 B. Applying the Framework 515

 1. USMCA 515

 2. AfCFTA 515

Conclusion 516

V. Appendix A: Framework To Analyze The Climate Change Readiness Of A Regional Trade Agreement 517

VI. Appendix B: Scoring Rubric Based On Framework 520

VII. Appendix C: Application Of Proposed Framework To The USMCA 521

VIII. Appendix D: Application Of Proposed Framework To The AfCFTA. 521

INTRODUCTION

Climate change poses a threat to global value chains, and impacts are already being felt worldwide. Because climate change is a foreseeable crisis, the international community has a rare opportunity to address anticipated impacts through trade agreements before conditions worsen. This Note will address how nations can incorporate climate change readiness into trade agreements in an inclusive, equitable, and meaningful way.

Part I will discuss anticipated impacts to trade by climate change, and Part II will discuss how nations can prepare. With preparation in mind, Part III will suggest how trade negotiators can draft or modify Regional Trade Agreements to be more resilient in the face of climate disasters. Finally, Part IV will propose a framework to help negotiators determine the climate-change readiness of a trade agreement.

I. CLIMATE CHANGE POSES FORESEEABLE THREATS TO INTERNATIONAL TRADE

Climate change is one of the largest challenges facing present and future generations. The increase in global temperatures has in turn increased the frequency and magnitude of extreme weather events.¹ Natural disasters including fires, storms, and extreme temperature conditions occur three times more often today than fifty years ago.² The increased frequency of extreme phenomena is likely to impact all aspects of global value chains, especially production and transportation.³

A. PRODUCTION

Agriculture and manufacturing will face some of the most significant impacts from climate change.⁴ Flooding affects food supply by endangering livestock and limiting planting ability, which leads to decreased yields.⁵ Extreme temperatures also threaten agriculture, particularly the growth of many commodity crops.⁶ Although worldwide aggregate agriculture production is not projected to decline until 2050, it is anticipated that “suitable production zones will shift, annual yields will become more variable, and price volatility of agricultural commodities will increase.”⁷ South Asia and Sub-Saharan Africa are expected to be at the forefront of negative crop yields in coming years.⁸

1. See *What is Climate Change?*, UNITED NATIONS, <https://www.un.org/en/climatechange/what-is-climate-change> [<https://perma.cc/6UVE-J6HH>].

2. See *Natural disasters occurring three times more often than 50 years ago: new FAO report*, UNITED NATIONS (Mar. 18, 2021), <https://news.un.org/en/story/2021/03/1087702> [<https://perma.cc/YM3M-YDPY>].

3. See *Climate Impacts on Agriculture and Food Supply*, CITY OF CHI. U.S. ENV’T PROT. AGENCY, <https://climatechange.chicago.gov/climate-impacts/climate-impacts-agriculture-and-food-supply#international> [<https://perma.cc/TZ7W-FQP9>] (explaining international impacts of climate change on food supply chains with a focus on productivity and delivery). See generally Adnan Seric & Yee Siong Tong, *What are global value chains and why do they matter?*, UNITED NATIONS INDUS. DEV. ORG. (August 2019), <https://iap.unido.org/articles/what-are-global-value-chains-and-why-do-they-matter> [<https://perma.cc/XA32-Y8WU>] (defining a global value chain as “the full range of activities (design, production, marketing, distribution, and support to the final consumer, etc.) that are divided among multiple firms and workers across geographic spaces to bring a product from its conception to its end use and beyond”); *Climate Change Impacts on Transportation*, U.S. ENV’T PROT. AGENCY, <https://www.epa.gov/climateimpacts/climate-change-impacts-transportation> [<https://perma.cc/X8UT-474W>] (describing a brief overview of climate change impacts on transportation systems).

4. See Ankai Xu & José-Antonio Monteiro, *International trade in the time of climate crisis*, CTR. FOR ECON. POL’Y RSCH. (Dec. 12, 2022), <https://cepr.org/voxeu/columns/international-trade-time-climate-crisis> [<https://perma.cc/ZQ69-GUSL>] (warming of one degree Celsius in global temperature is expected to decrease agricultural and light manufacturing exports); see also World Trade Org. Secretariat, *Climate Change Adaptation and Trade*, Policy Brief 5 (2022), https://www.wto.org/english/news_e/news22_e/dgo_ted_climate_change_sept22.pdf [<https://perma.cc/2XUV-VP8S>].

5. Renée Cho, *How Climate Change Impacts the Economy*, COLUM. CLIMATE SCH.: STATE OF THE PLANET (June 20, 2019), <https://news.climate.columbia.edu/2019/06/20/climate-change-economy-impacts/> [<https://perma.cc/GZ6G-CFWY>].

6. *Id.*

7. EUROPEAN ENV’T AGENCY, *Global climate change impacts and the supply of agricultural commodities to Europe* (Feb. 11, 2021), <https://www.eea.europa.eu/publications/global-climate-change-impacts-and> [<https://perma.cc/6N43-L3UG>].

