International Trade Centre

GENEVA GRADUATE INSTITUTE

INSTITUT DE HAUTES ÉTUDES INTERNATIONALES ET DU DÉVELOPPEMENT

GRADUATE INSTITUTE OF INTERNATIONAL AND DEVELOPMENT STUDIES

Climate Neutrality at Borders:

Mitigating Environmental Externalities of Cross-Border Activities

June 2024

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List of Abbreviations

AAC	Autoclaved Aerated Concrete
ARP	Applied Research Project
ASYCUDA	Togo Automated System for Customs Data
CBD	Convention on Biological Diversity
CEB	Communauté Electrique du Bénin
CET	Common External Tariff
CGI	Green Customs Initiative
ECG	Electricity Company Ghana
ECOWAS	Economic Community of West African States
EDI	Electronic Data Interchange
ETLS	ECOWAS Trade Liberalisation Scheme
EU	European Union
E-Waste	Electronic Waste
EWS	Early Warning Systems
FDA	Food and Drugs Authority
GBCI	Green Business Certification Institute
GHG emissions	Greenhouse gas emissions
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRA	Ghana Revenue Authority
GRIHA	Green Rating for Integrated Habitat Assessment
GSA	Ghana Standards Authority
GTC	Global Trade Consultant Ghana
IAQ	Air quality index
ICUMS	Ghana's Integrated Customs Management System
IDF	Import Declaration Form
IEA	International Energy Agency
IEQ	Indoor Environment Quality
IHEID	Institut de hautes études internationales et du développement
IOM	International Organisation for Migration
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change

IPPC	International Plant Protection Convention
ISO	International Organisation for Standardisation
ISWA	International Solid Waste Association
ITC	International Trade Centre
ITRSP	Informal Trade Regulatory Support Programme
kWh	kilowatt/hour
LBSAPs	City Biodiversity Index and Local Biodiversity Strategies and Action Plans
LCA	Life cycle assessment
LEED	Leadership in Energy and Environmental Design
MEAs	Multilateral Environmental Agreements
PEFC	Programme for the Endorsement of Forest Certification
PoE	Point of Entry
PPE	Personal Protective Equipment
PV	Solar photovoltaic
SDGs	Sustainable Development Goals
SMEs	Small and medium-sized enterprises
SREP	Scaling-Up Renewable Energy Programme
TAGG	Traders Advocacy Group Ghana
TERI	The Energy and Resources Institute
TIN	Taxpayer Identification Number
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
URDPFI	Urban and Regional Development Plans Formulation and Implementation
WACTAF	West African Association for Cross-Border Trade in Agroforestry-pastoral, fisheries products and Food
WAGS	West African Grid System
WHO	World Health Organisation
WorldGBC	World Green Building Council
WRI	World Resources Institute
WtE	Waste-to-Energy
WTO	World Trade Organisation

Executive Summary

This report, on "Climate Neutrality. at Borders: Mitigating Environmental Externalities of Cross-Border Activities", explores the environmental challenges associated with cross-border trade at the Aflao-Lomé border ecosystem between Ghana and Togo, with a particular focus on Ghana. The study emphasises the crucial role of infrastructure and sustainability in facilitating trade within the Economic Community Of West African States (ECOWAS) region. The Aflao-Lomé border is a pivotal point for trade between Ghana and its neighbouring countries; however, the environmental impact of cross-border activities at this juncture is significant and concerning. Through a meticulous process of desk review and interviews, our research has uncovered critical findings that underscore the importance of promoting climate neutrality and environmental stewardship.

The report identifies key concepts such as infrastructure and green buildings, waste management, resources, and green cover and biodiversity as critical areas for evaluating environmental impacts at borders. By mapping out these key research areas, the report sets the stage for a comprehensive analysis of the environmental externalities generated at the Aflao-Lomé border and their implications for sustainable trade practices.

The report highlights several key findings that underscore the need for significant improvements. Firstly, the current infrastructure and sustainable practices are inadequate to support the growing demands of cross-border trade. There is a noticeable lack of proper storage facilities for perishable goods across the border, often leading to increased spoilage and waste. Effective waste management strategies are also urgently required, as the rampant dumping of waste poses significant threats to the ecosystem, leading to severe environmental and health hazards.

Streamlining clearance procedures and enhancing digital platforms is essential to reduce the high reliance on paper for cross-border documentation, which not only delays processes but also increases environmental impact. Furthermore, the existing facilities do not meet the needs of traders, leading to inefficiencies and increased operational costs. The enforcement of existing regulations is inefficient, necessitating more robust government involvement to ensure compliance and promote sustainable practices.

To address these critical issues, the report recommends substantial investment in infrastructure development, including commercial parking facilities and storage solutions for perishable goods, to reduce spoilage and enhance trade efficiency. Comprehensive waste management strategies

must be implemented to prevent environmental degradation and protect public health. Enhancing digital platforms to streamline clearance procedures will reduce the reliance on paper and improve operational efficiency. Finally, increased government oversight and enforcement of environmental regulations are essential to ensure compliance and foster a sustainable trade environment. By adopting climate-neutral practices at borders, the report underscores the importance of mitigating the environmental impact of cross-border trade activities, which will not only protect the ecosystem but also enhance trade efficiency and economic growth within the ECOWAS region.

Table 1: Policy Recommendations at a Glance

Policy Recommendations at a Glance	
Infrastructure & Green Buildings	Significant improvement of infrastructure and buildings at border crossing needed. Focus on retrofitting existing infrastructure and provide financial incentives for greening buildings.
Resources	Streamline clearance procedures, enhance digital platforms with technology assistance desks, and establish a bilateral agreement for document acknowledgment.
Waste Management	Implement comprehensive waste management policies and invest in proper infrastructure. Encourage a circular economy and consider public health impacts.
Green Cover & Biodiversity	Address economic drivers of deforestation and incorporate sustainability criteria in trade agreements.
Capacity building	Train customs officials on sustainable trade practices.
Stakeholder Engagement	Create feedback channels (online forms, complaint boxes, hotlines) and conduct regular consultations to include community and trader insights in decision-making.
Cross-Border Cooperation	Enhance coordination through joint meetings and workshops.
Incentive Programs	Promote sustainable practices with trader recognition and public engagement initiatives.
Sustainable Trade Advocacy	Adopt practical narratives to motivate stakeholders.
Anti-Corruption Measures	Establish inspection systems and improve incentives for customs officials.
Funding Mechanisms	Advocate for increased government spending on greening trade at the border environment and mobile private sector investment in environmental practices.
Governmental Advocacy	Advocate at the governmental level for more sustainable practices and support in implementation.

1 Introduction

The United Nations' Sustainable Development Goals (SDGs), established in 2015, advocate for collective efforts to foster a more sustainable future. Addressing a range of global challenges, including climate change, environmental degradation, and responsible consumption and production, the SDGs emphasise the integration of environmental considerations into various facts of economic development. Despite the crucial role of trade for economic development, trading activities occurring at borders can have adverse environmental effects, such as deforestation, or waste production among other issues. There is a pressing need to reform and incorporate sustainability measures at borders within trade facilitation and cross-border trade.

Sustainability refers to the practice of meeting the needs of the present without compromising the ability of future generations to meet their own needs (UN Brundtland Commission, 1987). It involves using resources in a way that preserves the environment, supports social well-being, and maintains economic viability for the long term. In the context of trading across borders, environmental sustainability and climate neutrality refer to the principles and practices applied to international trade that seek to promote environmental protection and the reduction of carbon emissions. This concept involves ensuring that trade activities that do not extensively contribute to adverse environmental impacts.

According to the World Trade Organisation (WTO), trade facilitation means "the simplification, modernisation, and harmonisation of export and import processes and the exchange of associated information flows" (Natasha, Lim, & Duval, 2021). It involves implementing measures that streamline border procedures and promoting convergence of standards to reduce paperwork and formalities. This not only holds the potential to decrease waiting times at borders but also to mitigate product losses, and costs of storage and refrigeration, ultimately contributing to a substantial improvement in the export capabilities of developing countries (WTO, 2015).

The research will focus on the question; "How can trade facilitation measures at borders be reformed and integrated with sustainability practices to mitigate the negative environmental externalities associated with cross-border trade."

This project directs its focus towards a comprehensive evaluation of the environmental externalities generated within the border as an ecosystem. This will be studied through a case study of the Aflao border between Ghana and Togo.

The primary objective is to provide policy recommendations and possible trade facilitation methods that enhance the environmental sustainability of cross-border trade in the West African context. By addressing the environmental challenges associated with trade activities at borders, the aim is to contribute to the broader goal of achieving sustainable development outlined in the SDGs.

The findings from the academic research and interviews are summarised and analysed in this report with a case study as the focal point of analysis along with theoretical concepts served as the basis for analysis. The report has been structured into six chapters.

Chapter 1 introduces the research question and gives an overview of the objectives. Chapter 2 details the key concepts that were arrived at after mapping the whole picture based on the literature review, the research discovers research gaps where existing literature less covers. Chapter 3 details the research design, encompassing the data collection and data analysis methods used. Chapter 4 delves into the findings gleaned from expert interviews and literature for the chosen case study. Chapter 5 consists of policy recommendations proposing potential that could serve as valuable tools for sustainable transitions and/reforms, but not limited to. Chapter 6 is the concluding chapter, summarising the key findings of the research project.

2 Key Concepts

Recent years have witnessed unprecedented highs in greenhouse gas emissions (GHG emissions), coupled with rapid acceleration of climate impacts. The Emissions Gap Report 2023 titled "Broken Record – Temperatures hit new highs, yet world fails to cut emissions (again)" demonstrated that current national pledges on emissions reductions fall woefully short. Under these pledges, global warming is projected to reach 2.5-2.9° C this century, far exceeding the Paris Agreement's target of limiting warming to well below 2° C, preferably 1.5° C. To achieve the 1.5° C target, a dramatic reduction of 42% in greenhouse gas emissions by 2030 is necessary (UNEP, 2023a).

While borders play an important role in contributing towards climate change, borders are also adversely affected by the changing climate. According to "The Special Report on Global Warming of 1.5 °C" by the Intergovernmental Panel on Climate Change (IPCC), the integration of adaptation and mitigation strategies in climate action presents an opportunity for twofold benefits across sectors (IPCC, 2018). For instance, sustainable land management practices can simultaneously reduce GHG emissions and mitigate disaster risk. Borders, in addition to efficient trade flow, are increasingly tackling challenges like carbon emissions, paper usage, waste management, pollution, risk management and more.

The Green Customs Initiative (CGI) is a collaborative mechanism set up by international organisations such as United Nations Environment Programme (UNEP) and Basel Convention to help border control officers build capacity in preventing illegal environmentally sensitive commodity trading. The Green Customs Guide (UNEP, 2022) regulates the workflow in inspecting, sorting, storing, reporting, and disposing of suspicious items. This guidance develops instructions based on the health and safety of customs officers, as well as compliance under the multilateral environmental agreement (MEA). It provides border control officers with an overall framework and assessment indicators in each cross-border inspection process. However, it remains limited in that it only focuses on the commodity but does not touch upon the cross-border operation procedure.