8. Xu & Monteiro, *supra* note 4.

Manufacturing productivity is threatened by anticipated strains on both labor and infrastructure. Labor shortages, which are expected to impact productivity across all sectors, may be caused by a combination of climate migration, displacement in the aftermath of disasters, and climate-change related waterborne and foodborne illnesses.⁹ Infrastructure that supports manufacturing such as energy supply, water resources, telecommunication services, and roads, are also expected to be in need of increased repair and maintenance in the face of climate-related events.¹⁰

As the world changes, consumer needs will also shift, impacting production. The redistribution of suitable environments for agriculture and manufacturing may make consumers more reliant on imported versions of products that were previously produced domestically.¹¹ In response to the energy transition and energy demands, consumer demand for climate-friendly technology is also expected to rise.¹²

B. TRANSPORTATION

Transportation of products will also be impacted as infrastructure choke points, namely roads, maritime ports, and airports, are increasingly exposed to climate

9. See *How are trade and environmental sustainability compatible?*, ORG. FOR ECON. CO-OPERATION AND DEV., <https://www.oecd.org/trade/topics/trade-and-the-environment/> (last visited May 15, 2023); Cho, *supra* note 5 (estimating that climate change will result in a loss of two billion labor hours per year by 2090); Gabrielle Tétrault-Farber, *Number of internally displaced people hits record due to war, climate change*, REUTERS (May 11, 2023, 6:69 AM), [https://www.reuters.com/world/number-internally-displaced-people-hits-record-due-war-climate-change-2023-05-11/#:~:text=GENEVA%2C%20May%2011%20\(Reuters\),to%20data%20published%20on%20Thursday](https://www.reuters.com/world/number-internally-displaced-people-hits-record-due-war-climate-change-2023-05-11/#:~:text=GENEVA%2C%20May%2011%20(Reuters),to%20data%20published%20on%20Thursday) (in 2022, there were an estimated thirty-two point six million displaced persons due to climate disasters like floods and landslides). See generally Jessica Dietrich et al., *Impact of climate change on foodborne infections and intoxications*, 8(S3) J. HEALTH MONITORING, 78, 87 (2023), https://edoc.rki.de/bitstream/handle/176904/11083/JHealthMonit_2023_S3_Foodborne_infections_intoxications_climate_change_health.pdf?sequence=1&isAllowed=y [<https://perma.cc/MU56-YQ66>] (explaining an anticipated rise in foodborne illnesses in Germany as a result of climate change).

10. Cho, *supra* note 5.

11. While not a perfect comparison, a current example of an import reliance can be observed in the critical minerals industry. See *Press Release, National Mining Association, U.S. Reaches Highest Recorded Mineral Import Reliance*, NAT'L MINING ASS'N (Jan. 31, 2023) <https://nma.org/2023/01/31/u-s-reaches-highest-recorded-mineral-import-reliance/> [<https://perma.cc/TRY7-HL3X>]. This import reliance for critical minerals is related to where the minerals are mined and processed, which is currently dominated by China. See Hyong-Min Kim & Deep Jariwala, *The Not-So-Rare Earth Elements: A Question of Supply and Demand* 6 (2021), https://kleinmanenergy.upenn.edu/wp-content/uploads/2021/09/KCEP-The-Not-So-Rare-Earth-Elements_withES.pdf [<https://perma.cc/9SE9-XLYZ>]. Another example to be considered is Chinese consumer demand for imported food goods, which has already strained food security in the face of global shocks. See Zonggyuan Zoe Liu, *China Increasingly Relies on Imported Food. That's a Problem*, COUNCIL ON FOREIGN RELS.: ASIA PROGRAM (Jan. 25, 2023 3:54 PM), <https://www.cfr.org/article/china-increasingly-relies-imported-food-thats-problem> [<https://perma.cc/96S4-M8ZF>].

12. See Xu & Monteiro, *supra* note 4.

change impacts.¹³ Maritime shipping accounts for ninety percent of global trade by volume, anticipated port closures caused by extreme weather events are therefore worrisome.¹⁴ The mid-2021 logjams of container vessels at the Long Beach and Los Angeles Ports serve as a warning sign for future congestion.¹⁵ At these two ports, an increase in import demand combined with limited labor and structural capacity at major ports led to a global shipping container shortage, an oil spill, and negative impacts on exports.¹⁶ Road infrastructure faces risks from flooding and extreme heat, and from threats to fuel access and power supply stability.¹⁷ Airline transport is similarly at risk from flooding, extreme heat, and threats to fuel supply access, and airplane payload capacity will decrease as temperatures rise.¹⁸ In summary, climate change poses a risk to many, if not all, aspects of transportation.