Therefore, our research focuses towards a comprehensive evaluation of the environmental externalities generated within the border as an ecosystem. Existing frameworks and indicators used to measure sustainability and climate neutrality involve various international agreements, protocols, and standards were studied (GIZ, n.d.; Sustainable Building Certifications - World Green Building Council, 2023; World Bank,

2022; GRI - Topic Standard for Waste, n.d.; UNFSS, 2022; Cities and Nature: Planning for the Future | UN-Habitat, n.d.; ICLEI, 2023; WRI, 2021; TERI, 2023). A framework was developed with an extensive list of indicators to measure sustainability and climate neutrality such as infrastructure and green building, GHG emissions, pollution, supply chain, waste management, resources, green cover and biodiversity, etc. (refer to Annex 1). Out of which, four main indicators are studied in detail in this case study and analysis. Each index comprises various parameters.

These indicators serve as guidance and metrics to track the border's performance. with respect to sustainability and climate neutrality. The indicators capture both mitigation and adaptation aspects.

This paper aims to empirically demonstrate the current performance of the border ecosystem in our chosen case study by focusing on the following indicators:

i. Infrastructure and Green Building
ii. Waste management
iii. Resources
iv. Green cover and biodiversity

Figure 1: Key indices for measuring sustainability and climate neutrality (Research Team, 2024)

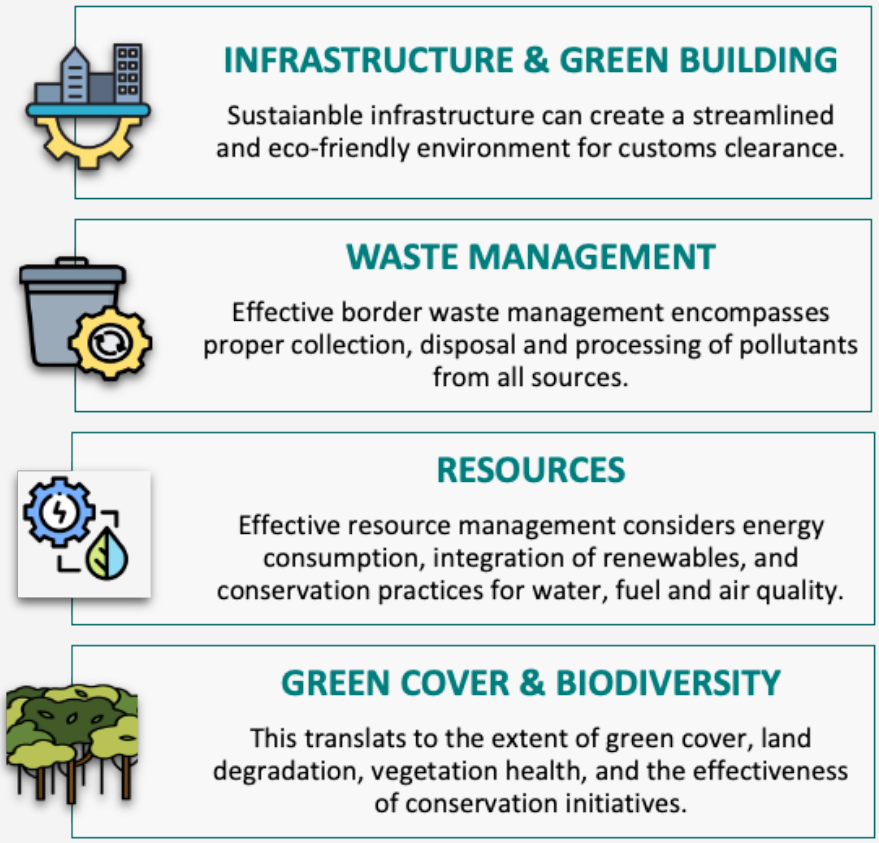


Figure 2: Overview of the key concepts (Research Team, 2024)

Table 2: SDGs fulfilled by the indicators (THE 17 GOALS | Sustainable Development; n.d.)

Key concept	SDGs addressed
Infrastructure and Green Building	SDG 9: : Industry, Innovation and Infrastructure; SDG 13: Climate Action
Waste management	SDG 12: Responsible Consumption and Production includes environmentally sound management of all waste through prevention, reduction, recycling, and reuse (targets 12.4 and 12.5) and reduction of food waste (target 12.3); SDG 13: Climate Action
Resources	SDG 12: Responsible Consumption and Production; SDG 7: Affordable and Clean Energy; SDG 13: Climate Action
Green cover and biodiversity	SDG 11, SDG 15: 15: Life on Land

INDICATOR 1

Infrastructure and Green Buildings

Human induced-climate change has accumulated with the net GHG emissions over the last century. These emissions primarily stem from five key activities: energy consumption, land-use and land-use change, established patterns of consumption, and associated production practices (IPCC, 2023). In the domain of life cycle assessment (LCAs), the construction industry stands out as a key contributor to environmental burdens impacting housing, transportation, and food as significant environmental impact areas (Ghana Green Building Summit, 2020). Accounting for 37% of global emissions (UNEP, 2023b), this sector presents a crucial opportunity for mitigation efforts. International trade hinges upon the presence of robust infrastructure. The physical infrastructure includes transportation systems (e.g., ports, roads), storage facilities, and dedicated buildings. Well-developed physical infrastructure facilitates the movement and storage of goods essential for trade activities. Conversely, underdeveloped or poor-quality infrastructure can significantly impede trade flows. Increased transportation costs and extended delivery times, direct consequences of inadequate infrastructure, act as major barriers to economic growth (UNCTAD, 2016).

By prioritising sustainability in border infrastructure development and management, nations can contribute to more resilient and equitable global supply chains. “Green buildings” offer a holistic approach to reducing the built environment’s impact on climate change. Green buildings enhance both individual and community resilience by tackling interrelated aspects of sustainability within the built environment. The World Green Building Council (WorldGBC) defines a green building as “a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impacts, on our climate and natural environment. Green buildings preserve precious natural resources and improve our quality of life” (What Is a Sustainable Built Environment? - World Green Building Council, 2023). This trend reflects a broader shift towards sustainable, energy-efficient, and non-toxic construction practices across the entire building life cycle, encompassing material procurement, design, operation, and demolition. Consequently, sustainable border infrastructure can minimise environmental impact while strengthening supply chains (ibid.).

Several standardised frameworks and rating

systems exist for construction of green buildings. These frameworks include, but are not limited to the Leadership in Energy and Environmental Design (LEED) by the Green Business Certification Institute (GBCI), Green Rating for Integrated Habitat Assessment (GRIHA). Additionally, the WorldGBC plays a crucial role in promoting sustainable infrastructure. The relevant indicators within these frameworks typically evaluate cities based on their current and future plans regarding adoption of green building practices. The indicators within the 'Infrastructure and Green Buildings' category strive to encompass several of the aforementioned objectives concerning border infrastructure sustainability. They cover a broad spectrum of factors crucial for sustainable development in border areas. These include considerations such as building materials, which focus on their environmental impact, durability, and energy efficiency. Efforts are also made to minimise water consumption and improve energy efficiency across border facilities. Indoor Environment Quality (IEQ) is another important aspect, evaluating factors such as indoor air quality (IAQ), thermal comfort, lighting, and noise levels within buildings (GRIHA, 2017).

Regarding storage management, the framework includes parameters like maintaining safe temperature levels for perishable goods storage, ensuring appropriate flooring for hygiene and safety, and implementing effective pest control measures during goods movement (WTO, 2015). The framework also stresses the importance of training staff in proper handling procedures and providing them with necessary equipment to ensure efficient customs clearance and minimize delays (U.S. Green Building Council, n.d.).

Social inclusivity is also emphasised as a critical component of sustainability. This involves assessing features such as ramps, accessible restrooms, and clear signage to facilitate ease of access for all users (World Bank, 2022).

Each of these parameters further consist of indicators. For instance, ‘Sustainable Material Procurement, Design, Operation, and Demolition’ looks at the whole Life Cycle of buildings from sustainable materials used for design and operations to demolition of buildings done in a reduced environmental impact (Cordis, 2014). Low-to-zero-GHG intensity production processes for basic materials like primary metals, building materials and chemicals remain in the pilot or near-commercial stages. Another example is ‘Energy Efficiency’ which includes widespread adoption of LED lighting, evaporative cooling, indirect radiant cooling, and shading on the windows (Energy Efficiency in Buildings | UNECE, n.d.).

Integrated design principles applied to both new construction and building retrofits have yielded a growing number of structures achieving zero energy or zero carbon

footprints. These advancements can not only enhance energy efficiency but also promote the adoption of various low-emission technologies, including decentralised renewable energy sources. Furthermore, such advancements can create new economic opportunities (IPCC, 2023).

Table 3: Infrastructure and Green Buildings

Infrastructure and Green Buildings		
Parameters	**Categories**	**Indicators**
Green buildings	Sustainable material procurement, design, operation, and demolition	Example of sustainable materials: Autoclaved Aerated Concrete (AAC) blocks (lightweight blocks, are standardised, precast bricks that combine sand, cement, lime, water, and an expansion agent, good for the environment), mould resistant, wood, bamboo, recycled steel
	Energy efficiency	Evaporative cooling, indirect radiant cooling, shading on the windows, energy efficient lighting (LED, sodium vapour lamps, etc.)
	Water conservation	Assess if the site is on the course to use water to also meet future water demands (e.g. wastewater recycle and reuse, flood/ water stagnation risk management like end-to-end Early Warning Systems (EWS), energy-efficient water supply system like the type of pumps/equipment)

Green buildings	Indoor Environment Quality (IEQ)	Air quality, but access to daylight and views (through open windows as external shades or overhangs blocks sunlight), Reflective paint (bounces direct sunlight off the walls and roof to keep the house cooler), and occupant control over lighting and thermal comfort, appropriate acoustic design
	Accessibility	Social inclusion on site (low-slope ramps, accessible parking, accessible restrooms, signage, etc.)
Storage (specifically for perishable goods)	Safe temperature (in both transportation and storage)	The perishable food that needs storing in exactly specified temperature can be made up of several groups. The grouping of foods is meat and marine products, dairy products, fruits and vegetables, and also ice cream and confectionery. Generally, chilled stores maintain products at temperatures between -1 and 12 °C, whereas frozen stores generally maintain products at temperatures below -18 °C (UN Environment and IIR 2018)
	Appropriate flooring	Epoxy, concrete flooring with sealant
	Pest control	Hermetic or sealed storage (maybe dusting, fumigation, spraying), cleaning and disinfection
	Movement of good in the shortest possible time)	Time-take for: Preparation time (before arrival at customs). Arrival at customs and documentation review. Inspection and examination, Clearance and release
	Staff Training	With necessary equipment and/or infrastructure for the same, conduct random examination of goods

INDICATOR 2

Waste Management

The increase in volume and complexity of waste over the years poses a significant threat to both ecosystems and human health. Globally, an estimated 11.2 billion tonnes of solid waste are collected annually, with the decomposition of organic waste contributing roughly 5% of global greenhouse gas emissions. Inadequate waste management practices, encompassing the complete absence of collection systems to ineffective disposal methods, are also the primary cause of air, water, and soil contamination (UNEP, 2023). The need to reduce our reliance on plastic production and improve plastic waste management is a global issue and one that connects to the efforts to mitigate climate change, stop biodiversity loss, and curb pollution (Urban Shift, 2023). To tackle the plastic pollution crisis, experts say the world needs to overhaul the linear economic model that governs plastics and that perpetuates a throwaway culture.