II. NATIONS CAN PREPARE FOR CLIMATE CHANGE IMPACTS TO TRADE BY INCREASING AND DIVERSIFYING IMPORTS AND EXPORTS, SEEKING OUT AND INCREASING THE USE OF RESILIENT AND “GREEN” TECHNOLOGIES, AND IMPROVING RESILIENCY OF MAJOR INFRASTRUCTURE SYSTEMS

A. PRODUCTION

To combat threats to supply and production, system redundancies are crucial. Nations will need to be able to import necessary products to replace any internal production failures, while also mitigating the inability to export during a crisis. By expanding both the types of imports and the nations imported from, diversifying trade may help to address supply shortages in the event of far-reaching or simultaneous crises.¹⁹ Diversifying trade both by product and by trading partners will also yield benefits beyond climate change preparation, like incentivizing innovation and offering expanded market access.²⁰

Internal product diversification may also be helpful, especially in agricultural areas that are facing shifting weather patterns. Diversifying crops to include plants that can withstand varying ranges of temperature extremes and rain conditions can

13. See Xu & Monteiro, *supra* note 4; see also KENYA PRIV. SECTOR ALL., *Climate Change and Trade* (April 2014), <https://cdkn.org/sites/default/files/files/Climate-Change-and-Trade.pdf> [<https://perma.cc/U2RD-PZB8>].

14. see also KENYA PRIV. SECTOR ALL., *supra* note 13.

15. See *Case Study 1: Ports of Los Angeles and Long Beach, United States*, UNITED NATIONS CONF. ON TRADE AND DEV., [https://resilientmaritimelogistics.unctad.org/guidebook/case-study-1-ports-los-angeles-and-long-beach-united-states#:~:text=Since%20the%20onset%20of%20the,given%20time%20\(figure%2040\)](https://resilientmaritimelogistics.unctad.org/guidebook/case-study-1-ports-los-angeles-and-long-beach-united-states#:~:text=Since%20the%20onset%20of%20the,given%20time%20(figure%2040)) [<https://perma.cc/ES95-RLW9>].

16. *Id.*

17. KENYA PRIV. SECTOR ALL., *supra* note 13.

18. See Diandong Ren et al., *Impacts of climate warming on maximum aviation payloads*, 52 *Climate Dynamics* 1711, 1718 (2018), <https://link.springer.com/article/10.1007/s00382-018-4399-5> [<https://perma.cc/KAM8-RB5T>].

19. EUROPEAN ENV'T AGENCY, *supra* note 7.

20. Xu & Monteiro, *supra* note 4.

be revolutionary for nations that anticipate shifting agricultural viability. Manufacturing regions would benefit from either shifting to renewable electric power or to backup generators that are not dependent on oil and gas. In manufacturing sectors that rely on specific hard-to-access raw materials, like heavy metals, research and development of replacements and alternate sources will increase resiliency.

B. TRANSPORTATION

Infrastructure maintenance and resiliency measures will help to guard against transportation sector weaknesses.²¹ While it is most important to target areas that are critical to total system success, secondary routes should be improved and maintained in case of a widespread emergency. To be successful, infrastructure hardening must go beyond the main thoroughfares, and address the entire system that gets an exported product from producer to the point of exit, and an imported product from its point of entry to consumers.²²

Increasing access to climate friendly technology is also important, especially in the energy supply and transportation industries. Clean technology like electric vehicles and solar panels can allow nations to transition to self-sufficient transit systems.²³

III. REGIONAL TRADE AGREEMENTS ARE A VALUABLE TOOL NATIONS CAN LEVERAGE TO PREPARE TRADE FOR CLIMATE CHANGE

Regional trade agreements (RTAs) offer a unique opportunity for nations to address climate change preparedness in relation to trade. Beyond the on-the-face benefits of allowing nations to diversify trading partners and products, regional trade agreements offer signatories the flexibility to “go beyond what was possible multilaterally.”²⁴ A unique and powerful aspect of RTAs is the ability for these agreements to reach behind-the-border issues, through mechanisms like the harmonization of national regulations.²⁵ To prepare RTAs for climate change, negotiators should include provisions that directly address climate emergencies,

21. See generally MICHAEL MULLAR ET AL., *CLIMATE-RESILIENT INFRASTRUCTURE*: OECD ENVIRONMENT POLICY PAPER NO. 14 (2018); see also EUROPEAN ENV'T AGENCY, *supra* note 7.

22. Transportation infrastructure hardening in this manner may be accomplished by building in system redundancies. See U.S. DEPT. OF TRANSPORTATION, *BEYOND TRAFFIC 2045: TRENDS AND CHOICES – DRAFT*, 143 (2015), <https://rosap.ntl.bts.gov/view/dot/12160> [perma.cc/Z8TN-ZY57].

23. See INTERNATIONAL ENERGY AGENCY, *A 10-POINT PLAN TO CUT OIL USE*, 13 (2022), <https://iea.blob.core.windows.net/assets/c5043064-58b7-4066-b1e9-68d7d9203fe9/A10-PointPlanToCutOilUse.pdf> [https://perma.cc/8DZW-VRH3] (recommending ways to significantly reduce oil reliance in response to the global oil market shock after the Russian invasion of Ukraine in 2022).