Within the context of border management, waste management is a significant environmental concern, especially excessive paper utilisation associated with customs procedures.

Beyond paper, other sources of waste include packaging material employed for transporting goods, ranging from cardboard boxes to plastic wrapping. Additionally, construction and demolition projects undertaken to maintain or expand border infrastructure create their own waste streams. Furthermore, specific categories of waste require specialised handling due to their potential health or environmental risks. Examples include hazardous materials (batteries, electronics), medical waste, and sanitary waste generated by restrooms. Perishable goods lead to significant qualities of organic waste due to wastage during transportation or customs procedures.

Effective cross-border waste management systems necessitate not only formal institutional frameworks but also a clear allocation of responsibilities among various entities and individuals. This emphasis on shared responsibility is crucial, as efficient waste management safeguards not only the environment but also public health. The Basel Convention serves as a cornerstone international treaty governing the transboundary movement of hazardous wastes. This regulatory framework acknowledges the detrimental impacts these wastes can have on both human health and

the environment (Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, n.d.).

The waste management indicator of our study is aligned with the Basel Convention (Basel Convention on the Control of Transboundary Movements of Hazardous Wastes, n.d.) as well as refers to ISO 9001, ISO 14001, AND ISO 45001 standards (Henshaw, 2022) for standards for waste management. This indicator is broadly divided into two parameters, namely waste collection, and waste disposal/processing. Firstly, the waste collection parameter captures sufficiently strategically placed litter bins with appropriate design and capacity for different waste types (e.g., separate bins for recyclables with covers to minimise windblown litter) are essential. It also includes waste reduction strategies, including regulations limiting excessive packaging and promoting reusable alternatives. Some alternative strategies include dry waste processing facilities and the quantity of dry waste processed Material Recovery Facilities, Refuse Derived Fuel or Waste to Energy plants (Chavando et al., 2022).

Secondly, the waste disposal/processing parameter includes the accessibility and operational status of appropriate landfill or dump facilities. Ideally, operational disposal facilities with sufficient capacity should be located within a reasonable distance to minimise transportation costs and environmental impacts associated with long-haul waste movement. Inadequate management of landfills present a significant environmental concern due to the potential generation of two key emissions: leachate and landfill gas. Adequate transportation options for moving waste are also important (ISWA, 2016).

Finally, worker safety requires providing waste collection workers with proper Personal Protective Equipment (PPE) and safety training to minimise health risks associated with waste handling (EU-OSHA, n.d.). By comprehensively evaluating these parameters, border authorities can gain valuable insights into their waste management system, identify areas for improvement, and implement targeted strategies to achieve more sustainable waste management practices.

The global waste crisis demands a multifaceted response from border authorities. A crucial approach lies in embracing the principles of a circular economy, which prioritises extending product lifespans, resource recovery, and waste reduction. By integrating these concepts into border management practices, authorities can significantly combat the environmental and economic burdens of waste. This can be achieved through improved communication between border agencies and importers/exporters, encouraging sustainable packaging materials, promoting reusable alternatives, and potentially implementing regulations to limit unnecessary goods. By adopting these practices, border authorities

can respond to the global concerns of waste management and safeguard the environment, economy and public health (GRI, n.d.).

Table 4: Waste Management

Waste Management		
Parameters	**Categories**	**Indicators**
Waste Collection	Regular Cleaning	Presence of litter bins
	Waste segregation	Sorting and separation of waste as dry waste, general waste, recyclables, organic waste, hazardous waste, and construction or demolition waste, e-waste
Waste disposal/ processing	Disposal facilities available and operational	Nearest dumpsite or micro dumps, appropriate transport available to take the waste to the dumpsite, alternative disposal practice
	Safety of collection workers	Personal protection equipment

INDICATOR 3

Resources

Climate variability and change is expected to impact availability of various sources like water, fuel, air quality, paper, etc. To ensure sustainable development at borders, this indicator encompasses a comprehensive assessment of resource consumption and conservation practices. This indicator delves into the key resource areas of concern at borders and explores strategies for efficient and sustainable usage of said resources.

Energy is consumed at all the operational stages at the border ranging from lighting, appliance use, cooling equipment which alone can contribute to the majority of the energy use in the ecosystem. Nearly all aspects of energy production, transportation, and consumption generate significant environmental impacts. These impacts manifest in various forms, including air pollution, climate change, water contamination, thermal pollution, and solid waste disposal (European Environment Agency, 2024). Firstly, monitoring total energy consumption (kWh) at the border is an indicator for providing an understanding of energy use patterns (GreenPower, n.d.). Adoption of energy efficient practices, such as regular energy audits, LED lighting, turning off equipment and light when not in use, can significantly improve energy use (UNEP, 2023a).

Secondly, integrating renewable energy has the potential to significantly reduce reliance on fossil fuels for electricity generation. Tracking the percentage of total electricity consumption met by solar photovoltaic (PV) systems allows for continuous monitoring of the effectiveness of solar integration (Lesperance, Wilna, et al, 2021). Other alternatives include biomass energy generated from organic waste (IEA, n.d.) or nearby hydro dams (Oxfam, n.d.). Evaluating the reduction in carbon emissions achieved through the use of these alternative renewable energy sources provides a valuable metric for assessing their environmental benefits.

While energy consumption is a crucial aspect of environmental sustainability at borders, a comprehensive approach necessitates the conservation of other critical resources as well. This includes water, air, soil, and fuel. Installing water-efficient fixtures and exploring rainwater harvesting techniques can significantly reduce water usage at the border (Jagdale et al., 2023). Regularly monitoring the Air Quality Index (AQI) provides quantitative data on air quality

levels at borders. This information is crucial for informing decision-making regarding potential air pollution mitigation strategies (Using Air Quality Index | AirNow.gov, n.d.). Strategies may include measures to reduce vehicle idling times, encouraging the use of cleaner-burning fuels for border patrol vehicles, and implementing dust suppression techniques during construction or maintenance activities. Monitoring soil erosion or contamination concerns provides valuable information on potential soil degradation risks associated with border activities (Sumudu Senanayake et al., 2024). Additionally, strategies to optimise fuel consumption across various operations can contribute significantly to fuel conservation efforts. This may include measures to reduce idling times for trucks during waiting periods. Additionally, promoting the use of more fuel-efficient vehicles for border patrols and exploring alternative fuels for backup generators can further reduce the environmental impact of border operations.

Lastly, transferring goods from both developed and developing countries often highlights the enormous amount of 'red tape' (WTO, Trade Facilitation, n.d.).

Cross-border trade requires a significant amount of paperwork, ranging from custom declarations, and product licences, to packing requirements. Any discrepancies and this voluminous set of documentation can lead to delays and disrupt the whole supply chain. Further, it serves as a significant hurdle for small to medium-sized enterprises (SMEs) to venture into cross-border trade. For the traders, it leads to greater savings from the expedited movement of goods. Making trade paperless also enables businesses to comply with regulations more efficiently. For the government, paperless trade improves transparency and traceability from real-time information and cooperation (IBM, n.d.). For example, adopting electronic exchange based on the standards set by the UN of SPS certificates for agriculture products makes the process easier (World Economic Forum, 2023).

Thus, by adopting multi-faceted resource management strategies, border authorities can ensure sustainable development. This commitment to environmental responsibility will not only contribute to streamlining sustainable actions but also enhance the long-term resilience and effectiveness of border security operations.

Table 5: Resources

Resources		
Themes	Parameters	Indicators
Energy consumption	Electricity consumption at the site	Total electricity consumption (in kWh) at the site for the past year/population at the site, Unit:= kWh per capita
	IndustrialEnergy Efficiency	Energy audit, reducing energy consumption (examples: LED lights, turning off equipments and lights when not in use, optimising appliances, etc.), optimising custom processes (to reduce energy use), life cycle assessment of products, resource consumption per unit of output
Renewable energy	Solar Energy	Solar panels installation, percentage of total electricity consumption met by solar PV, monitoring the installed capacity of renewable energy technologies
	Biomass	Energy generated from biomass (kWh), reduction in carbon emissions compared to fossil fuel alternatives
	Hydropower	Nearest hydro dam, electricity generated from it, percentage of electricity generated from hydropower (kWh)

Conservation of resources	Water conservation	Installation of water fixtures, rainwater harvesting
	Paper Usage	Paper documents in cross-border trade clearance procedure
	Fuel conservation	Transportation (during waiting period for trucks), optimising backup generator
	Air quality	Air Quality Index (AQI), clear visibility, odour and smell, wildlife behaviour, community reports
	Soil conservation	Visual inspection (soil colour, soil texture, surface cover and vegetation), land use history, local practices, community reports

INDICATOR 4

Green Cover and Biodiversity

This indicator emphasises the critical role fostering green cover and biodiversity plays in both mitigating and adapting to the adverse impacts of climate change. Green spaces, such as parks, forests, and wetlands, play a vital role in regulating urban climates. They act as carbon sinks, absorbing and storing atmospheric carbon dioxide, a key GHG (The International Forestry Review, 2014). This sequestration process helps to combat climate change by reducing overall CO2 levels. Moreover, the loss of biodiversity can also exacerbate the effects of climate change, as deforestation releases GHG and reduces the environment's ability to buffer and recover from extreme weather conditions. (UN Environment Programme WCMC, 2023). The World Health Organisation (WHO) recommends a minimum of 9 square metres of green space per capita in urban areas. International guidelines, like the Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines, 2014, further promote specific green cover targets (12-18%) within city boundaries (De La Barrera et al., 2023).

The depletion of biodiversity and the associated deforestayion resulting from cross-border activities represent significant environmental externalities. According to the United Nations Conference on Trade and Development (UNCTAD), there is a critical need to address the economic drivers contributing to biodiversity loss, acknowledging the global economy's reliance on natural resources. UNCTAD underscores that relying solely on conservation efforts is inadequate; instead, it emphasises the necessity for a shift towards sustainable economic practices. The organisation advocates for the incorporation of trade-related indicators into the new biodiversity agreement, underscoring the significance of ensuring sustainability across the entire value chain (UNCTAD, 2024).