24. *Regionalism: friends or rivals?*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/thewto_e/whatis_e/tif_e/bey1_e.htm [https://perma.cc/E9WT-N9U6].

25. Heng Wang, *How to Assess Regional Trade Agreements? Deep FTAs v. China's Trade Agreements*, 54 THE INTERNATIONAL LAWYER, 247, 248 (2021).

promote technology transfer, lower technical barriers to trade, and harden infrastructure.

A. CLIMATE EMERGENCY PROTOCOLS

As of 2022, only eighteen percent of RTAs registered with the World Trade Organization explicitly addressed climate change.²⁶ Of these agreements, the majority use “best endeavor” language or merely acknowledge the importance of mitigation and adaptation.²⁷ If applicable, implementation is often in the form of institutional arrangements, like the formation of committees.²⁸ Relatedly, while ninety-seven percent of in-force RTAs have at least one environmental provision, this is most typically preambular language acknowledging the environment or a general exceptions clause for environmentally related trade considerations.²⁹ Trade negotiators should update environmental and climate change provisions by adding emergency protocols that go beyond a general exceptions clause.

The first step for effectuating an emergency protocol is for an agreement to establish when an emergency is occurring. Although some agreements, like the African Continental Free Trade Area (AfCFTA) agreement, allow for parties to apply to waive obligations in times of crisis, the application process itself is a barrier for a nation experiencing an emergency.³⁰ By instead defining emergencies, negotiators can be assured that parties have immediate access to the benefits of emergency protocols. Even if an agreement decides to keep a committee oversight involved in the grant of emergency status, a definition will expedite rulings and help reduce a committee’s confusion over whether an event qualifies.

To keep emergency protocols as accessible as possible, the threshold that triggers a finding of emergency should be defined broadly. Emergencies may look different, based on features like geographic location, topography, local climate, land use, age of infrastructure, and population density. Coastal areas may be more prone to flooding, whereas desert areas may be more prone to drought. To acknowledge and simplify potential types of disasters, trigger clauses should look to a general standard. In agricultural areas, the area of land affected may be an appropriate standard to judge the scale of a disaster, but in manufacturing-heavy areas, the number of people displaced may be a better indicator. As parties to an agreement may be of radically different sizes and production capacities, thresholds should be determined by percentages of people in a region displaced or area

26. WORLD TRADE ORGANIZATION, TRADE AND CLIMATE CHANGE: INFORMATION BRIEF NO. 2, 6 (2022), https://www.wto.org/english/news_e/news21_e/clim_03nov21-2_e.pdf [<https://perma.cc/6ZTY-QQEY>].

27. *Id.* at 4.

28. *Id.* at 9.

29. *Id.* at 4.

30. Agreement Establishing the African Continental Free Trade Area art. 15, Mar. 21, 2018, 58 I.L.M. 1028 [hereinafter AfCFTA].

of land impacted.³¹ As RTAs may be between parties that have differing industrial and production sectors, multiple thresholds triggering emergency provisions should be included.

Emergency provisions themselves, when triggered, should seek to provide recovery support to the nation experiencing the emergency. Similar to the application of special and differential treatment, parties that have triggered the emergency threshold should be allowed extra time to meet agreement obligations.³² In the event that a party cannot meet an obligation at all, specifically because of the climate emergency at hand, an agreement should provide that no sanctions should be levied. As agriculture is particularly vulnerable to climate disasters, negotiators may want to consider segregating and separately addressing trade obligations or considerations related to agriculture.

Since many RTAs are between countries that are geographically close, climate emergency protocols should address two different types of scenarios: those in which only one or some of the parties to an agreement are impacted by a disaster, and those in which all parties to an agreement are impacted by a common disaster, or simultaneous disasters. If an RTA does not otherwise lower technical barriers to trade in a meaningful way between the parties to the agreement, an emergency provision is a middle-ground area where negotiators should seek to lower technical trading boundaries.³³ If only one, or some, parties to an agreement are impacted by a climate disaster, the special provisions to lower technical barriers to trade can extend solely to the nation in need. If all parties are impacted, negotiators should consider implementing a temporary free trade zone between parties. To do so, parties to the agreement can temporarily agree to drop all tariffs, and to adopt international standards, instead of national standards, during the time of mutual crisis.³⁴ This temporary free trade zone after a common disaster can be limited to an arbitrary time period for simplicity, or until at least one nation has recovered to the point that it no longer qualifies as experiencing an emergency.

31. Degree of impact may also be important to consider. In measuring the magnitude of an impact on an area, it may make sense to quantify impact based on a percentage of a metric, in comparison with the same metric in the same area prior to impact (for example, the percentage differences in production rate before and after a crisis). In some regions or areas where “before” data is lacking, this may be difficult or impossible to quantify. To ensure relief in a time of emergency, lack of prior data should not exclude a party from triggering an emergency provision.

32. See *Special and differential treatment provisions*, WORLD TRADE ORGANIZATION, https://www.wto.org/english/tratop_e/devel_e/dev_special_differential_provisions_e.htm [<https://perma.cc/CRS9-WNBH>].