The construction of border infrastructure, associated pollution generation, and resource depletion constitute a multifaceted environmental challenge that disrupts biodiversity within and surrounding borders. To comprehensively assess this impact, this indicator is divided into two key parameters: biodiversity and green cover. Firstly, for fostering biodiversity, protecting and expanding green cover is crucial. The landmark Rio Earth Summit of 1992 marked a pivotal moment in establishing international policy frameworks for biodiversity conservation. Following the

signing of the Convention on Biological Diversity (CBD) several institutional frameworks were established to implement strategies for local biodiversity conservation efforts (Secretariat of the Convention on Biological Diversity, n.d.). The Programme for the Endorsement of Forest Certification (PEFC) stands as a prominent global alliance encompassing various national forest certification systems. This certificate programme advocates for the promotion of sustainable forest management practices through independent, third-party certification processes (PEFC, n.d.).

Secondly, the green cover indicator is vital because safeguarding and enhancing green spaces is essential for promoting biodiversity. Several national and international policies and initiatives provide a framework for greening initiatives such as the CBD and its associated tools, like the City Biodiversity Index and Local Biodiversity Strategies and Action Plans (LBSAPs), provide guidance for self-assessment, planning, and implementation of biodiversity conservation efforts. Strategies for assessing the green cover associated with a border includes factors like the proportion of existing green cover within city boundaries, the quality of water bodies and open spaces, and the presence of management and maintenance plans for these areas (Institute for Global Environmental Strategies, 2021). Compliance with relevant national and international policies regarding biodiversity conservation and the establishment of institutional frameworks are also helpful.

By comprehensively evaluating and strategically expanding their green infrastructure, borders can become more resilient to the impacts of climate change while simultaneously enhancing the health and wellbeing of their residents.

Table 6: Green Cover and Biodiversity

Green Cover and Biodiversity		
Themes	Parameters	Indicators
Biodiversity	Species	Species of plants and animals observed (abundance and distribution of specific species), habitat alteration
	Ecosystems	Impact of air pollution, biodiversity loss, etc.
Green cover	Vegetation indices	Proportion of green cover, proportion of degraded land, vegetation indices, local reporting, conservation efforts and policies

Best Practices

Besides the above mentioned areas, some other practices were identified. Although they go beyond the scope of the indices, they can be noted for future policy recommendations.

Best practices:

1. Waste-to-energy (WtE): Generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source.

2. Leveraging data in decision-making: Some examples are Internet of Things (IOT) sensors and artificial intelligence in management systems, and tracking occupancy within buildings (for security and safety and cutting energy usage).

3. Benchmarking performance: One can only control what you measure hence benchmarking plays a crucial role and every facility manager should focus on benchmarking, using previous years' numbers, to be able to see upwards and downwards trends or even when trending flat. It is only when the facility manager employs the above that he will have opportunities to be able to improve efficiency, reduce wastage etc.

3 Methodology

The research methodology leading to this report includes (A) Case study of Aflao-Lomé border between Ghana and Togo: data collection methods include desk research and interviews with key stakeholders; (B) Qualitative analysis of the data collected in order to provide policy recommendations.

This research conducts a case study at the Aflao-Lomé border between Ghana and Togo. The rationale behind choosing this case study include: (1) The Aflao-Lomé border has been selected as a key border crossing point in the upcoming ITC project to scale up inclusive and sustainable trade facilitation in the ECOWAS region. (2) The Aflao-Lomé border is one of the busiest border crossing points in West Africa, and thus represents the cross-border trade situation in the region. (3) Considering the ITC's goal of gathering information on agricultural trade, Aflao-Lomé is an ideal location due to its substantial volume of agricultural products traded, including rice, onions, tomatoes, pineapples, corn, cassava, processed meat, and fertilisers. (4) With access to primary data, the Aflao-Lomé border is well-suited for this research, enabling the research team to engage directly with key stakeholders involved in cross-border trade, facilitated by the ITC, the project partner. Thus, choosing the Aflao border for this study provides essential background information to support ITC's trade facilitation efforts within ECOWAS.

3.1. Data Collection

The data collection for this case study involves a combination of desk research and expert interviews.

Desk research establishes the context of the Aflao-Lomé border, covering aspects such as geography, key features of the Ghanaian and Togolese economies, trade relations and policies between Ghana and Togo, customs clearance procedures in cross-border trade, and the situation of informal trade.

The interviews collect general background information and details about environmental practices at the Aflao-Lomé border, and seek insights from relevant stakeholders on strategies to promote environmentally friendly cross-border trade.

a. Sample design of the interview covers both public sector and private sector stakeholders. Planned public sector stakeholders included border/customs officials, ministries of trade/environmental/health and others, chamber of commerce and local mayor/governing bodies; while planned private stakeholders included trade associations, customs brokers, non-governmental organisations, and transporters etc. Please refer to Annex 2 for list of planned

interviewees.

b. Questionnaire is structured into six sections. Two versions of questionnaires were designed to cater to expertise of the public and private sectors. Throughout the entire questionnaire, both standard and open questions were included, for the purpose of comparability and openness. Section 1 contained general questions about the trade situation and environmental impact of trade at the Aflao-Lomé border. Section 2 focused on green infrastructure and buildings at the border. Section 3 probed into green clearance procedures of cross-border trade. Section 4 dealt with waste management challenges. Section 5 inquired about trade's impact on ecosystem and resources conservation. Section 6, as the concluding section, discussed the interviewee's insights and suggestions towards greener trade. Please refer to Annex 3 for the complete questionnaire.

c. Interview execution was facilitated by the research project partner, the ITC. After coordinating with stakeholders, the research team successfully conducted seven interviews: six from the private sector and one from the public sector. The key respondents were the Traders Advocacy Group Ghana (TAGG), an academic researcher specialising on trade (Samuel Bewiadzi), Global Trade Consultant Ghana (GTC), the Deutsche Gesellschaft für Internationale Zusammenarbeit Ghana (GIZ Ghana), the West Africa Association for Cross-Border Trade in Agroforestry-Pastoral, Fisheries Products and Food (WACTAF), Logistics Limited, and the Customs Division of Ghana Revenue Authority (GRA), Aflao border. The introduction for each interviewee is as described below:

Table 7: Introduction of Interviewees

Interviewee/Organisation	Brief Introduction
Traders Advocacy Group, Ghana (TAGG)	Traders Advocacy group Ghana (TAGG) is an association of traders in Ghana, providing a focus and forum for traders and consultants involved in trading across borders
Samuel Bewiadzi	Academic researcher and author of the paper Informal Trade Routes and Security along the Aflao-Lomé Border Region (Ghana-Togo) (2021)
Global Trade Consultant Ghana (GTC)	Global Trade Consult is a Ghanaian-based private consultancy firm supporting local and foreign organisations with business interests in Ghana
Deutsche Gesellschaft für Internationale Zusammenarbeit Ghana (GIZ Ghana)	GIZ is a German development organisation as well as a service provider in the field of international cooperation for sustainable development and international education work

West African Association for Cross-Border Trade in Agroforestry-pastoral, fisheries products and Food (WACTAF)	WACTAF aims to bring together private socio-professional organisations from agro-sylvo-pastoral and fishery value chains whose members carry out marketing activities of food or agro-sylvo-pastoral and fishery products in or between the countries of the Economic Community
Logistics Limited	Transportation company
Customs Division of Ghana Revenue Authority (GRA), Aflao border	Ghanaian Customs Authority at Aflao border

3.2. Data Analysis

The research adopts a qualitative approach in analysing the data collected from interviews. Interview data can be classified into descriptive statements, normative statements, and evaluative statements. During the analysis, the research aims to fit statements of interviewees into the logic chain of "background description – problem identification – solutions". The coding rule to analyse questions under each theme can be summarised as below:

Table 8: Data Analysis Categories and Analysis Rule

Categories	Forumulation Purpose	Coding Rule
General questions	Identifying the trade situation at the Aflao-Lomé border and interviewee's general opinion about trade's impact on environment	Descriptive statement's analysis of the Aflao-Lomé border and normative statements of interviewee's awareness of environmental issues in trade
Green infrastructure	Identifying border components and factors that affect the sustainable infrastructure building at the Aflao-Lomé border	Descriptive statements of border components and normative statements of sustainable building at the border

Green clearance procedures	Identifying the clearance efficiency	Descriptive statements of clearance release time and evaluative statements of existing improvement of clearance efficiency
Waste management	Identifying the sources of waste and management of waste	Descriptive statements of interviewee's observation of waste sources and evaluative statements of waste management methods
Ecosystem and Resources	Identifying resource consumption in border control	Descriptive and normative statements of paper/electricity use at the border and the evaluative statements of customs digitalisation
Towards green actions	Identifying current approaches of green trade and future policy recommendation	Descriptive statements of green action of interviewee's organisation and normative statements of interviewee's policy suggestion

3.3. Limitations

The response rate of the interviewees was low and disproportionate, with the research team receiving 1 response out of 4 invitations sent to the public sector and 6 out of 19 invitations sent to the private sector. The overall response rate is approximately 26%. This disproportionate representation between the public and private sectors may result in a lack of policy and administration perspective.

Additionally, interview results can be constrained by the experiences and subjective views of the key stakeholders.

Due to logistical constraints, the team could not conduct field research and relied solely on desk research and interviews. Consequently, the research findings should be interpreted critically. Moreover, the study selectively focused on four environmental externalities due to their measurable nature and the availability of data at the border.

4 Case Study: Aflao-Lomé Border Region (Ghana-Togo)

4.1 Context of Case Study:

Following an extensive literature review and desk research, gaps in existing research on the Aflao border between Ghana and Togo were identified. To address these gaps and gain deeper insights, remote interviews were conducted with key stakeholders. These interviews provided valuable insights into the broader implications of trade and its environmental impacts, as well as specific realities at the Aflao border. Additionally, they highlighted potential measures to improve the sustainability of trade across border crossings throughout West Africa.

4.2 Background to the Aflao Border

The Aflao-Lomé border region is a vital trading hub that supports local communities on both the Ghanaian and Togolese sides. Historically recognised as one of West Africa's busiest land crossings, the Aflao border logged approximately 76,000 arrivals and 37,000 departures in 2019 (IOM, 2022, p. 49). More recently, the Noepe Akanu joint border post has overtaken Aflao as the busiest crossing (GIZ, 2024; GRA, 2024). Established in 2018 with funding from the European Union (EU) and initiated by ECOWAS, Noepe Akanu operates as a modern one-stop border post.

The Aflao-Lomé border's presence and the thriving markets in Aflao and Lomé offer substantial economic benefits to local residents, supporting livelihoods through active participation in trade activities (Nugent, 2021). Daily, traders from Aflao and its surrounding areas cross the border to engage in commerce with their counterparts in Lomé (Bewiadzi, 2022). Key markets such as Denou and Tudu on the Ghanaian side, and Kodjoviakopé on the Togolese side, drive the frequent border crossings (TAGG, 2024; WACTAF, 2024; GIZ Ghana, 2024).

Figure 3: Aflao border crossing (Google Maps)

4.2.1 Trade Policy Framework at the Aflao-Lomé Border

Trade policies governing cross-border activities at the Aflao-Lomé border are shaped by key multilateral agreements, primarily under ECOWAS and the World Trade Organisation (WTO). Ghana adheres to the Common External Tariff (CET) established by ECOWAS, which standardised import tax rates among member states, ensuring consistency and predictability in trade transactions. Additionally, the ECOWAS Trade Liberalisation Scheme (ETLS) facilitates duty-free entry for goods among member states, crucial for fostering seamless trade flows at the Aflao border. However, challenges persist, notably due to inconsistent enforcement of ECOWAS regulations across member countries, which contributes to inefficiencies and compliance issues at border posts like Aflao (TAGG, 2024).

Furthermore, language barriers with predominantly French-speaking countries like Togo, and English-speaking countries like Ghana, complicate coordination efforts (TAGG, 2024; Logistics Limited, 2024).

Also, informal trade poses a significant challenge but is being addressed through the ECOWAS Regional Informal Trade Regulatory Support Programme (ITRSP) (WACTAF, 2024; TAGG, 2024; GTC, 2024). Estimated to constitute 40% to 80% of total trade volumes, informal trade significantly influences the border ecosystem at Aflao-Lomé (Bewiadzi, 2022). These informal trade routes often bypass formal border checks, impacting revenue collection and distorting official trade statistics. This practice not only poses economic challenges by reducing tariff revenues but also affects regulatory frameworks designed to ensure fair trade practices and environmental sustainability at the border (ibid.). Addressing these issues remains crucial for fostering a more regulated and sustainable trade environment at Aflao-Lomé, aligning with broader regional integration goals under ECOWAS and promoting economic stability across member states.

4.2.2 Trade Relations Across the Aflao Border

The relationship between Ghana and Togo is marked by significant bilateral trade, facilitated by their close geographical proximity and shared borders. However, the COVID-19 pandemic severely disrupted this trade, nearly bringing it to a standstill (TAGG, 2024; Bewiadzi, 2024; WACTAF, 2024). Despite this setback, trade between the two countries has generally experienced substantial growth over the past decade (TAGG, 2024; WACTAF, 2024; GTC, 2024; Bewiadzi, 2024).

A diverse array of products is traded at the Ghana-Togo border between Lomé and Aflao (Nugent, 2021).

1. Fish, Fruits, and Vegetables: Traders from both sides of the border engage in the exchange of fresh produce, including fish, fruits, and vegetables, reflecting the agricultural trade dynamics in the region. There are varying accounts regarding the volume of perishable goods traded. Some sources suggest a significant trade in perishables like tomatoes, onions, and carrots across Aflao (Logistics Limited, 2024), while others indicate minimal exchange (TAGG, 2024).

2. Textiles & Shoes: Textiles & Shoes: Dutch textiles, imported at competitive prices, are key commodities in cross-border trade, with Lomé serving as a primary hub for textile commerce in the sub-region. These goods are prominently traded at Ghana's Tudu Market (TAGG, 2024; WACTAF, 2024).

3. Medical Goods: The trade of medical goods is substantial, although specific quantities were not specified (Bewiadzi, 2024).

4. Cosmetics: Cosmetic products are also notable items traded at the border (Logistics Limited, 2024).

5. Electronics: Imported electronics and similar items are available at markets like Asigamé, attracting traders from various regions and countries (Logistics Limited, 2024; TAGG, 2024).

6. Soft Drinks and Alcoholic Beverages: Ghanaian soft drinks and specific brands of alcoholic bitters are exchanged between the two countries, reflecting distinct consumer preferences adapted to the international border. Due to lower prices in Togo, soft drinks, particularly Coca-Cola, are frequently traded across the border into Ghana (TAGG, 2024).

7. Petroleum Products: Petroleum products, notably cheaper in Ghana, drive clandestine trade routes towards Lomé. Zemidjan riders often purchase large quantities of petrol in Ghana and transport them to Lomé through unofficial channels (Bewiadzi, 2022; 2024).

4.3 Infrastructure and Green Buildings at Aflao Border

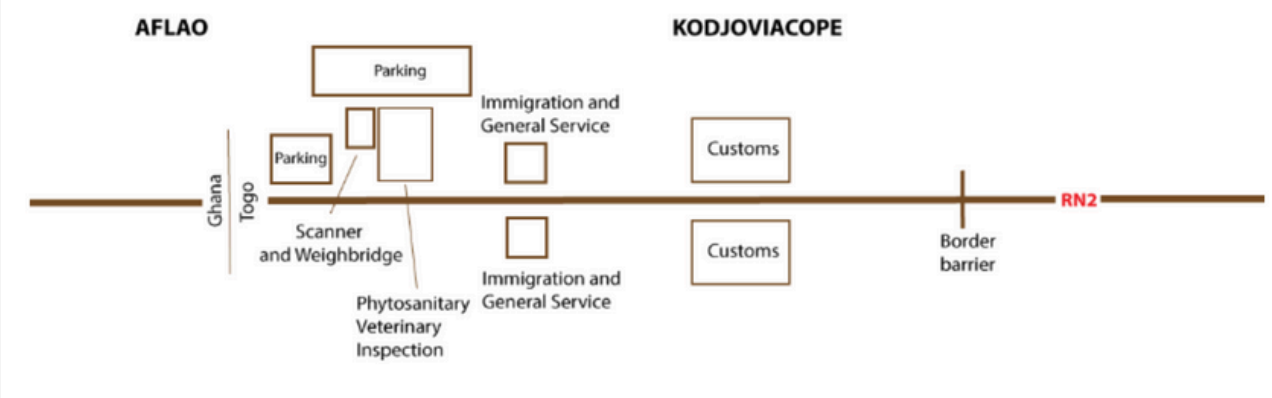
Figure 4: Satellite image of the border crossing at the Ghana-Togo border (IOM, 2022, p. 46)

The satellite image illustrates the dynamic nature of the border area, characterised by a tightly integrated environment where residential and government buildings, including customs facilities, are closely interwoven with the surrounding community within a compact 500-metre stretch of roadway (Bewiadzi, 2024; IOM, 2022). This close integration underscores the challenge of border protection, as the border area is intricately intertwined with its environment.

Generally good infrastructure conditions were observed on the Ghanaian side of the Aflao border, with satisfactory drainage and stable, reliable internet connectivity (IOM, 2022). However, there is a shortage of commercial parking facilities, with only three designated stations available for commercial vehicles located about 500 metres from the border (GRA, 2024). On the Togolese side, deficiencies were noted in drainage, internet connectivity, road conditions, parking areas, and facilities (IOM, 2022).

While specific data on water conservation efforts were not found, there are ongoing concerns about severe water quality degradation due to illegal gold mining activities (TAGG, 2024).

Figure 5: Simplified map of the Ghana-Togo border (IOM, 2022, p. 48)



Storage facilities at the border, especially for perishable goods, are a major concern for traders due to the increased risk of spoilage and economic losses (TAGG, 2024). Despite some satisfaction with existing storage facilities, there is a confirmed lack of proper storage infrastructure (WACTAF, 2024). Initiatives for improved storage exist elsewhere in Ghana, but the Aflao border remains neglected, necessitating rapid product movement due to inadequate storage conditions (ibid.; Bewiadzi, 2024). The absence of dedicated storage for perishables is evident, as trucks are directed to parking lots instead of designated areas with controlled environments. This situation limits traders' choices and may force them to settle for suboptimal conditions at Aflao (IOM, 2022; Bewiadzi, 2024).

4.4 Waste Management at Aflao Border

At the core of cross-border trade analysis in Ghana lies a regulatory framework for waste management that, while theoretically in place, lacks proper enforcement. This regulatory gap creates an environment ripe for illicit activities to thrive, buoyed by strong economic incentives driven by profit and demand for waste disposal services (ISS Africa, 2024). The transnational nature of the trade involves a complex web of actors across borders, from waste producers to brokers and final receivers. However, beneath the surface of economic opportunity lurk significant environmental and health hazards, underscoring the urgency of effective intervention. Governance challenges, including corruption and weak oversight, further exacerbate the issue (Soudachanh, Campitelli, & Salhofer, 2024).

The findings regarding waste generated at the Aflao border underscore the pressing issue of inadequate waste management practices in Ghana, where nationally, only 20% of the generated waste is collected. The remaining 80% is burned openly, dumped in open fields indiscriminately or buried (Soudachanh, Campitelli, & Salhofer, 2024). The presence of non-segregated waste bins containing various types of waste, including plastics, paper, electronic, and organic waste, reflects a systemic failure in waste disposal infrastructure and practices (GRA, 2024). This situation not only poses immediate environmental risks at the border but also exacerbates broader challenges associated with waste management across the country. Inefficient waste collection and disposal systems, coupled with insufficient enforcement of regulations, contribute to the proliferation of unmanaged waste in the border area. The lack of proper waste segregation exacerbates environmental degradation and health hazards, as different types of waste may contaminate soil, water sources, and air quality.

Furthermore, addressing waste management challenges at the Aflao border requires a multi-stakeholder approach involving government agencies, local authorities, private sector entities, and community participation. Collaborative efforts to improve waste collection infrastructure, implementing waste segregation programs, and strengthening enforcement of waste management regulations are crucial for promoting sustainable development and protecting the environment in border areas and throughout Ghana (GRA, 2024).

Table 9: Current situation of Waste Management practices at Aflao border

Category	Key Findings
Regulatory Framework	• Theoretically in place but lacks proper enforcement • Creates an environment ripe for illicit activities
Transnational Nature	• Involves a complex web of actors across borders, including waste producers, brokers, and final receivers • Significant economic opportunities are present
Environmental and Health Hazards	• Significant environmental and health risks associated with improper waste management • Contamination of soil, water sources, and air quality due to unmanaged waste • Nationwide, only 20% of generated waste is collected; the remaining 80% is either burned openly, dumped in open fields, or buried
Governance Challenges	• Issues with corruption and weak oversight exacerbate waste management problems • Inefficient enforcement of existing regulations • Interviews highlight the presence of non-segregated waste bins containing plastics, paper, electronic, and organic waste
Systemic Failures	• Reflects a systemic failure in waste disposal infrastructure and practices • Nationwide waste collection and disposal practices are highly inefficient
Required Interventions	• Multi-stakeholder approach is necessary • Involvement of government agencies, local authorities, private sector entities, and community participation
Proposed Solutions	• Improve waste collection infrastructure • Strengthen enforcement of waste management regulations • Collaborative efforts for sustainable development and environmental protection

4.5 Resources Consumption at Aflao Border

Environmental externalities of cross-border trade include increased resource consumption in cross-border procedures. Paper use is closely tied to the documentation procedure, which can be improved by streamlining clearance procedure and facilitating documentation check. Electricity generation is necessary in the ongoing digitalisation process of the customs system. Therefore, in the context of the Aflao-Lomé border, the main resource consumption types considered by the research are paper use and electricity consumption. In addition to direct use of resources in cross-border trade procedure, the efficiency of cross-border trade also indirectly affects the quality of traded goods, especially perishable goods, and resources usage during border waiting time.