33. UNCTAD Economists, *How regional trade agreements can improve access to medical products during crises*, UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (Mar. 10, 2021), <https://unctad.org/news/how-regional-trade-agreements-can-improve-access-medical-products-during-crisis>.

34. *Id.*

B. TECHNOLOGY TRANSFER PROVISIONS

By encouraging, promoting, and easing technology transfer, technology transfer provisions within RTAs can help support the climate resiliency of both production and transportation. A recent study by Professors Martínez-Zarzoso and Chelala analyzed the impacts of technology transfer provisions on exports, both in volume and in technology content.³⁵ Based on this study, negotiators should encourage technology related RTA provisions to promote a higher number of technology related exports. Deep RTAs were found to be more successful than shallow RTAs, with variable impacts based on development level of parties.³⁶ Professors Martínez-Zarzoso and Chelala noted that effects of such provisions are very pronounced in South-South agreements, less so in North-North agreements, and variable in North-South Agreements. Compensating for the negative impact technology provisions sometimes have in North-South agreements, the study found that intellectual property provisions resulted in a positive impact on trade volume, even in shallow agreements.³⁷

To best prepare for climate change, technology transfer in the sectors of seeds, fertilizer, and clean technology are vital. Negotiators should seek to draft provisions that encourage and ease technology transfer in these sectors. Specifically, they should do so by including product or sector specific carveouts and addressing the associated intellectual property rights. Although intellectual property provisions were shown to increase exports in the Martínez-Zarzoso and Chelala study, another study of Jordan's TRIPS-Plus agreements did not show positive impacts on trade exports from any of its provisions, and instead found a detrimental impact on the cost of medicines for local citizens.³⁸ To avoid burdening locals more than spurring innovation, negotiators should avoid provisions that restrain compulsory licensing. Instead, negotiators should consider provisions that allow inventors to extend patent terms, or allow for expedited or "fast tracked" patent programs for parties to the treaty or patents related to climate and environmental technology.³⁹

35. IMMACULADA MARTÍNEZ-ZARZOSO & SANTIAGO CHELALA, Trade Agreements and International Technology Transfer, 157, 157 REVIEW OF WORLD ECONOMICS 631 (2021).

36. *Id.* at 651.

37. *Id.*

38. *Id.*; Taleb Awad Warrad, The Economic Impact of the TRIPS-Plus Provision in the Jordan-US Free Trade Agreement, WIPO-WTO Colloquium Papers 2013, 45, 51, https://www.wto.org/english/tratop_e/trips_e/colloquium_papers_e/2013/chapter_6_2013_e.pdf.

39. See Warrad, *supra* note 38 (patent extensions introduced as a TRIPS-plus measure in Jordan); *Expedite your patent application*, GOVERNMENT OF CANADA, <https://ised-isde.canada.ca/site/canadian-intellectual-property-office/en/patents/expedite-your-patent-application> [https://perma.cc/99E7-SF5E] (last modified July 16, 2020) (fast tracking in Canada available to trading partners).

C. REDUCING TECHNICAL BARRIERS TO TRADE

Regional trade agreements that lower technical barriers to trade will allow parties to diversify imports and exports, which will be advantageous for nations preparing for supply and production shortages. A recent working paper by Professor Arevik Gnutzmann-Mkrtychyan and Christian Henn for the International Monetary Fund suggests that complete non-discriminatory tariff elimination can result in “considerable trade expansion.”⁴⁰ The paper links tariff elimination to reduction in overall costs to traders, as a result of lowering the frequency of customs inspections.⁴¹ To encourage trade expansion, negotiations should seek to eliminate tariffs.

Negotiators should also aim to harmonize regulatory standards, either by aligning national regulations or by mutually respecting national regulatory agencies. Elimination of additional border testing, customs inspections, and duplicate-standard review will lower trading costs for exporters.⁴² These actions will help to diversify and expedite the trade of goods, while also encouraging producers to enter cross-border trade. Lowering regulatory requirements and tariffs will make trade more accessible to micro-, small-, and medium-sized enterprises, which will further diversify exports and expand trade.⁴³

D. PROVISIONS TO HARDEN INFRASTRUCTURE

Hardening infrastructure is arguably one of the most important aspects of climate change readiness. Infrastructure development and trade agreements often go hand and hand, but this is not a given. China’s Belt and Road Initiative has undertaken infrastructure projects across Asia, and is often accompanied by free trade agreements or “border development zones” in the areas projects have been funded.⁴⁴ In the other direction, the African Continental Free Trade Area agreement (AfCFTA) has spurred infrastructure investment by the African Development Bank.⁴⁵ Negotiators should look beyond the incidental impacts of RTAs, and instead include infrastructure hardening initiatives within RTAs.

40. IMF, *Peeling Away the Layers: Impacts of Durable Tariff Elimination*, WP/18/109, at 37 (May 2018) <https://www.imf.org/-/media/Files/Publications/WP/2018/wp18109.ashx>.