Table 10: Cargo control process at the Aflao border post (IOM, 2022, p. 48)

Step	Location	Activities
1	Customs Office	Movement sheets are issued to the exporter based on the number of checkpoints between the entry and exit points. Each checkpoint receives a movement sheet to confirm the passage of the goods
2	Customs Office	Entries of all movement sheets are recorded in the ICUMS system for easy tracking and confirmation
3	Exit Point	At the exit point, a gate-out entry is recorded in the ICUMS system to close the transaction

4.5.1 Paper Use in Clearance Procedure

Table 10 above presents the goods and clearance process for the Aflao border post (2022). At the Aflao Border post, an internal arrangement between customs officials and traders allows for goods in transit to be brought into the Point of Entry (PoE) for reloading from Togo, as this is more cost-effective.

To pass the Aflao Border from the Ghanaian side includes the following five steps:

i. Submission of declaration document:
Importers and exporters are encouraged to submit declarations and required documents either through the online Integrated Customs Management System (ICUMS) prior to the arrival of goods at the border ports or submit it on-site at the time the goods arrive at the border. According to the customs officer, submitting documents online generates a single bill of entry, which is the sole document required at the border. However, delays often occur due to importers and exporters arriving without proper documentation. Required documents on Ghana side can include:

- Original waybill
- Attested invoice
- Packing list
- Import Declaration Form (IDF) from Ministry of Trade (for import)
- Bank of Ghana Exchange Control Form A2 (for traditional export goods)
- Taxpayer Identification Number (TIN) from GRA or GhanaCard PIN
- Required permit(s) from any of the regulatory agencies, dependent on the type of goods. i.e. Food and Drugs Authority (FDA), Ghana Standards Authority (GSA), etc.

ii. Payment of taxes and duties:
Once customs authorities classify, evaluate, and approve the goods declaration, they generate a tax bill for traders to pay taxes and duties at participating banks.

iii. Goods examination:
Ghana categorises import goods into three label groups, namely red (mandatory physical examination, yellow (digital scan), and green (released at the gate but scanned automatically on the way out of port). Importers can select examination officers through ICUMS once taxes and duties are paid. Tax bills are presented to the examination officer, scanning officer, or exit officer at the customs.

iv. Clearance and exit:
Goods that pass the physical examination or scanning go through security checks with a waybill at the exit. The goods are released when all the procedures above are completed. The clearance process at Aflao is fully automated, but there is no shared IT system interface between Ghana and Togo. This lack of interconnection means that different documents are required on the Togolese side

of the border.

Cross-border clearance procedures at the Aflao Border can be completed efficiently within 8 to 10 minutes if all documents are correctly prepared (TAGG, 2024; GTC, 2024; Logistics Limited 2024). However, several obstacles can impede this efficiency, resulting in clearance times ranging from 2 to 8 hours.

1. ***Incomplete Documentation:*** Insufficient paperwork can delay clearance by up to 2 days (Logistics Limited, 2024).
2. ***Queuing Time:*** Limited customs capacity often causes trucks to wait in line upon arrival at customs, delaying clearance procedures (Bewiadzi, 2024).
3. ***Volume of Goods:*** Large quantities of goods can significantly extend clearance times, with traders of 5–6 trucks potentially requiring 2–3 days to complete procedures (GRA, 2024; TAGG, 2024).
4. ***Corruption:*** Corruption significantly contributes to clearance delays, with allegations including exploiting tax claims for additional fees at border crossings.

An average of 10 documents are necessary for one product to clear the border, with efforts made to consolidate paperwork for multiple products in a single transaction to minimise redundancy (Logistics Limited, 2024).

The ongoing reliance on paper documentation is attributed to slow digitalisation and the presence of separate IT systems between Ghana and Togo (TAGG, 2024). There is scepticism that this reliance on paper will diminish in the near future, despite efforts to reduce paper usage through digitising work processes and implementing waste reduction and separation practices (GTC, 2024).

ECOWAS governments are prioritising the digitisation of customs clearance processes. Ghana is implementing ICUMS for online cross-trade filing, while Togo utilises the Automated System for Customs Data (ASYCUDA) system. Emphasis is placed on government incentives to drive digitalisation progress, particularly to prevent revenue leakage due to corruption.

Challenges in promoting digital trade platforms include:

1. ***Operational Resistance:*** Some officials oppose digitalisation due to conflicting interests, hindering progress (TAGG, 2024; GRA, 2024).
2. ***Transition Period Challenges:*** Customs may still prefer paper versions over digital files during the transition period, complicating the adoption of digital platforms (Logistics Limited, 2024).
3. *Technology Constraints:* Some traders face barriers in accessing digital platforms due to technological limitations (WACTAF, 2024).
4. ***Disconnected Systems:*** Disconnected digital systems may require traders to file

documents twice, impacting the efficiency of cross-border procedures (IOM, 2022; GIZ Ghana, 2024).

4.5.2 Electricity Consumption

Government investment has supported electricity facilities along the border. The Electricity Company of Ghana (ECG) has invested over two million cedis to improve electricity supply in seven communities along the Ghana-Togo Border at Aflao (Daily Guide Network, 2020). Ghana is part of the West African Grid System (WAGS), interconnected with the Communauté Electrique du Bénin (CEB) of Togo and Benin (GRIDCo, 2022). The Aflao Border is connected to this grid system, ensuring reliable electricity supply to the border area (Bewiadzi, 2024).

Further investigation into electricity consumption at the border is warranted for deeper analysis. Possible approaches include analysing lighting facilities, freezing storage facilities, and the usage habits of electronic devices by users. However, due to limitations in the experience of interviewees, relevant information is absent from the research data. Therefore, this research serves as a background for future research to build on.

4.6 Green Cover and Biodiversity at Aflao Border

The unique landscape of the Aflao border, situated between the sea and the city, presents a delicate ecosystem that is particularly vulnerable to environmental degradation and biodiversity loss. As highlighted by findings from interviews (GRA, 2024; WACTAF, 2024), the rampant dumping of waste in this area poses a significant threat to the region's flora and fauna. The indiscriminate disposal of waste interferes with the natural habitats of various plant and animal species, disrupting their ecosystems and contributing to biodiversity loss.

One of the immediate consequences of waste dumping is the alteration of soil composition and nutrient levels, which can negatively impact the growth and survival of native plant species. Additionally, it was repeatedly mentioned in various interviews (GRA, 2024; WACTAF, 2024; Logistics Limited, 2024) that plastic waste, in particular, can persist in the environment for decades, releasing harmful chemicals and physically obstructing the growth of vegetation. This disruption of plant communities not only diminishes the aesthetic appeal of the landscape but also reduces habitat availability for wildlife, leading to declines in biodiversity. Furthermore, the presence of waste attracts scavenging animals, such as rodents and birds, which enter storage areas and compromise the integrity of stored products (GRA, 2024). This results in significant losses for businesses operating at the border, impacting local economies and livelihoods. The need for greater security measures to mitigate these losses further underscores the complex interplay between environmental degradation, economic activity, and biodiversity conservation.

Addressing biodiversity loss at the Aflao border requires a holistic approach that considers both local and global drivers of environmental degradation. Efforts to improve waste management practices, enforce regulations against illegal dumping, and promote sustainable land use practices are essential steps toward safeguarding the region's unique biodiversity and ecological integrity. Additionally, promoting community engagement and awareness-raising initiatives can foster a sense of stewardship and collective responsibility for protecting the natural heritage of the Aflao border and its surrounding ecosystems. Organising environmental education workshops and skill development sessions can empower locals with knowledge on

sustainable practices and conservation. Regular clean-up drives, involving schools and community groups, can help combat pollution and deforestation. Public awareness campaigns through local media and educational materials can highlight the importance of the region's ecosystems. Developing ecotourism with guided nature tours and cultural festivals can generate economic benefits while promoting environmental stewardship.

5 Policy Recommendations

5.1. Introduction

The existing environmental policies governing cross-border trade in West Africa have come under scrutiny for their limited government initiatives and enforcement, as noted by various stakeholders (WACTAF, 2024; TAGG, 2024; Logistics Limited, 2024). Despite the presence of Multilateral Environmental Agreements (MEAs), the inconsistent application of these policies across the region presents significant challenges (GIZ Ghana, 2024). Stakeholder discussions have highlighted a consensus on the insufficient cooperation between government ministries and the private sector, often attributed to administrative divisions below the regional level (TAGG, 2024). Recognising the pivotal role of government action in promoting sustainable trade practices, stakeholders stress the necessity for incentives and directives to foster sustainability (GRA, 2024). Involving private organisations in advocacy efforts and collaborative initiatives alongside entities such as the ITC is considered crucial for promoting sustainable trade practices (TAGG, 2024; Logistics Limited, 2024). However, stakeholders also observe that sustainability initiatives often lack prioritisation unless mandated by the government (Logistics Limited, 2024).

Building on these observations, the following policy recommendations aim to address the identified challenges and promote sustainable cross-border trade practices. The recommendations are organised from the most feasible to implement to those that require more substantial effort and resources.

5.2. General Recommendations

i. Facilitate Stakeholder Engagement and Collaboration: Implement accessible channels for public feedback, such as online contact forms, on-site complaint mailboxes, and telephone hotlines within customs operations at the Aflao-Lomé border. These measures are crucial to ensure that the local community and traders can easily voice their concerns and suggestions regarding environmental policies. Additionally, conduct regular stakeholder consultation sessions to gather insights from diverse community groups, ensuring their perspectives are considered in decision-making processes. These initiatives are essential for enhancing transparency and fostering collaboration among stakeholders, ultimately contributing to the effective implementation of environmental policies at the border.

ii. Implement Incentive Program for Sustainable Trade and Public Engagement: Implement a dual incentive program aimed at promoting sustainable practices both among traders and the public.

For traders, introduce initiatives like the "Trader of the Month" awards to recognise businesses adhering to sustainability standards, coupled with streamlined clearance processes for trucks transporting goods meeting these criteria, enhancing compliance efficiency. Simultaneously, engage the public by offering incentives such as discounts or rewards for adopting eco-friendly products and participating in recycling efforts. Additionally, establish community-based programs to reward neighbourhoods supporting local sustainability projects, fostering collective engagement and environmental stewardship. These efforts aim to create a cohesive approach where both traders and the public are motivated and rewarded for contributing to sustainable trade practices and environmental conservation.

iii. Adopt Appropriate Narrative in Sustainable Trade Advocacy: Adopt appropriate narratives in sustainable trade advocacy by focusing on practical, relatable arguments for traders, customs officers, and nearby communities. Alongside macro-level themes like the SDGs, highlight the economic benefits, compliance requirements, and public health advantages of sustainable trade practices to motivate individual actors to support environmental initiatives.

iv. Capacity Building on Sustainable Trade Practices: Train customs officials to understand sustainable trade practices and associated environmental risks, as well as practices to align with environmental regulations. Develop handbooks outlining sustainable considerations for customs officials, possibly through collaboration with organisations like the ITC.

v. Enhance Cross-Border Cooperation: Facilitate regular joint meetings and workshops between customs officials from Ghana and Togo to harmonise procedures and enhance cooperation in enforcing environmental policies across the border.

vi. Government Briefing on Sustainable Practices: Brief the government on the importance of sustainable practices in cross-border activities, especially in the border environment, to raise awareness and foster development of joint programs. This ensures that governmental bodies are informed about the environmental impacts and benefits of sustainable trade practices, leading to coordinated efforts and collaborative projects.

vii. Reduce Corruption: Build inspection systems by establishing both independent inspection agencies and internal audit groups. Improve incentive mechanisms for customs officials such as increasing salary, taking anti-corruption as an accelerator for promotion.

viii. Improve Funding Mechanism: Increase government budget on environmental practices in trade. Mobilise private sector investment through flexible corporations such as private-public partnership, turning

environmental concerns into profitable opportunities and at the same time ease the burden for public funding.

5.3 Specific Recommendations

Recommendations for Infrastructure & Green Buildings

i. Retrofitting Existing Infrastructure: Carefully evaluate the necessity of constructing new infrastructure, prioritising the retrofitting of existing border facilities as the primary approach. This includes comprehensive building assessments to identify improvement areas, upgrading energy and water systems to minimise consumption, and maximising natural daylight use based on space function. Specific retrofitting measures should include installing solar shading devices on windows to reduce energy demands and applying cool green roofs to manage water run-off and enhance thermal insulation. Continuous evaluation throughout the retrofitting process is crucial to ensure ongoing effectiveness and sustainability.

ii. Financial and Regulatory Incentives: Advocate at the governmental level for the provision of financial and regulatory incentives, such as tax breaks, subsidies, and grants, to support green infrastructure projects. Push for the implementation of expedited permitting processes and bonus density allowances specifically tailored for green buildings. These efforts are crucial to incentivise sustainable development and enhance environmental practices in border infrastructure projects.

Recommendations for Waste Management

i. Comprehensive Waste Management Policies: Develop and implement comprehensive waste management policies at borders, focusing on waste prevention, reduction, recycling, and reuse.

ii. Invest in Waste Management Infrastructure: Invest in proper waste collection, sorting, treatment, and disposal facilities. Comply with regulations to enforce waste management policies.

iii. Transition Towards Circular Economy: Encourage practices that minimise waste generation, extend product life cycles, and promote resource efficiency. Implement e-waste recycling programs and organic waste composting facilities, such as using compostable waste at the border to generate biomass energy.

iv. Consider Public Health Impact: Integrate a public health perspective into waste management policies, ensuring considerations

like the distance between disposal sites and residential areas are carefully calculated to minimise health risks. This involves implementing measures that prioritise community well-being by strategically locating waste facilities to mitigate potential environmental and health impacts on nearby populations. Additionally, raise public awareness about waste management practices by highlighting how effective waste disposal and recycling contribute to reducing environmental pollution and promoting better public health outcomes. Through education and advocacy, emphasise the interconnectedness between waste management practices and community health, fostering greater community engagement and support for sustainable waste solutions.

Recommendations for Resources

i. Establish Technology Assistance Desks to Promote Digitalisation: Promote the digitalisation of cross-border documentation to save paper. Build technology assistance desks to link traders and customs, providing instructions and exchange information between the two groups, lowering technology and language barriers.

ii. Interconnect Digital System: Establish a bilateral agreement between Ghana and Togo to promote the dual acknowledgement of customs documents, thereby reducing delays and administrative burdens. This would streamline customs procedures and reduce waiting times for cross-border traders.

iii. Streamline Border Control: Assess the efficient rate of control to make sure cross-border goods can be checked while release time can be shortened. Streamline tagging of goods under different classification to reduce the goods waste due to long release time

Recommendations for Green Cover and Biodiversity

i. Address Economic Drivers of Deforestation: Implement trade restrictions or tariffs on products sourced from deforested areas, incentivise sustainable sourcing practices, and promote certification schemes that verify products' sustainability credentials.

ii. Incorporate Sustainability Criteria in Trade Agreements: Incorporate sustainability criteria into bilateral and multilateral trade agreements. This entails negotiating clauses mandating adherence to sustainable forestry practices and biodiversity conservation.

6 Conclusion

In conclusion, this comprehensive evaluation of cross-border trade sustainability at the Aflao border between Ghana and Togo underscores the need for reform and integration of sustainability measures within trade facilitation processes. The project has highlighted various environmental externalities generated at the border, including waste management challenges, biodiversity loss, and resource inefficiencies, all of which demand immediate attention to mitigate their adverse impacts.

Through the case study and stakeholder interviews, it is evident that while there are ongoing efforts to digitise customs procedures and promote sustainability initiatives, significant challenges remain. These challenges include corruption, inadequate waste management infrastructure, and a lack of coordination between government agencies and stakeholders.

Policy recommendations have been outlined to address these challenges comprehensively. These recommendations span across infrastructure and green building practices, waste management policies, resource efficiency measures, and biodiversity conservation strategies. Key among these recommendations are the promotion of digitalisation to reduce paper usage, and the implementation of measures to address the economic drivers of biodiversity loss. Additionally, the developed framework can also serve as a springboard for further interventions and research endeavours in evaluating the environmental impacts within border ecosystems.

Furthermore, the engagement of both the private and public sectors is crucial in driving sustainable trade practices. While some organisations are actively involved in advocacy and initiatives for sustainability, there is a need for greater collaboration and coordination between stakeholders and government agencies to achieve meaningful progress.

Overall, by implementing the policy recommendations outlined in this report, stakeholders can work towards enhancing the environmental sustainability of cross-border trade at the Aflao border and contribute to the broader goal of achieving sustainable development outlined in the UN Sustainable Development Goals.

The research for this report was primarily based on desk research and supplemented by interviews with select private sector stakeholders and one public sector stakeholder. Future research could explore these aspects in greater depth on-site at the Aflao border. Additionally, while this study focuses on the Ghanaian side of the Aflao border, a parallel study on the Togolese side would provide a more comprehensive understanding of the environmental externalities at the Aflao-Lomé border.

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8 Annex

Annex 1: Extended Analytical Framework

Concept	Variables	Sub-points	Indicators
Environmental externalities	Pollution	Air pollution	Visual Inspection
			Wildlife Behaviour
			Odour and Smell
			Community Reports
			Government Environmental Agencies
			Air Quality Index (AQI)
			Community Surveys
		Water pollution	Water quality index
			Odour and Smell
			Observing Fish and Wildlife
			Use Simple Testing Kits
			Community Reports

			Government Water Quality Reports
		Soil contamination	Visual inspection
			Plant health
			Community reports
			Land use history
			Consulting local authorities
	GHG emission	Carbon pricing	Tarif adjustment such as CBAM
			Emission reporting and reduction plans
			Carbon footprint analysis
	Resources	Energy consumption	Electricity consumption at the site
			Industrial Energy Efficiency
		Renewable energy	Solar Energy

			Biomass
			Hydropower
		Conservation of resources	Water conservation
			Fuel conservation
			Air quality
			Soil conservation
	Ecosystem	Biodiversity & habitat loss	Species observation
			Habitat alterations
			Land use changes
			Conservation efforts and policies --> look at satellite images
		Deforestation	Vegetation indices
			Forest inventories
			Change detection
			Ask forest monitoring agencies
			Local reporting
			Conservation efforts and policies --> look at satellite images
		Soil degradation	Erosion
			Sedimentation

			Vegetation changes
			Land use practices
			Conservation efforts and practices
	Green cover, and Biodiversity	Biodiversity	Species
			Ecosystems
		Green cover	Vegetation indices
	Waste management	Waste collection	Regular cleaning
			Waste segregation
			Waste reduction strategies
		Waste disposal/processing	Disposal facilities available and operational
			Safety of collection worker
	Public Health	Maintaining a Safe Workplace	Protecting workers from chemical substances exposure, inhalable dusts, asbestos, lead and welding fume
			Protection from biological agents such as bacteria, virus, fungi and other micro-organisms or parts of them and their associated toxin

		Protecting workers from ergonomics risk factors	elements of the working system including tasks, mental workload, equipment, workspace and environment, and aims to prevent work related musculoskeletal disorders (WMSD) and other problems
		Psychosocial risk factors	awareness of work-related stress and providing resources to deal with it (Existing norms should be broadened to include violence, bullying and harassment, and occupational stress)
			technical support for psychosocial risk factors
			Ensuring hygiene standards (such as good housekeeping and careful design of premises, sufficient air and light, safe drinking water, facilities to rest, wash, change and dry clothes, protection from noise and vibration and first aid provision)

		General norms	regulating working time, working hours per day and week, rest time, vacation, part-time work and night work. I
			Regulate safety and health in specific sector
Green trade workflow: from macro framework to operational level	Sustainable supply chain	Eco Friendly transportation	Emission of trade transportation
			Energy consumption in trade transportation
		Eco Friendly production & packaging	Raw material consumption
			End-of-life package treatment
			Percentage of biodegradable material
		Circular economy	OECD environment indicators set
			EU circular economy indicators p11-12
	Custom management and cross-	Environmental management	KPIs and tools to manage environmental performance
			Training for customs officers
			Carbon emission footprint

	border activities		Sorting and labelling scheme to facilitate trade of eco-friendly goods
			Idling of trucks
			Operation of other border components
		Streamlining paperwork/digitalisation	Average paper usage in one cross-border trade
			Average daily paper waste in documentation process
			Application of digital documentation system
		Trade facilitation	OECD trade facilitation indicators
	Infrastructure	Green buildings	Sustainable material procurement, design, operation, and demolition
			Energy efficiency
			Energy Efficient Lighting
			Water conservation

			Indoor Environment Quality (IEQ)
			Accessibility
		Storage (specifically for perishable goods)	Safe temperature (in both transportation and storage)
			Appropriate flooring
			Cleaning and disinfection
			Pest control
			Movement of good in the shortest possible time (measure the time)
			Random examination of goods
			Training staff
Green trade workflow: from macro framework to operational level	Investment	Carbon offsetting projects	Government policies such as carbon pricing, emission reduction targets, and tax credits for carbon offset projects
			Market demand for carbon credits & carbon trading platforms
			Innovations in carbon capture and offset projects such as

			renewable energy technologies or reforestation techniques
			Investment funds specifically targeting carbon offset projects or green trade initiatives
			Engagement/involvement of private sector
	Policies and Standards	International agreements, protocols, and standards	Performance on Clean Development Mechanism (CDM): meeting emission reduction limitation targets
			Performance on Life Cycle Assessment (LCA): a process of quantifying impact across various stages of the service provided)
			National Determined Contribution (NDC)
			Treatment of Hazardous Wastes and their Disposal
			Partnerships (such as Green Custom Initiative)
		National policies and standards	National Climate Change Policy (NCCP)