41. *Id.*

42. See *Reducing Technical Barriers to Trade*, OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE ARCHIVE, <https://ustr.gov/about-us/policy-offices/press-office/fact-sheets/2017/march/reducing-technical-barriers-trade> [<https://perma.cc/6RHS-VBNK>].

43. See generally *Global Alliance for Trade Facilitation*, THE TRADE FACILITATION AGREEMENT THROUGH AN MSME LENS (2021), <https://www.tradefacilitation.org/content/uploads/2021/05/tfa-through-msme-lens-toolkit-final.pdf>.

44. See Chris Devonshire-Ellis, *China’s Free Trade Agreements Along the Belt & Road Initiative*, SILK ROAD BRIEFING (Feb. 26, 2021), <https://www.silkroadbriefing.com/news/2021/02/26/chinas-free-trade-agreements-along-the-belt-road-initiative/>.

45. See *African Development Bank and AfCFTA Secretariat partner to stimulate industry*, African Development Bank Group (Oct. 30, 2021), <https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-and-afcfta-secretariat-partner-stimulate-industry-46499>.

To harden regional infrastructure, negotiators should consider adding an infrastructure provision to RTAs. Acknowledgement of infrastructure dependencies on a regional scale may also be helpful for future interpreters to understand intent and priority of the drafters. Shallow language, like commitments to maintain national infrastructure and establish emergency plans, does not utilize the full power that RTAs can offer. Negotiators should instead consider including deeper-reaching provisions, that rely on the cooperative and mutually beneficial nature of RTAs.

An example of a deep reaching provision is one that creates a regional infrastructure committee, with members from all parties to the agreement, that will be charged with identifying and mapping the critical regional transportation system. Mapping of this nature would include transit paths from production centers to points of exit, and paths from points of entry to consumers. As infrastructure is interdependent, the committee would also be responsible for compiling a list of critical infrastructure needs and points.⁴⁶ This would include non-transportation infrastructure like water and sanitation facilities, power plants, transmission stations, and telecommunication facilities.⁴⁷ The committee would then also be charged with identifying and ranking the weakest points of the system. To make the committee more powerful, the infrastructure provision could also establish a joint fund that the committee must spend to improve and harden regional infrastructure. The committee should focus efforts on the weakest identified points and oversee the completion of infrastructure projects.

While an alternative, and obvious, deep reaching provision would be to harmonize national infrastructure resilience regulations by setting minimum standards, negotiators should be wary of choosing this option. Standards would need to vary by geography and topography of specific locations, and reaching an agreement on regulations may hinder the formation of a RTA, which would be detrimental to climate change preparation overall. Enforcement would be practically impossible, and any sanctions designed to enforce minimum standards would impair trade and be undermine climate disaster preparedness.

If an infrastructure provision does create or enhance power to harden regional infrastructure, principles of equity and inclusion should not be overlooked. Infrastructure projects should be undertaken in a manner that is respectful to the area in which they are occurring, with the participation of the local labor force, with health and safety standards for both laborers and project neighbors. Minimum safety and labor rights standards should be incorporated and implemented, to either an agreed-upon international standard or the strictest standards

46. See Robert Reid, *How to make infrastructure more resilient against climate change*, AMERICAN SOCIETY OF CIVIL ENGINEERS: CIVIL ENGINEERING SOURCE (JAN. 3, 2022), <https://www.asce.org/publications-and-news/civil-engineering-source/civil-engineering-magazine/issues/magazine-issue/article/2022/01/how-to-make-infrastructure-more-resilient-against-climate-change> [<https://perma.cc/DY3H-P8KY>].

47. *Id.*

of any party of the agreement.⁴⁸ Benefits of hardened systems should be extended to all local citizens, not just trade-related industries, and the managers of infrastructure projects should take care to hire medium and small enterprises, and women-owned enterprises, when possible.⁴⁹

IV. NEGOTIATORS CAN USE A FRAMEWORK TO ANALYZE THE CLIMATE CHANGE READINESS OF REGIONAL TRADE AGREEMENTS

Created from the recommendations presented in the previous section, the following framework will allow for interested parties to better understand how climate-ready a regional trade agreement may be. By looking closely at emergency protocols, technology transfer, technical barriers to trade, and infrastructure resiliency provisions, the framework will help identify preparation gaps, with the goal of addressing gaps in an equitable and meaningful manner.

A. FRAMEWORK PROPOSAL AND METHODOLOGY

This framework (Appendix A) is intended to be used to evaluate a single regional trade agreement. The framework works like a rubric and uses a criterion-reference method to generate a score.⁵⁰ Subcategories and criterion were based off of the recommendations identified in Section III. To use the framework, a user should first refer to the series of questions on the far left. The second column lists possible answers, and corresponding points to be awarded based on the answer chosen. The matrix to the right shows the distribution of the potential points. After a user fills out the table, they should sum the total points across and down each column and row. These subtotals can then be plugged into the scoring matrix (Appendix B) to determine subsection and total scores. By examining weak subsection scores and questions where an agreement did not earn points, users of the framework will be able to better understand where additional or different, language may be beneficial to equitable climate change preparedness.⁵¹

48. Although harmonization of labor standards in trade agreements is sometimes considered a protectionist measure that hurts less-developed countries, a 2021 study found that may not be the case. Céline Carrère, Marcelo Olarreaga, and Damian Raess, *Labor clauses in trade agreements: Hidden protectionism?*, 17 *Rev. Int'l Orgs.* 453, 479 (2022), <https://doi.org/10.1007/s11558-021-09423-3> (“low-income countries with weaker labor standards should not fear the introduction of LCs as a protectionist tool in PTAs as they help rather than hinder their market access to high-income countries”).

49. In the United States, the U.S. Small Business Administration provides programming support to help small and women-owned businesses win federal contracts. Similar programs could be used to meet hiring goals for regional infrastructure projects. *Contracting Assistance Programs*, U.S. SMALL BUILDING ADMINISTRATION, <https://www.sba.gov/federal-contracting/contracting-assistance-programs> [<https://perma.cc/CKE8-JSHW>].

50. See generally *Grading Methods*, CENTRAL MICHIGAN UNIVERSITY, <https://www.cmich.edu/offices-departments/curriculum-instructional-support/explore-teaching-and-learning/design-an-effective-course/assessment-and-evaluation/grading-methods> [<https://perma.cc/2H27-M76S>].

51. The current version of this framework does not weight subsections by importance, which may be a useful addition in the future.

B. APPLYING THE FRAMEWORK

Low-scoring sections can help negotiators identify gaps that, if filled, would make the operation of a trade agreement, and thus trade itself, more resilient in the face of a climate emergency. This section of the paper discusses the findings from the application of the framework to the United States-Mexico-Canada Agreement (USMCA) and the African Continental Free Trade Area (AfCFTA) agreement.⁵²

1. USMCA

The USMCA scored a 60%, or a D-, using the proposed framework. (Appendix C). While the agreement does return strong results for technology transfer, equity and inclusion, and technical barriers to trade subcategories, it was weak in infrastructure and emergency preparation. To better prepare the USMCA for climate change, negotiators should consider amending the USMCA to include emergency provisions that extend beyond force majeure allowances to restrict agricultural trade, acknowledge climate change, and institute regional infrastructure hardening measures that go beyond telecommunication system cooperation.

2. AfCFTA

The AfCFTA scored a 47%, or an F, using the proposed framework. (Appendix D). It scored very strongly in the technical barriers to trade subcategory, but its overall score was significantly weakened by its failure to deal with technology transfer, intellectual property provisions, and infrastructure. The emergency preparation score was moderate, mainly due to articles fifteen, twenty-six, and twenty-seven. However, the agreement fails to define an emergency, and creates a potentially cumbersome process for disaster-stricken parties to apply for a waiver of obligations.⁵³ To better prepare the AfCFTA for climate change, appropriate amendments may include incorporating intellectual property and technology transfer provisions, specifically in the fields of agriculture and clean technology, and incorporating language to increase the resiliency of regional infrastructure. To promote equity and inclusion, negotiators should provide opportunities for medium and small enterprises in infrastructure work, include a provision regarding labor and safety standards, define qualifying emergencies in a broad manner, and incorporate compulsory licensing provisions, either through TRIPS or through a stand-alone intellectual property agreement.

52. *United States- Mexico- Canada Agreement*, OFF. OF THE U.S. TRADE REPRESENTATIVE, <https://ustr.gov/trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between> [<https://perma.cc/QB6D-MWLZ>] [hereinafter USMCA]; AfCFTA, *see also AfCFTA*, *supra* note 30.

53. AfCFTA, *supra* note 30, art. 15, 26, and 27.

CONCLUSION

There is no silver-bullet solution to prepare regional trade agreements for the impacts of climate change. Although current predictions of climate change impacts point toward disruptions in the production and transportation segments of global value chains, stakeholders must stay vigilant, and adapt to challenges as they come. Negotiators can get ahead of the game by adding or amending provisions to agreements that set up emergency protocols, encourage technology transfer, lower technical barriers to trade, and harden regional infrastructure. By using the proposed framework, negotiators can quickly identify both where there may be gaps, and where there may be opportunities to make agreements more equitable and inclusive.