			Carbon emission reductions from the forest and land use sectors
			Undertake annual compliance monitoring
			Monitoring of environmental indicators (air quality)
			Organise meetings/workshops for internal and external organisations to ensure implementation of Ghana's international obligations
			Use of environmentally friendly energy supply sources such as renewable energy
			Shift from oil to gas where gas is a feasible alternative
			E-waste management Fund
			Management and utilisation of renewable energy sources for production of heat and power in an efficient and environmentally sustainable manner

			Forestry and wildlife policy and the water policy (which promotes rational use of water resources)
			Forest Plantation Strategy, 2017-2040 (can it be implemented at borders?)
			Upholding standards and procedures (Eg. scheduled inspections, time in release procedure)

Annex 2: Planned Interviewees

Organisation	Contact Email	Organisation	Contact Email
The Ghana Standards Authority (GSA)	info@gra.gov.gh	Cocoa Processing Company	info@goldentreeghana.com
Ghana Ministry of Environment	info@mesti.gov.gh	West Africa Association for Cross-Border Trade, in Agro-forestry-pastoral, fisheries products and Food (WACTAF)	contact@aocta-wacta.org
Ghana Ministry of Trade	info@moti.gov.gh	Friends of Earth Ghana	web@foei.org
Ghana Shippers Authority (GSA)	info@shippers.org.gh	A Rocha Ghana	ghana@arocha.org
Ghana National Chamber of Commerce and Industry	gncc@ncs.com.gh	Adentan Waste to Wages (ADWAWA)	clgaghana@gmail.com
Association of Ghana Industries	agivolta@agighana.org	GIZ Ghana	giz-ghana@giz.de
Institute of Import & Export Management	global.travels@iiiem.in	Logistics Limited	servicedesk@ut-logistics.com
AFAGE Associations of Ghanaian Exporters	info@fageghana.com	Custom Brokers Association-Ghana	info@cubag.org
National Seed Trade Association	info@nastag.org	Samuel Bewiadzi	sbewiadzi@uhas.edu.gh

Traders Advocacy Group Ghana, TAGG	tradersadvocacygroup@gmail.com	IDH - The Sustainable Trade Initiative	kyei-Mensah@idhtrade.org or abambire@idhtrade.org
Global Trade Consult	info@globaltradeconsult.com.gh		

Annex 3: Interview Questionnaire

Public sector including border/customs officials, ministries of trade/environmental/health and others, Chamber of commerce and local mayors/ governing bodies

Private sector including Associations, Customs Brokers, NGOs, and transporters

Question	Private sector	Public sector	Question	Private sector	Public sector
1	X	X	2	X	X
3	X	X	4	X	X
5	X	X	6	X	X
7		X	8	X	X
9	X	X	10	X	X
11		X	12		X
13		X	14	X	
15	X	X	16		X
17		X	18	X	X
19	X	X	20	X	X
21	X		22		X
23	X		24	X	X
25	X	X	26	X	X
27	X		28	X	
29	X	X	30		X
31		X	32	X	X
33	X	X	34	X	
35	X	X	36		X
37	X	X	38	X	
39		X	40	X	X
41	X		42	X	X

General questions

1. How much trade is going through the Aflao border crossings? What type of products are going through the most?
2. How many consignments are going through every day on average?
3. Can you describe how much trade has increased and if the nature of trade has changed in the last five years? (taking aside COVID-19 disturbance)
4. What are the minimum and maximum temperature ranges at the Aflao border?
5. In your opinion, what is the proportion of trade that informally goes through this border?

	Less than 20%		Between 20% and 45%
	Between 45% and 55%		Between 55% and 80%
	More than 80%		I don't know.

6. On a scale from 1 to 10, to what extent do you think trade contributes to climate change and environmental degradation? Please tell us the factors that you see contributing the most.

	Air pollution		Soil pollution and land degradation
	Water pollution		Biodiversity loss
	Energy consumption		Paper waste generation
	Transport/logistic carbon footprint		Water waste generation
	Digital carbon footprint		Plastic waste generation
	I don't know.		Generation of other waste

7. Do you track the environmental impacts of cross-border trade?

	YES		NO
	I don't know.		

If YES, what are those factors and how are they tracked?

8. In general, is your organisation concerned about the harmful effects of cross-border trade on ecosystems?

	YES		NO
	I don't know.		

If YES, how do you plan to limit those effects?

Theme 1: green infrastructure, buildings and storages at the Aflao border

9. What and how are the facilities and amenities at the Aflao border?

	Parking for trucks		Toilets
	Parking for car		Bathrooms
	Dedicated lanes for women		Healthcare centre
	Street lights		Daycare centre
	Waste disposal		Storage centre
	Street pavement		Market
	Light fixtures		Security control room
	Custom office		Fire safety equipments and alarm
	Weighbridge for trucks		Insurance of the goods
	Safety kit/First AID		Water facility
	Safety training for staff		Internet facility
	Drainage system		Warehouse
	Goods physical checking point		Petrol station
	Duty free shop		Canteen
	Bus station		Post office
	Bank		Beach
	Boundary monument		Dormitory of customs officer

10. What kind of materials are used in the border infrastructure?

	Bamboo plywood		
	Metal siding		
	ICF framing		
	Foundational insulation		
	ACC		
	Concrete bricks		
	Sand lime bricks		

Eg., ACC, concrete bricks, sand lime bricks, wood, bamboo, etc.

- If answered with non-sustainable material: why sustainable materials like ACC, wood, bamboo, etc. are not used, are there any regulations that encourage/discourage this?"
- If answered with sustainable material: Are there any incentives to encourage using sustainable building materials like mould-resistant wood and bamboo in border construction projects?

11. To the best of your knowledge, what was the main factor in selecting the materials used in the border infrastructure? How much was the geographical environment considered?

12. Are the border offices and infrastructures fully independent in terms of energy? If yes, what kind of lighting is used-LED, CFLs, high-efficiency fluorescent lamps, etc.

[Energy-efficient lighting is designed to reduce electricity usage, lower energy bills, and decrease greenhouse gas emissions. Some examples are LED, CFLs, high-efficiency fluorescent lamps, etc.]

13. What kind of lighting fixtures are used at the site?

- If answered with energy efficient lighting: have energy bills decreased since the implementation of energy-efficient lighting? Have there been fewer lighting maintenance requirements or reduced lamp replacement costs with energy-efficient lighting?
- If answered with non-energy efficient lighting: Are there plans to transition border facilities to LED lighting or other energy-saving technologies? If not, what can be some incentives to transition to energy-efficient lighting?

14. Are there any refrigerated storage facilities available at the Aflao Border ?

	YES		NO
	I don't know.		

If YES, what technologies, systems or good practices are used?

15. Are there any standards for the temperature when transporting perishable goods across borders?

	YES		NO
	I don't know.		

If YES, how are they enforced?

16. Are there any established protocols for cleaning or disinfecting border facilities and amenities to minimise the risk of contamination, pollutants, and waste?

	YES		NO
	I don't know.		

If YES, who is responsible, how frequently does the cleaning take place and can you explain the process?

Theme 2 : green clearance procedures

Environmental regulation sets rules to protect nature, health, and fix damaged environments.

17. What are the environmental regulations that apply to goods crossing the border? How effectively are these regulations enforced?
18. Is there a standardised protocol in place for random checking of perishable goods to ensure compliance with regulatory requirements and quality standards? (random checking, temperature control, fast processing of goods, etc.) What agencies are conducting controls at the Aflao borders on both sides? Please make a detailed list.
19. How many of those controls are conducted jointly?
20. In your experience, how long does the clearance process take, considering the time between the moment an operator arrives at the border and the moment he is free on the other side of the border?

	Less than 10 minutes		Between 10 minutes and 2 hours
	Between 2 hours and 8 hours		Between 8 hours and 16 hours
	Between 16 hours and 1 day		Between 1 day and 3 days
	Between 3 days and 6 days		More than 6 days

21. What do operators do in the meantime?
22. Are there any efforts and what measures are used to reduce this processing time?
23. In your opinion, in what specific way does border controls contribute to environmental degradation?

Theme 3 : waste management

24. What are the major sources of waste at the Aflao border?
25. What are the different sources of waste at the Aflao border? And who or what generates those wastes?
26. Are there any mechanisms to organise the disposal of waste ? Are different types of waste categorised? (Eg. waste, recyclables, organic waste, hazardous waste, and construction or demolition waste)

	YES		NO
	I don't know.		

If YES, what are some challenges or successes you have encountered?

27. Are there designated landfill sites within or in the vicinity of the Aflao border?

	YES		NO
	I don't know.		

28. Are there any waste recovery and recycling facilities near the border?

	YES		NO
	I don't know.		

If YES, how does the waste from the site get transported there?

29. Are there any regulations/bye-laws on sanitation?

	YES		NO
	I don't know.		

If YES, who is responsible, and how are they implemented?

Theme 4: ecosystem and resources

30. How many documents, copies of documents and number of paper sheets are required to be submitted to customs for one specific product? Please make a detailed list.
    If the respondent can't make a list immediately, we can also provide reference as follows and ask for specific practices in Aflao-Lome border:
    According to Ghana customs website, documents can include:
    - Original waybill or Bill of Lading
    - Attested invoice
    - Packing list
    - Import Declaration Form (IDF) from Ministry of Trade (for import)
    - Bank of Ghana Exchange Control Form A2 (for traditional export goods)
    - Taxpayer Identification Number (TIN) from GRA or GhanaCard PIN
    - Required permit(s) from any of the regulatory agencies, dependent on the type of goods.
31. How many of those documents can be obtained electronically? And are they recognised on both sides of the border?
32. In your opinion, what are the challenges to reducing paper documents in cross-border trade? What beneficial effects, advantages, concerns, or drawbacks can digital customs and other administrations bring?
33. What other activities and circumstances can generate waste, electricity, and water consumption?
34. What's the influence of cross-border trade and transportation on the nearby environment, and have there been known events of pollution ?

Theme 5: towards green actions

35. To what extent the awareness of sustainability issues and climate change has improved in your department/organisation/institution over the last 10 years?

	Not at all improved		Slightly improved
	Somewhat improved		Very much improved
	I don't know.		

36. Is your department/organisation/institution implementing any environmental policies or regulations in cross-border trade operations?

	YES		NO
	I don't know.		

    If YES, what are they?

37. Are there any ongoing projects in Ghana, and in particular in the Aflao area, to make trade and transport more sustainable?
38. What is the role of private stakeholders, customs brokers, and trucking companies in the green transition?
39. What do you think are the incentives and obstacles to make or implement those policies and regulations?
40. How could state agencies and the private sector work together to make trade more sustainable?
41. In what way are you advocating for sustainable trade in Ghana?

Final questions

42. Do you have any recommendations to reduce the impact of cross-border trade on the environment?