V. APPENDIX A: FRAMEWORK TO ANALYZE THE CLIMATE CHANGE READINESS OF A REGIONAL TRADE AGREEMENT

Questions	Possible Answers & Points	Emergency Preparation	Technology Transfer	TBTs	Infrastructure	Equity and Inclusion	General	Total Possible Points Per Question
Are there more than two parties to the agreement?	No (0)						1	1
	Yes (1)							
GENERAL								
Does the preamble address climate change or the environment?	Neither (0)						2	2
	One (1)							
	Both (2)							
Does the preamble address infrastructure?	No (0)				1		1	1
	Yes (1)							
Is there an environmental provision?	None (0)						1	1
	One or more (1)							
Are any of the environmental provisions considered "deep"?	No (0)						1	1
	Yes (1)							
Is there a climate change provision?	None (0)						1	1
	One or more (1)							
Are any of the climate change provisions considered "deep"?	No (0)						1	1
	Yes (1)							
EMERGENCY PREPARATION								
Is there an emergency provision?	No (0)	1						1
	Yes (1)							
Does the emergency provision specifically address climate emergencies?	No (0)	1						1
	Yes (1)							
Are emergencies defined? If so, in a broad manner or a narrow manner?	No (0)	1				1		2
	Yes, Narrow (1 EP)							
	Yes, Broad (1 EP, 1 EI)							
Do emergency protocols extend time to meet obligations?	No (0)	1						1
	Yes (1)							
Do emergency protocols negate sanctions?	No (0)	1						1
	Yes (1)							
Are there separate carve-outs for agricultural protocols in the case of an emergency?	None (0)	1						1
	One or more (1)							

Questions	Possible Answers & Points	Emergency Preparation	Technology Transfer	TBTs	Infrastructure	Equity and Inclusion	General	Total Possible Points Per Question
TECHNICAL BARRIERS TO TRADE								
Does the agreement address TBTs?	No (0) Yes (1)			1				1
Does the agreement incorporate the WTO TBT Agreement?	No (0) Yes (1)			1				1
Does the agreement reduce or significantly limit tariffs?	No (0) Yes, but discriminatorily (1) Yes, non-discriminatorily (2)			2				2
Does the agreement get rid of tariffs?	No (0) Yes, but discriminatorily (1) Yes, non-discriminatorily (2)			2				2
Does the agreement specifically address MSMEs in regard to TBTs?	No (0) Yes (1)					1		1
Are TBTs reduced only in emergencies, or always?	Never (0) Emergencies (1 EP) Always (1 EP, 1 TBT)	1		1				2
Does the agreement harmonize product regulations?	No (0) Yes (1)			1				1
TECHNOLOGY TRANSFER								
Is there a technology transfer provision?	None (0) One or more (1)		1					1
Does the agreement emphasize seed and fertilizer technology transfer?	No (0) Yes (1)		1					1
Does the agreement emphasize clean tech technology transfer?	No (0) Yes (1)		1					1
Does the agreement include TRIPS+ provisions?	No (0) Yes (1)		1					1

Questions	Possible Answers & Points	Emergency Preparation	Technology Transfer	TBTs	Infrastructure	Equity and Inclusion	General	Total Possible Points Per Question
Does the agreement restrict compulsory licensing?	No (1)					-1, 1		1
	Yes (-1)							
Does the agreement promote technology-related information sharing and transparency between parties?	No (0)		1					1
	Yes (1)							
Does the agreement create a way to fast-track patents?	No (0)		1					1
	Yes (1)							
INFRASTRUCTURE								
Do any provisions cover infrastructure reinforcement?	None (0)				1			1
	One or more (1)							
If so, are any infrastructure provisions "deep"?	No (0)				1			1
	Yes (1)							
Does the agreement provide infrastructure hardening opportunities to MSMEs and/or woman owned businesses?	No (0)					1		1
	Yes (1)							
Does the agreement harmonize labor standards to the safest guidelines?	No (0)					1		1
	Yes (1)							
OVERALL TOTAL POSSIBLE POINTS		7	6	8	3	5	7	36

VI. APPENDIX B: SCORING RUBRIC BASED ON FRAMEWORK

Category	Points Scored (User to input)	Total Points Possible	Score (Divide points scored column by points possible and multiply by 100)
Emergency Preparation		7	%
Technology Transfer		6	%
TBTs		8	%
Infrastructure		3	%
Equity and Inclusion		5	%
General		7	N/A – “general” is not a subcategory, and is instead used to sum uncategorized questions so that they factor into the overall score.
TOTAL		36	Total scores should be interpreted on a grade- scale, as follows: A: 90 – 100% B: 80 – 89% C: 70 – 79% D: 60 – 69% F: 0 – 59%

VII. APPENDIX C: APPLICATION OF PROPOSED FRAMEWORK TO THE USMCA

Category	Points Scored	Total Points Possible	Score
Emergency Preparation	2	7	29%
Technology Transfer	5	6	83%
TBTs	6	8	75%
Infrastructure	1	3	33%
Equity and Inclusion	4	5	80%
General	3.5	7	N/A
TOTAL % SCORE	21.5	36	60%
SCORE			D

VIII. APPENDIX D: APPLICATION OF PROPOSED FRAMEWORK TO THE AfCFTA

Category	Points Scored	Total Points Possible	Score
Emergency Preparation	5	7	71%
Technology Transfer	0	6	0%
TBTs	8	8	100%
Infrastructure	1	3	33%
Equity and Inclusion	1	5	20%
General	2	7	N/A
TOTAL % SCORE	17	36	47%
SCORE			F